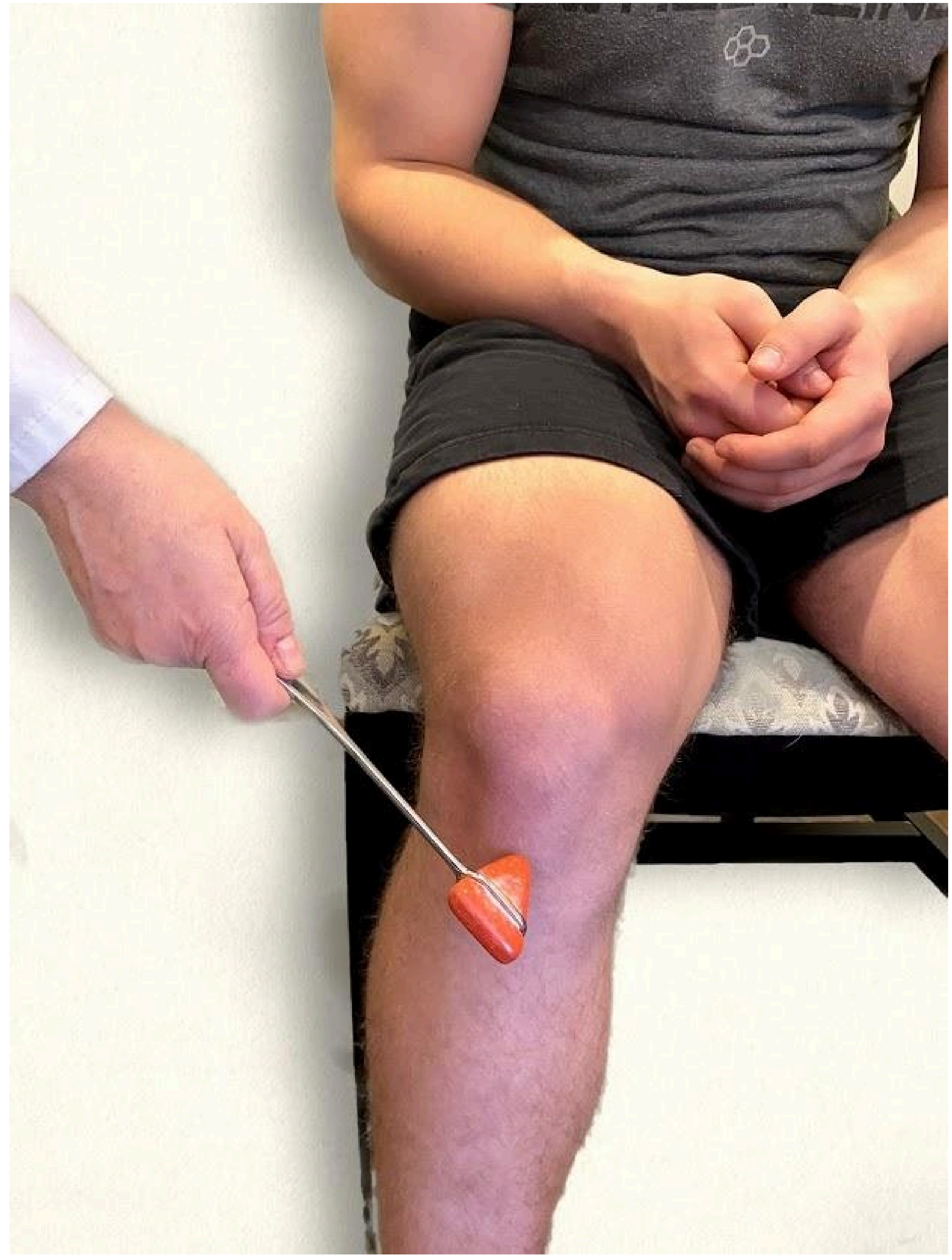


Figure 6.39 Patellar Reflex

Plantar Reflex

The plantar reflex, or “Babinski reflex” assesses lumbar spine L5 and sacral spine S1. Ask the patient to extend their lower leg, and then stabilize their foot in the air with your hand. Slide the object along the lateral surface of

the sole of the foot toward the toes. Many patients are ticklish and withdraw their foot, so it is sufficient to elicit the reflex by using your thumb to stroke lightly from the sole of the foot toward the toes. If there is no response, use a blunt object such as a key or pen. The expected reflex is flexion (i.e., bending) of the great toe. An abnormal response is toe extension (i.e., straightening), also known as the Babinski reflex. In a child younger than 2 years old, the big toe should bend up and backward toward the top of your foot while the other four toes fan out. This response is normal and doesn't indicate any problems or abnormalities. In a child older than 2 years old or in a mature adult, the Babinski sign should be absent. All five toes should flex, or curl downward, as if they're trying to grab something. If this test is conducted on a child older than 2 or an adult and the toes respond like those of a child under two years old, this can indicate an underlying neurological issue. See Figures 6.40 – 6.43[5,6,7,8] for images of assessing the plantar reflex.

5. "Neuro Exam Image 23.png" and "Neuro Exam Image 21.png" by Meredith Pomietlo for Chippewa Valley Technical College are licensed under CC BY 4.0
6. "Lawrence 1960 20.4.png" by Earl Lawrence House & Ben Pansky is in the Public Domain.
7. "BabinskiSign.jpg" by Medicus of Borg is in the Public Domain.
8. "Babinski-newborn.jpg" by Medicus of Borg is licensed under CC BY-SA 3.0

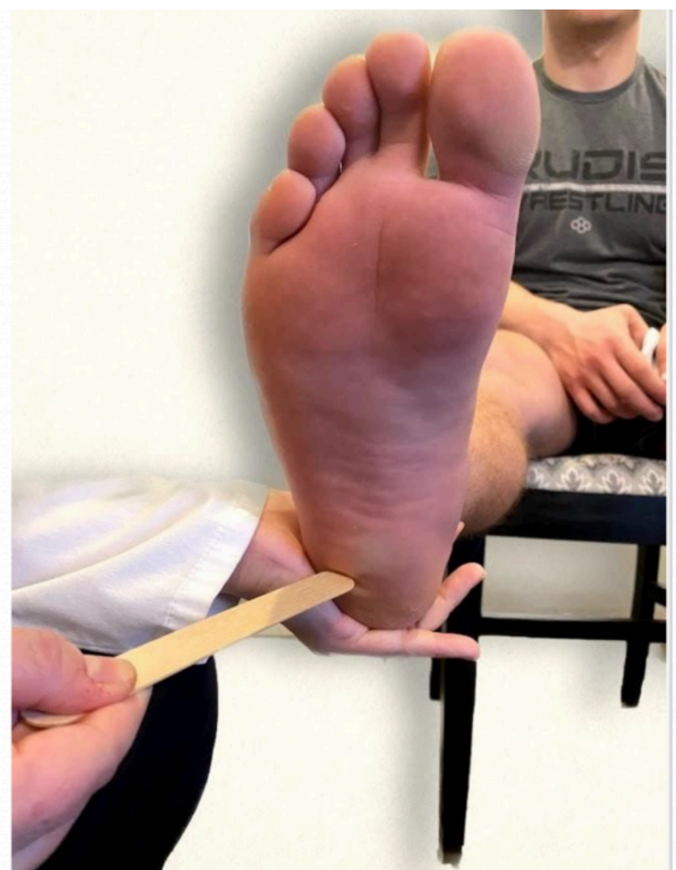
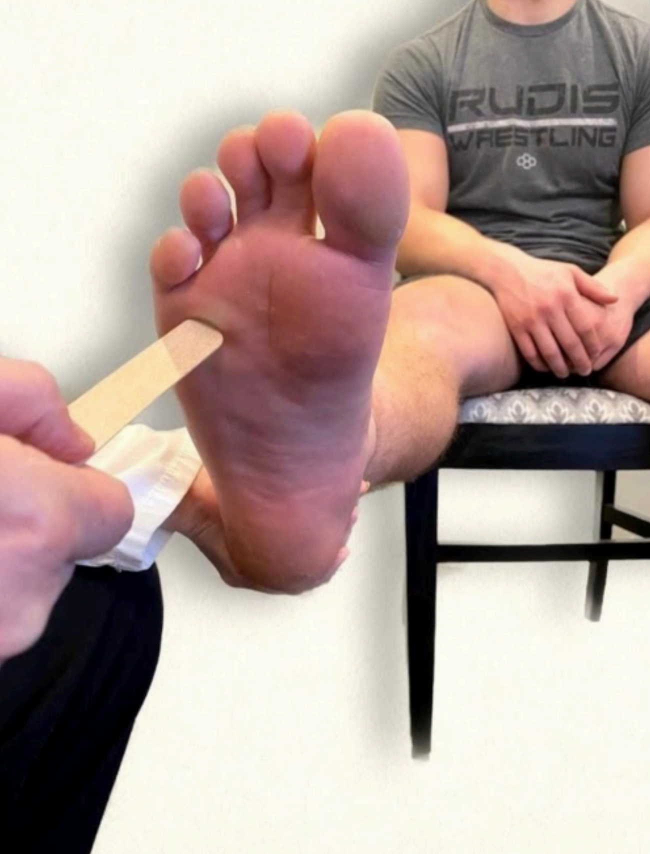
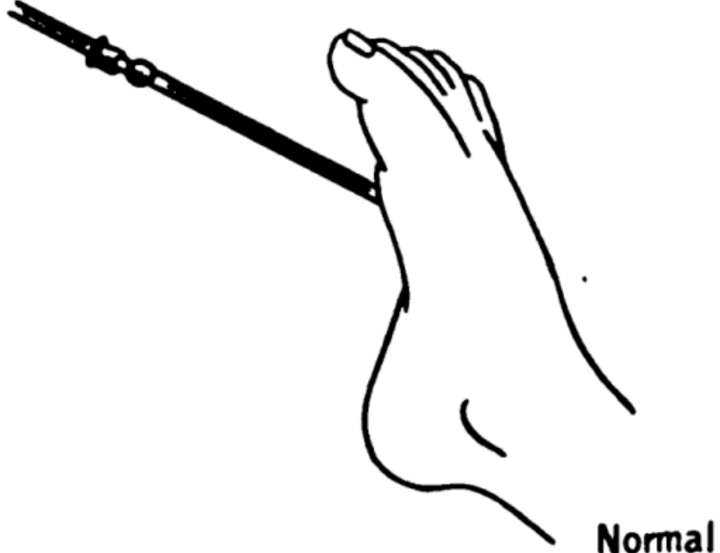



Figure 6.40 The Plantar Reflex



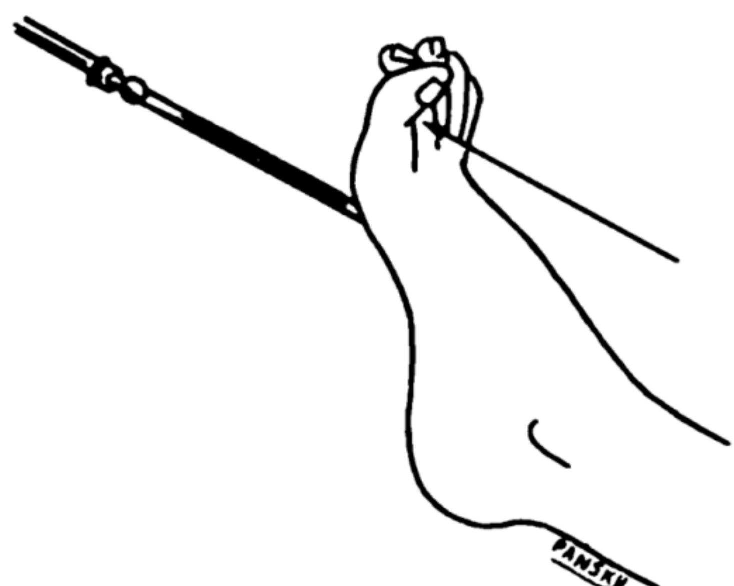


Figure 6.41 Plantar Reflex and Babinski Sign

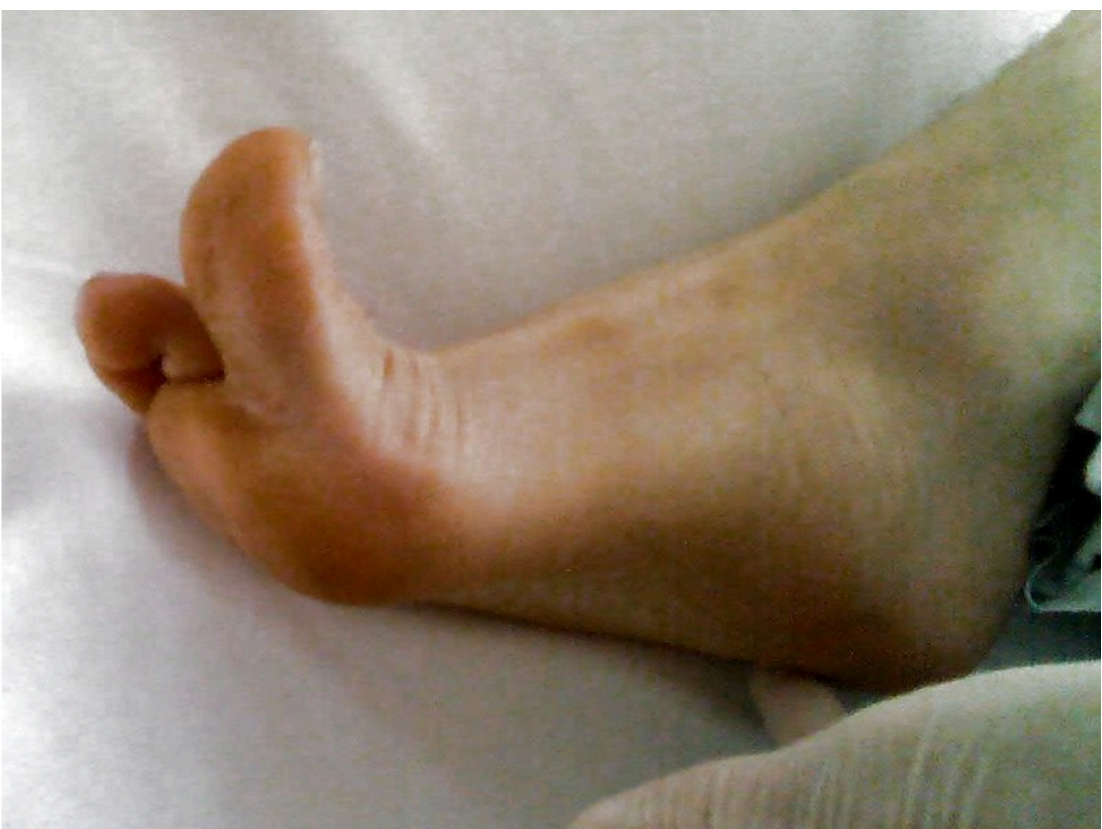


Figure 6.42 The Babinski Sign in an Adult

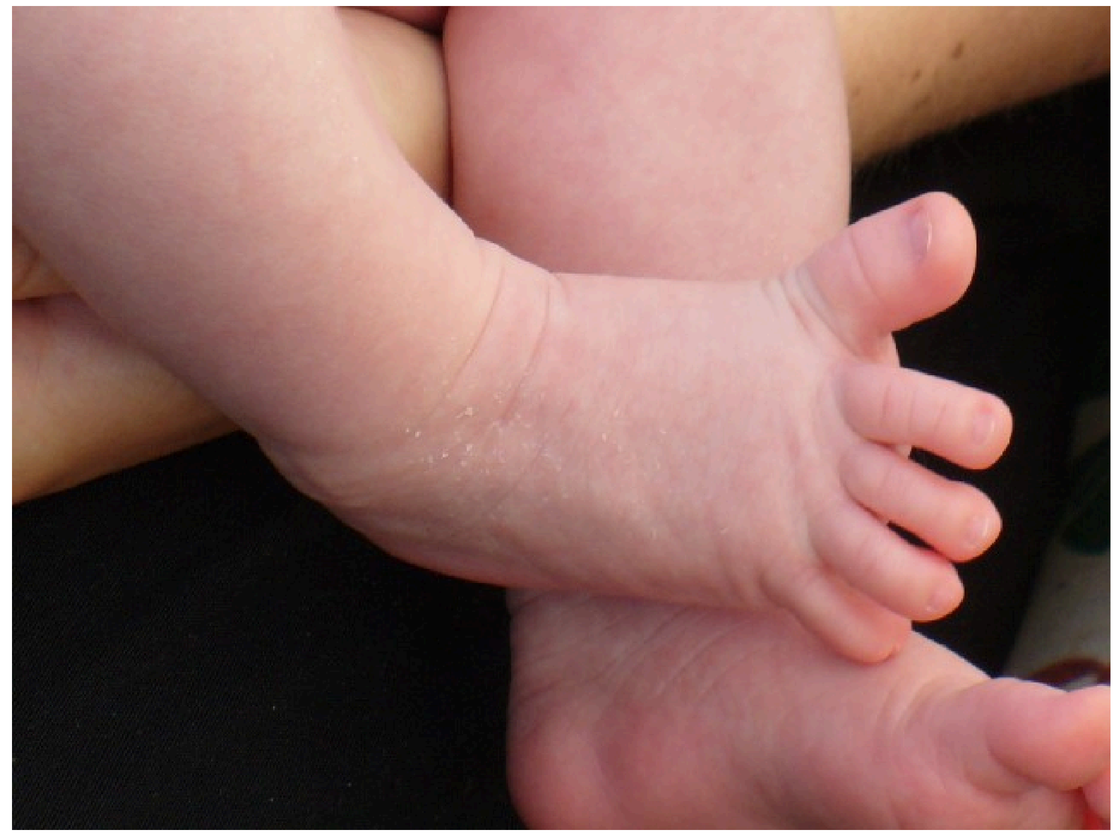


Figure 6.43 The Normal Babinski Reflex in a Newborn

Assessment of Deep Tendon Reflexes on YouTube[9]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1196#oembed-1

9. RegisteredNurseRN. (2016, April 1). *Deep tendon reflex examination for nursing head to toe assessment of neuro system* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/eqOpNQH09pA

Babinski-Plantar Reflex on YouTube[10]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1196#oembed-2

Newborn Reflexes

Newborn reflexes originate in the central nervous system and are exhibited by infants at birth but disappear as part of child development. Neurological disease or delayed development is indicated if these reflexes are not present at birth, do not spontaneously resolve, or reappear in adulthood. Common newborn reflexes include sucking, rooting, palmar grasp, plantar grasp, **Babinski**, Moro, and tonic neck reflexes.

Sucking Reflex

The sucking reflex is common to all mammals and is present at birth. It is linked with the rooting reflex and breastfeeding. It causes the child to instinctively suck anything that touches the roof of their mouth and simulates the way a child naturally eats. See Figure 6.44[11] for an image of the newborn sucking reflex.

10. RegisteredNurseRN. (2016, March 29). *Babinski reflex | Plantar reflex test | Nursing head to toe assessment* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/dcJgxuLtHdg
11. "BabySuckingFingers.jpg" by Florence Devouard (anthere) is licensed under CC BY-SA 3.0

Figure 6.44 Newborn Sucking Reflex

Rooting Reflex

The rooting reflex assists in the act of breastfeeding. A newborn infant will turn its head toward anything that strokes its cheek or mouth, searching for the object by moving its head in steadily decreasing arcs until the object is found. See Figure 6.45[12] for an image of a newborn exhibiting the rooting reflex.

12. "Rooting Reflex" by Ashley Arbuckle is licensed under CC BY 2.0

Figure 6.45 Newborn Rooting Reflex

Palmar and Plantar Grasps

When an object is placed in an infant's hand and the palm of the child is stroked, the fingers will close reflexively, referred to as the palmar grasp reflex. A similar reflexive action occurs if an object is placed on the plantar surface of an infant's foot, referred to as the plantar grasp reflex. See Figure 6.46[13] for an image of the palmar grasp reflex.

13. "baby-428395_960_720.jpg" by jarmoluk is licensed under CC0

Figure 6.46 Newborn Palmer Grasp Reflex

Moro Reflex

The Moro reflex is present at birth and is often stimulated by a loud noise. The Moro reflex occurs when the legs and head of the infant extend while the arms jerk up and out with the palms up. See Figure 6.47[14] for an image of an infant exhibiting the Moro reflex.

14. "Moro reflex.jpg" by tawamie is licensed under CC BY-SA 3.0

Figure 6.47 Newborn Moro Reflex

Tonic Neck Reflex

The asymmetrical tonic neck reflex, also known as the "fencing posture," occurs when the child's head is turned to the side. The arm on the same side as the head is turned will straighten and the opposite arm will bend. See Figure 6.48[15] for an image of the tonic neck reflex.

15. "Asymmetrical tonic neck reflex (ATNR) in a two-week-old female.jpg" by Samuel Finlayson is licensed under CC BY-SA 4.0

Figure 6.48 Tonic Neck

Walking-Stepping Reflex

Although infants cannot support their own weight, when the soles of their feet touch a surface, it appears as if they are attempting to walk by placing one foot in front of the other foot.

6.10 Neurological Assessment

Now that we have reviewed tests included in a neurological exam, let's review components of a routine neurological assessment typically performed by registered nurses. The neurological assessment begins by collecting subjective data followed by a physical examination.

Subjective Assessment

Subjective data collection guides the focus of the physical examination. Collect data from the patient using effective communication and pay particular attention to what the patient is reporting, including current symptoms and any history of neurological illness. Ask follow-up questions related to symptoms such as confusion, headache, vertigo, seizures, recent injury or fall, weakness, numbness, tingling, difficulty swallowing (called **dysphagia**) or speaking (called **dysphasia**), or lack of coordination of body movements.[1]

See Table 6.10a for sample interview questions to use during the subjective assessment

Table 6.10a Interview Questions Related to Subjective Assessment of Neurological System

1. This work is a derivative of Clinical Procedures for Safer Patient Care by British Columbia Institute of Technology licensed under CC BY 4.0

Interview Questions	Follow-up
Are you experiencing any current neurological concerns such as headache, dizziness, weakness, numbness, tingling, tremors, loss of balance, or decreased coordination? **Have you experienced any difficulty swallowing or speaking?** **Have you experienced any recent falls?**	If the patient is seeking care for an acute neurological problem, use the PQRSTU method to further evaluate their chief complaint. The PQRSTU method is described in the "Health History" chapter. Note: If critical findings of an acute neurological event are actively occurring, such as signs of a stroke, obtain emergency assistance according to agency policy.
Have you ever experienced a neurological condition such as a stroke, transient ischemic attack, seizure, or head injury?	Describe the condition(s), date(s), and treatment(s).
Are you currently taking any medications, herbs, or supplements for a neurological condition?	Please describe.

Life Span Considerations

NEWBORN

At birth, the neurologic system is not fully developed. The brain is still developing, and the newborn's anterior fontanelle doesn't close until approximately 18 months of age. The sensory and motor systems gradually develop in the first year of life. The newborn's sensory system responds to stimuli by crying or moving body parts. Initial motor activity is primitive in the form of newborn reflexes. Additional information about newborn reflexes is provided in the "Assessing Reflexes" section. As the newborn develops, so do the motor and sensory integration. Specific questions to ask parents or caregivers of infants include the following:

- Have you noticed your infant sleeping excessively or having difficulty arousing?

- Has your infant had difficulty feeding, sucking, or swallowing?

CHILDREN

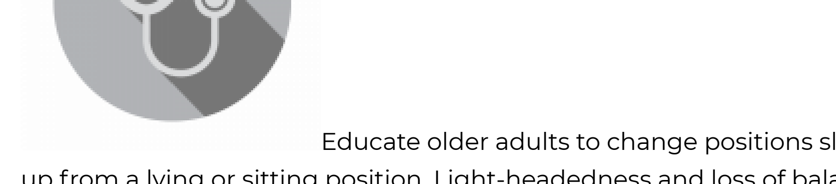
Depending on the child's age and developmental level, they may answer questions independently or the child's parent/guardian may provide information. Specific questions for children include the following:

- Have you ever had a head injury or a concussion?
- Do you experience headaches? If so, how often?
- Have you had a seizure or convulsion?
- Have you noticed if your child has any problems with walking or balance?
- Have you noticed if your child experiences episodes of not being aware of their environment?

OLDER ADULTS

The aging adult experiences a general slowing in nerve conduction, resulting in a slowed motor and sensory interaction. Fine coordination, balance, and reflex activity may be impaired. There may also be a gradual decrease in cerebral blood flow and oxygen use that can cause dizziness and loss of balance. Examples of specific subjective questions for the older adult include the following:

- Have you ever had a head injury or recent fall?
- Do you experience any shaking or tremors of your hands? If so, do they occur more with rest or activity?
- Have you had any weakness, numbness, or tingling in any of your extremities?
- Have you noticed a problem with balance or coordination?
- Do you ever feel lightheaded or dizzy? If so, does it occur with activity or change in position?

Educate older adults to change positions slowly, especially when standing up from a lying or sitting position. Light-headedness and loss of balance during these activities increase the risk for falls.

Objective Assessment

The physical examination of the neurological system includes assessment of both the central and peripheral nervous systems. A routine neurological exam usually starts by assessing the patient's mental status followed by evaluation of sensory function and motor function. Comprehensive neurological exams may further evaluate cranial nerve function and deep tendon reflexes. The nurse must be knowledgeable of what is normal or expected for the patient's age, development, and condition to analyze the meaning of the data that are being collected.

Inspection

Nurses begin assessing a patient's overall neurological status by observing their general appearance, posture, ability to walk, and personal hygiene in the first few minutes of nurse-patient interaction. For additional information about obtaining an overall impression of a patient's status while performing an assessment, see the "General Survey" chapter.

Level of orientation is assessed and other standardized tools to evaluate a patient's mental status may be used, such as the Glasgow Coma Scale (GCS), NIH Stroke Scale, or Mini-Mental State Exam (MMSE). Read more

information about these tools under the "Assessing Mental Status" section earlier in this chapter.

The nurse also assesses a patient's cerebellar function by observing their gait and balance. See the "Assessing Cerebellar Function" section earlier in chapter for more information.

Auscultation

Auscultation refers to the action of listening to sounds from the heart, lungs, or other organs with a stethoscope as a part of physical examination. Auscultation is not typically performed by registered nurses during a routine neurological assessment. However, advanced practice nurses and other health care providers may auscultate the carotid arteries for the presence of a swishing sound called a **bruit**. Bruits suggest interference with cerebral blood flow that can cause neurological deficits.

Palpation

Palpation during a physical examination typically refers to the use of touch to evaluate organs for size, location, or tenderness, but palpation during the neurologic physical exam involves using touch to assess sensory function and motor function. Refer to sections on "Assessing Sensory Function," "Assessing Motor Strength," "Assessing Cranial Nerves," and "Assessing Reflexes" earlier in this chapter for additional information on how to perform these tests.

See Table 6.10b for a summary of expected and unexpected findings when performing an adult neurological assessment.

Table 6.10b Expected Versus Unexpected Findings on Adult Neurological Assessment

Assessment	Expected Findings	Unexpected Findings (Document and notify provider if new finding*)

Inspection	Alert and oriented to person, place, and time Symmetrical facial expressions Clear and appropriate speech Ability to follow instructions PERRLA (Pupils are equal, round, and reactive to light and accommodation) Cranial nerves all intact Negative Romberg test Sensory function present Cortical functioning (indicated by stereognosis) intact Good balance Coordinated gait with equal arm swing Finger-to-nose, rapid alternating arm movements, and heel-to-shin performance intact Negative pronator drift test	Not alert and oriented to person, place, and/or time Asymmetrical facial expressions Garbled speech Inability to follow directions Pupils unequal in size or reactivity Deficits in one or more cranial nerve assessments Positive Romberg test Sensory function impaired in one or more areas Stereognosis not intact Poor balance Shuffled or asymmetrical gait with unequal arm swing Unable to complete finger-to-nose, alternating arm movement, or heel-to-shin tests Positive pronator drift test Unequal strength of upper and/or lower extremities One or more deep tendon reflexes are not reactive

	Motor strength in upper and lower extremities equal bilaterally Deep tendon reflexes intact	
Critical findings to report immediately and/or obtain emergency assistance:		Change in mental status, pupil responsiveness, facial drooping, slurred words or inability to speak, or sudden unilateral loss of motor strength

6.11 Sample Documentation

Sample Documentation of Expected Findings

Patient denies any new onset of symptoms of headaches, dizziness, visual disturbances, numbness, tingling, or weakness. Patient is alert and oriented to person, place, and time. Dress is appropriate, well-groomed, and proper hygiene. Patient is cooperative and appropriately follows instructions during the exam. Speech is clear and facial expressions are symmetrical. Glasgow scores at 15. Gait is coordinated and erect with good balance. PERRLA, pupil size 4mm. Sensation intact in all extremities to light touch. Cranial nerves intact x 12. No deficits demonstrated on Mini-Mental Status Exam. Upper and lower extremity strength and hand grasps are 5/5 (equal with full resistance bilaterally). Follows commands appropriately. Cerebellar function intact as demonstrated through alternating hand movements and finger-to-nose test. Negative Romberg and Pronator drift. Balance is stable during heel-to-toe test. Tolerated exam without difficulty.

Sample Documentation of Unexpected Findings

Patient is alert and oriented to person, place, and time. Speech is clear; affect and facial expressions are appropriate to situation. Patient cooperative with exam and exhibits pleasant and calm behavior. Dress is appropriate, well-groomed, and proper hygiene. Posture remains erect in wheelchair, with intermittent drift to left side. History of CVA with left-sided hemiplegia. Bilateral hearing aids in place with corrective lenses on. Pupils are 4mm equal and round. Reaction intact and accommodation intact right eye. Left pupil 2mm, round nonreactive to light and accommodation. Upper extremity hand grips, nonsymmetrical due to left-sided weakness. Right hand grip and upper extremity strength strong at 4/5. Left lower extremity residual weakness, rated at 1/5, right lower extremity strength 4/5. Sensation intact to light touch bilaterally, R>L. Unable to assess Romberg and Pronator drift.

6.12 Checklist for Neurological Assessment

Begin assessing a patient's general appearance, posture, ability to walk, personal hygiene, and other general survey assessments during the first few minutes of the initial nurse-patient interaction. When asking the patient to perform specific neurological tests, it is helpful to demonstrate movements for the patient. Explain the purpose and use of any equipment used.

Use the checklist below to review the steps for completion of a routine "Neurological Assessment."

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather supplies: penlight. For a comprehensive neurological exam, additional supplies may be needed: Snellen chart; tongue depressor; cotton wisp or applicator; and percussion hammer; objects to touch, such as coins or paper clips; substances to smell, such as vanilla, mint, or coffee; and substances to taste such as sugar, salt, or lemon.
2. Perform safety steps:
    - Perform hand hygiene.
    - Check the room for transmission-based precautions.
    - Introduce yourself, your role, the purpose of your visit, and an estimate of the time it will take.
    - Confirm patient ID using two patient identifiers (e.g., name and date of birth).

- Explain the process to the patient and ask if they have any questions.
- Be organized and systematic.
- Use appropriate listening and questioning skills.
- Listen and attend to patient cues.
- Ensure the patient's privacy and dignity.
- Assess ABCs.

3. Obtain subjective assessment data related to history of neurological disease and any current neurological concerns using effective communication.
4. Assess the patient's behavior, language, mood, hygiene, and choice of dress while performing the interview. Note any hearing or visual deficits and ensure glasses and hearing aids are in place, if needed.
5. Assess level of consciousness and orientation; use Glasgow Coma Scale if appropriate.
6. (Optional) Complete Mini-Mental State Examination (MMSE), if indicated.
7. Assess for PERRLA.
8. Assess motor strength and sensation.

    - Hand grasps
    - Upper body strength/resistance
    - Lower body strength/resistance
    - Sensation in extremities

9. Assess coordination and balance.

    - Ask the patient to walk, using an assistive device if needed, assessing gait for smoothness, coordination, and arm swing.
    - As appropriate, assess the patient's ability to tandem walk (heel to toe), walk on tiptoes, and walk on heels.
    - Assess cerebellar functioning using tests such as Romberg,

pronator drift, rapid alternating hand movement, fingertip-to-nose, and heel-to-shin tests.

10. (Optional) Perform a cranial nerve assessment and assess deep tendon reflexes as indicated.
11. Assist the patient to a comfortable position, ask if they have any questions, and thank them for their time.
12. Ensure safety measures when leaving the room:
    - CALL LIGHT: Within reach
    - BED: Low and locked (in lowest position and brakes on)
    - SIDE RAILS: Secured
    - TABLE: Within reach
    - ROOM: Risk-free for falls (scan room and clear any obstacles)
13. Perform hand hygiene.
14. Document the assessment findings and report any concerns according to agency policy.

6.13 Learning Activities

Learning Activities

(Answers to "Learning Activities" can be found in the '"Answer Key'" at the end of the book. Answers to interactive activity elements will be provided within the element as immediate feedback.)

1. A male patient has an impairment of cranial nerve II. **Specific to this impairment, the nurse would plan to do which of the following to ensure patient safety?**

   a. Use a loud tone when speaking to the patient
   b. Test the temperature of the shower water
   c. Check the temperature of the food prior to eating
   d. Remove obstacles when ambulating

2. The nurse is performing a mental status examination on a patient with confusion. **This test assesses which of the following?**

   a. Cerebral function
   b. Cerebellar function
   c. Sensory function
   d. Intellectual function

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Match the cards with images to the correct name of the reflex being tested.

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https://wtcs.pressbooks.pub/nursingskills/?p=1206#h5p-114

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 6, Assignment 1.

- Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 6, Assignment 2.

VI Glossary

Accommodation: The ability of the eye to adjust from near vision to far vision. Pupils constrict at near vision and dilate at far vision.

Anosmia: Partial or complete loss of smell. This symptom can be related to underlying cranial nerve dysfunction or other nonpathological causes such as a common cold.

Babinski response: A reflex demonstrated as fanning of 4 toes with great toe bending towards top of foot when object slid along sole of foot. Normal in children under 2. Older than 2 through adulthood, all five toes should curl downward.

Broca's area: An area located in the frontal lobe that is responsible for the production of language and controlling movements responsible for speech.

Bruit: A swishing sound heard upon auscultation.

Central nervous system: The part of the nervous system that includes the brain (the interpretation center) and the spinal cord (the transmission pathway).

Cerebellum: The part of the brain that coordinates skeletal and smooth muscle movement and maintains equilibrium and balance.

Cerebral cortex: The cerebrum is covered by a wrinkled outer layer of gray matter.

Comatose: A decreased level of consciousness with a score of less than 8 on the Glasgow Coma Scale.

Convergence: The action of both eyes moving inward as they focus on a close object using near vision.

Dermatome: An area of the skin that is supplied by a single spinal nerve.

Diplopia: Double vision (i.e., seeing two images of a single object).

Dysphagia: Difficulty swallowing.

Dysphasia: Difficulty speaking.

Hypothalamus: The autonomic control center of the brain that controls functions such as blood pressure, heart rate, digestive movement, and pain perception.

Kinesthesia: A person's sense of movement.

Level of consciousness: A patient's level of arousal and alertness, commonly assessed by asking them to report their name, current location, and time.

Motor nerves: Nerves in the peripheral nervous system that transmit motor signals from the brain to the muscles to cause movement.

Nystagmus: Involuntary, shaky eye movements.

Paralysis: The partial or complete loss of strength, movement, or control of a muscle or group of muscles within a body part that can be caused by brain or spinal injury.

Peripheral nervous system: The part of the nervous system that includes the cranial and spinal nerves.

Proprioception: A person's sense of their body position.

Ptosis: Drooping of the eyelid.

Sensation: The function of receiving information about the environment. The major senses are taste, smell, touch, sight, and hearing.

Sensory nerves: Nerves in the peripheral nervous system that carry impulses from the body to the brain for processing.

Stereognosis: The ability to perceive the physical form and identity of an object based on tactile stimuli alone.

Thalamus: Relays sensory information and motor information in collaboration with the cerebellum.

PART VII

CHAPTER 7 HEAD AND NECK ASSESSMENT

7.1 Head and Neck Assessment Introduction

Learning Objectives

- Perform a head and neck assessment, including the skull, face, nose, oral cavity, and neck
- Modify assessment techniques to reflect variations across the life span
- Recognize and report significant deviations from norms
- Document actions and observations

Inspection of a patient's head, neck, and oral cavity is part of the routine daily assessment performed by a registered nurse (RN) during inpatient care.[1] There are also several head and neck conditions that the RN may be the first to notice after a patient is admitted that require notification of the health care provider. Let's get started by reviewing the basic anatomy and physiology of the head and neck and common medical conditions.

1. Giddens, J. F. (2007). A survey of physical examination techniques performed by RNs: Lessons for nursing education. *Journal of Nursing Education, 46*(2), 83-87. https://doi.org/10.3928/01484834-20070201-09

7.2 Head and Neck Basic Concepts

To perform and document an accurate assessment of the head and neck, it is important to understand their basic anatomy and physiology.

Anatomy

Skull

The anterior skull consists of facial bones that provide the bony support for the eyes and structures of the face. This anterior view of the skull is dominated by the openings of the orbits, the nasal cavity, and the upper and lower jaws. See Figure 7.1[1] for an illustration of the skull. The **orbit** is the bony socket that houses the eyeball and the muscles that move the eyeball. Inside the nasal area of the skull, the nasal cavity is divided into halves by the **nasal septum** that consists of both bone and cartilage components. The **mandible** forms the lower jaw and is the only movable bone in the skull. The **maxilla** forms the upper jaw and supports the upper teeth.[2]

1. "704_Skull -01.jpg" by OpenStax College is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/7-2-the-skull
2. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

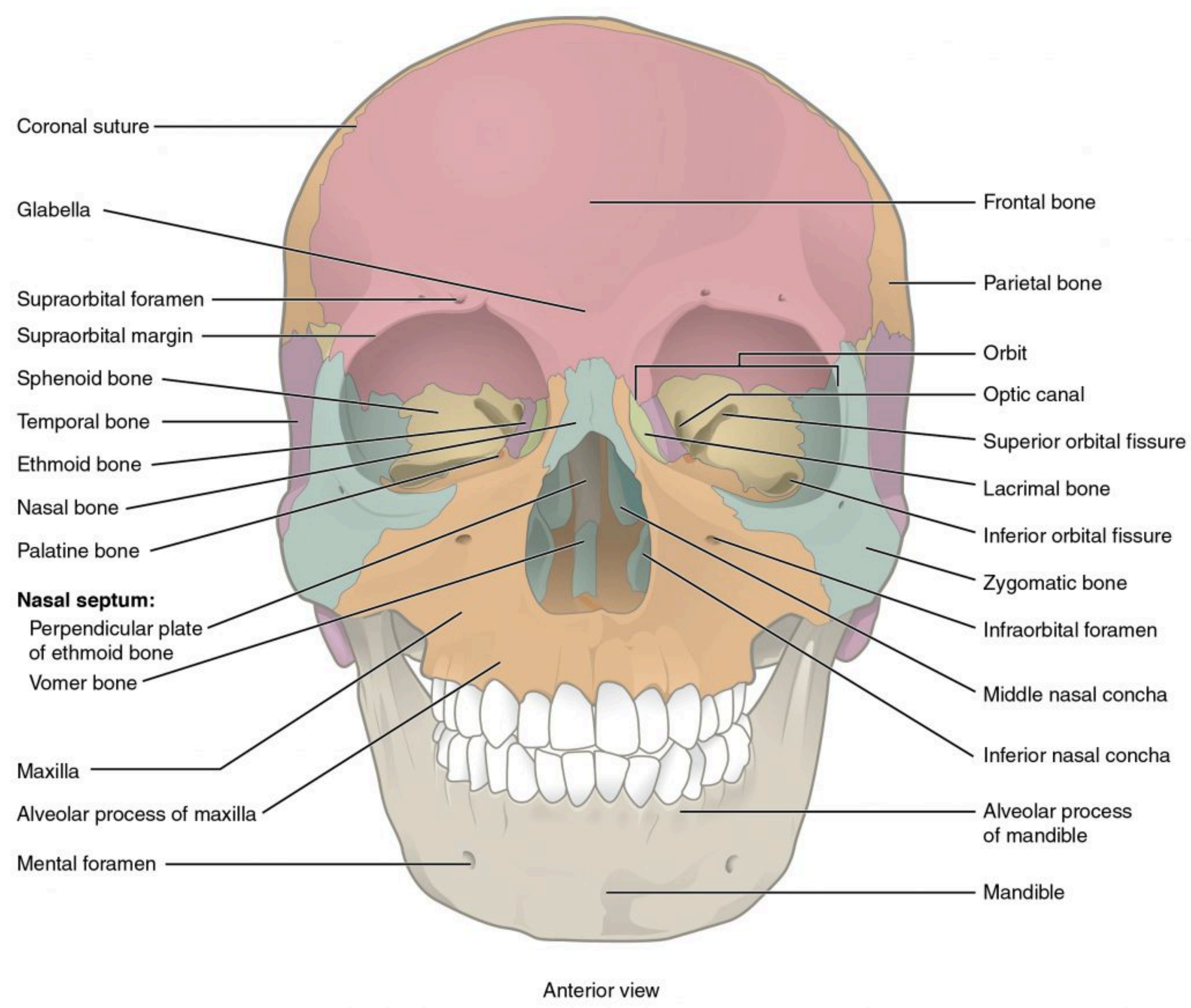

Figure 7.1 Skull

The **cranium**, or "brain case," surrounds and protects the brain that occupies the cranial cavity. See Figure 7.2[3] for an image of the brain within the cranial cavity. The brain case consists of eight bones, including the paired parietal and temporal bones, plus the unpaired frontal, occipital, sphenoid, and ethmoid bones.[4]

3. This work is a derivative of "727_Cranial_Fossae.jpg" by OpenStax and is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/7-2-the-skull
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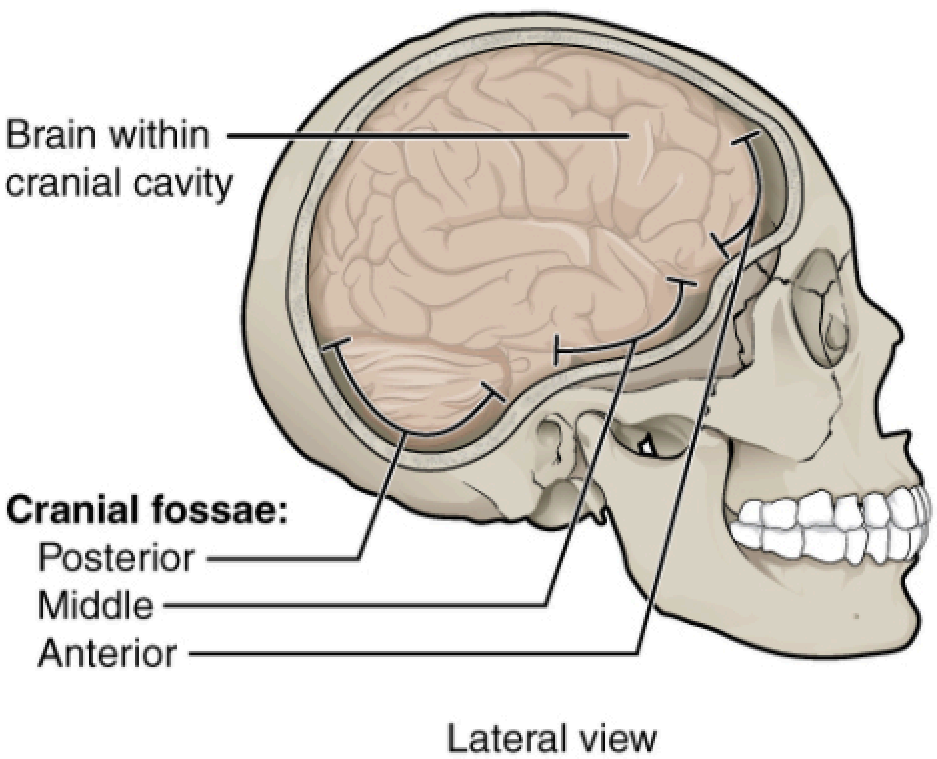

Figure 7.2 Cranial Cavity

A **suture** is an interlocking joint between adjacent bones of the skull and is filled with dense, fibrous connective tissue that unites the bones. In a newborn infant, the pressure from vaginal delivery compresses the head and causes the bony plates to overlap at the sutures, creating a small ridge. Over the next few days, the head expands, the overlapping disappears, and the edges of the bony plates meet edge to edge. This is the normal position for the remainder of the life span and the sutures become immobile.

See Figure 7.3[5] for an illustration of two of the sutures, the coronal and squamous sutures, on the lateral view of the head. The coronal suture is seen on the top of the skull. It runs from side to side across the skull and joins the frontal bone to the right and left parietal bones. The squamous suture is located on the lateral side of the skull. It unites the squamous

5. "705 Lateral View of Skull-01.jpg" by OpenStax is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/7-2-the-skull

portion of the temporal bone with the parietal bone. At the intersection of the coronal and squamous sutures is the pterion, a small, capital H-shaped suture line region that unites the frontal bone, parietal bone, temporal bone, and greater wing of the sphenoid bone. The pterion is an important clinical landmark because located immediately under it, inside the skull, is a major branch of an artery that supplies the brain. A strong blow to this region can fracture the bones around the pterion. If the underlying artery is damaged, bleeding can cause the formation of a collection of blood, called a **hematoma**, between the brain and interior of the skull, which can be life-threatening.[6]

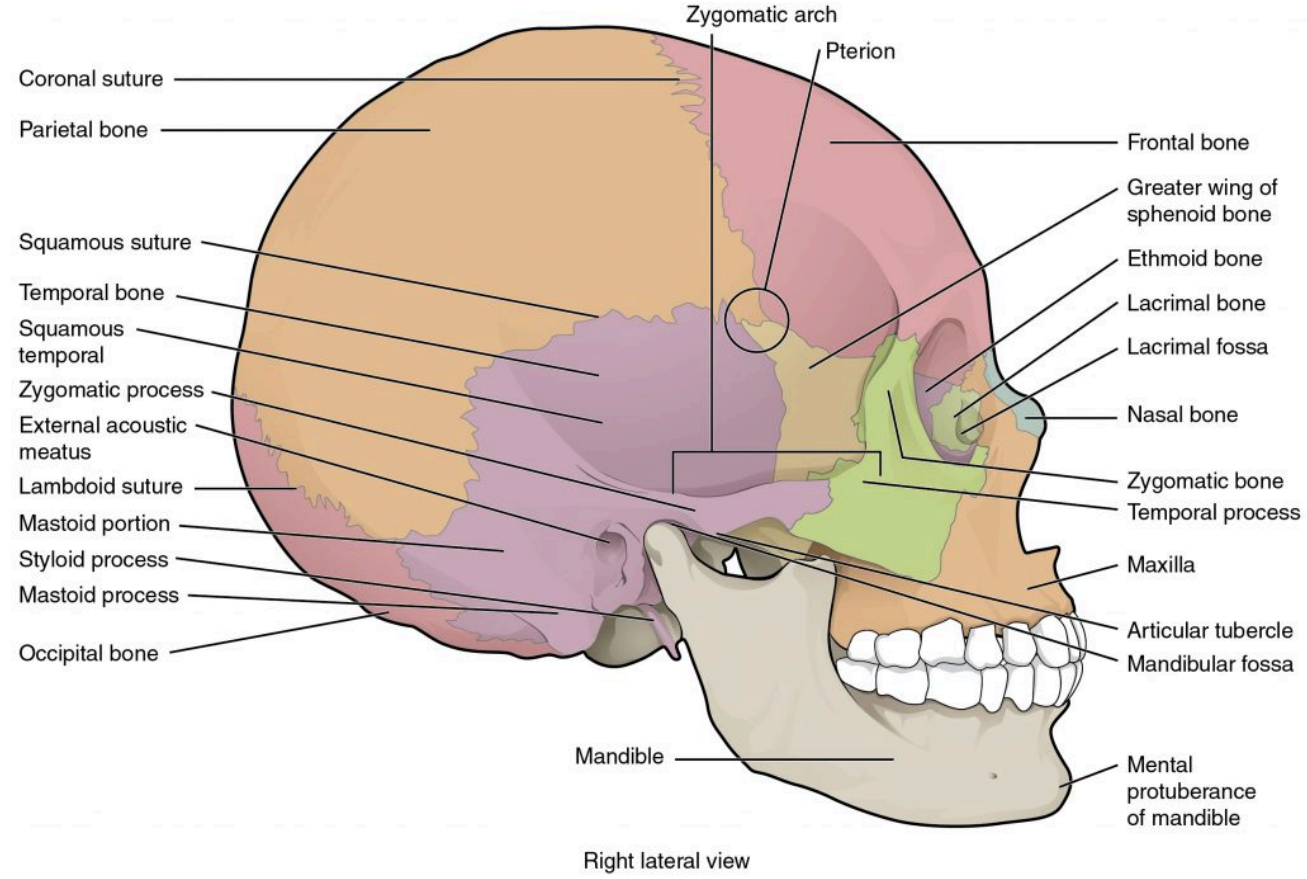

Figure 7.3 Coronal Sutures in Lateral View of Skull

6. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

Paranasal Sinuses

The paranasal sinuses are hollow, air-filled spaces located within the skull. See Figure 7.4[7] for an illustration of the sinuses. The sinuses connect with the nasal cavity and are lined with nasal mucosa. They reduce bone mass, lightening the skull, and also add resonance to the voice. When a person has a cold or sinus congestion, the mucosa swells and produces excess mucus that often obstructs the narrow passageways between the sinuses and the nasal cavity. The resulting pressure produces pain and discomfort.[8]

Each of the paranasal sinuses is named for the skull bone that it occupies. The frontal sinus is located just above the eyebrows within the frontal bone. The largest sinus, the maxillary sinus, is paired and located within the right and left maxillary bones just below the orbits. The maxillary sinuses are most commonly involved during sinus infections. The sphenoid sinus is a single, midline sinus located within the body of the sphenoid bone. The lateral aspects of the ethmoid bone contain multiple small spaces separated by very thin, bony walls. Each of these spaces is called an ethmoid air cell.

7. "Paranasal Sinuses ant.jpg" by OpenStax is licensed under CC BY-SA 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/7-2-the-skull
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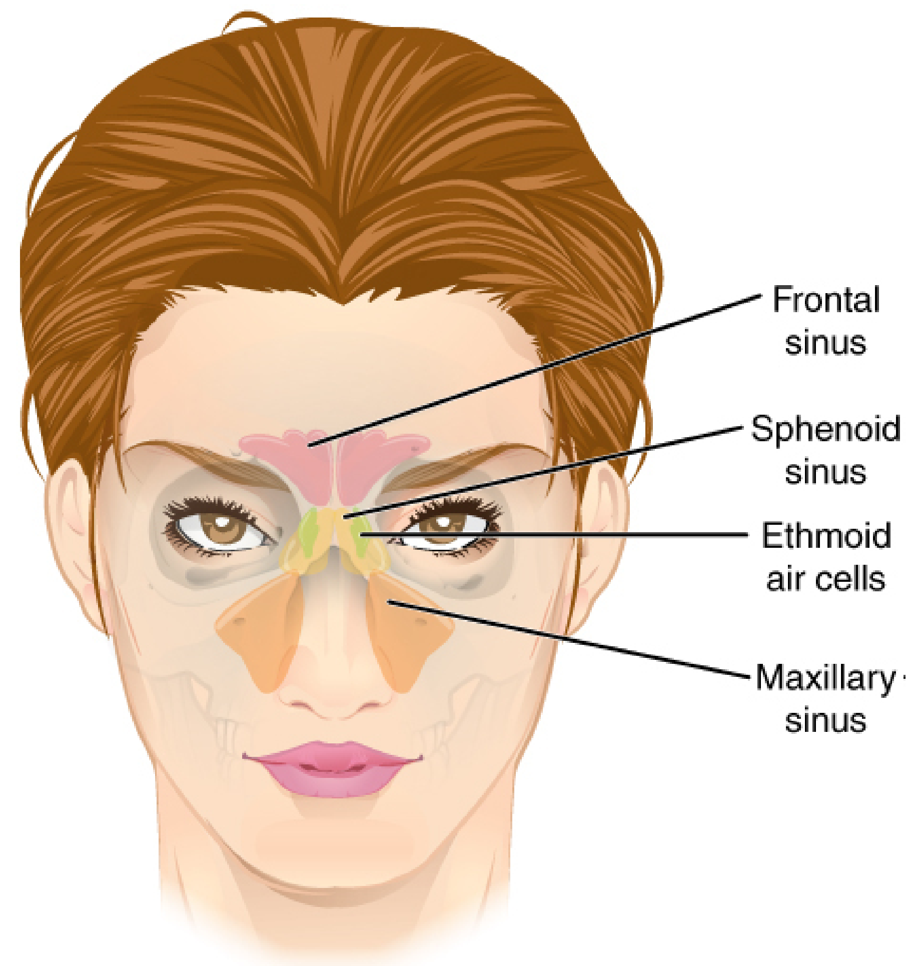

Figure 7.4 Sinuses

Anatomy of Nose, Pharynx, and Mouth

See Figure 7.5[9] to review the anatomy of the head and neck. The major entrance and exit for the respiratory system is through the nose. The bridge of the nose consists of bone, but the protruding portion of the nose is composed of cartilage. The **nares** are the nostril openings that open into the nasal cavity and are separated into left and right sections by the **nasal septum**. The floor of the nasal cavity is composed of the palate. The hard palate is located at the anterior region of the nasal cavity and is composed of bone. The soft palate is located at the posterior portion of the nasal cavity and consists of muscle tissue. The **uvula** is a small, teardrop-shaped

9. "2303 Anatomy of Nose-Pharynx-Mouth-Larynx.jpg" by OpenStax is licensed CC BY 3.0

structure located at the apex of the soft palate. Both the uvula and soft palate move like a pendulum during swallowing, swinging upward to close off the nasopharynx and prevent ingested materials from entering the nasal cavity.[10]

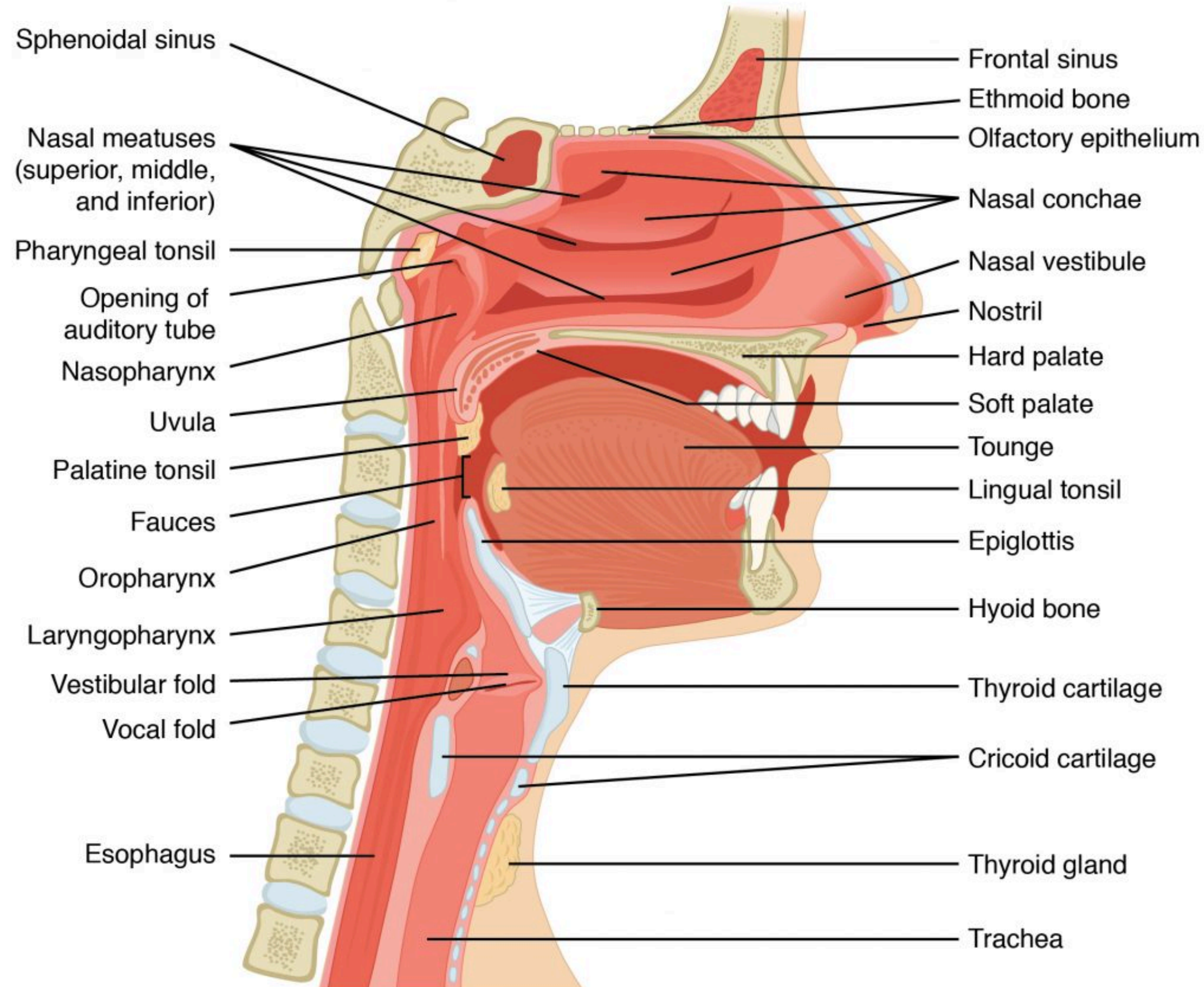

Figure 7.5 Anatomy of the Head and Neck

As air is inhaled through the nose, the paranasal sinuses warm and humidify the incoming air as it moves into the pharynx. The **pharynx** is a tube-lined mucous membrane that begins at the nasal cavity and is

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divided into three major regions: the nasopharynx, the oropharynx, and the laryngopharynx.[11]

The **nasopharynx** serves only as an airway. At the top of the nasopharynx is the pharyngeal tonsil, commonly referred to as the adenoids. Adenoids are lymphoid tissue that trap and destroy invading pathogens that enter during inhalation. They are large in children but tend to regress with age and may even disappear.[12]

The **oropharynx** is a passageway for both air and food. The oropharynx is bordered superiorly by the nasopharynx and anteriorly by the oral cavity. The oropharynx contains two sets of tonsils, the palatine and lingual tonsils. The palatine tonsil is located laterally in the oropharynx, and the lingual tonsil is located at the base of the tongue. Similar to the pharyngeal tonsil, the palatine and lingual tonsils are composed of lymphoid tissue and trap and destroy pathogens entering the body through the oral or nasal cavities. See Figure 7.6[13] for an image of the oral cavity and oropharynx with enlarged palatine tonsils.

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12. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction
13. This work is a derivative of "2209 Location and Histology of Tonsils.jpg" by OpenStax and is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/21-1-anatomy-of-the-lymphatic-and-immune-systems

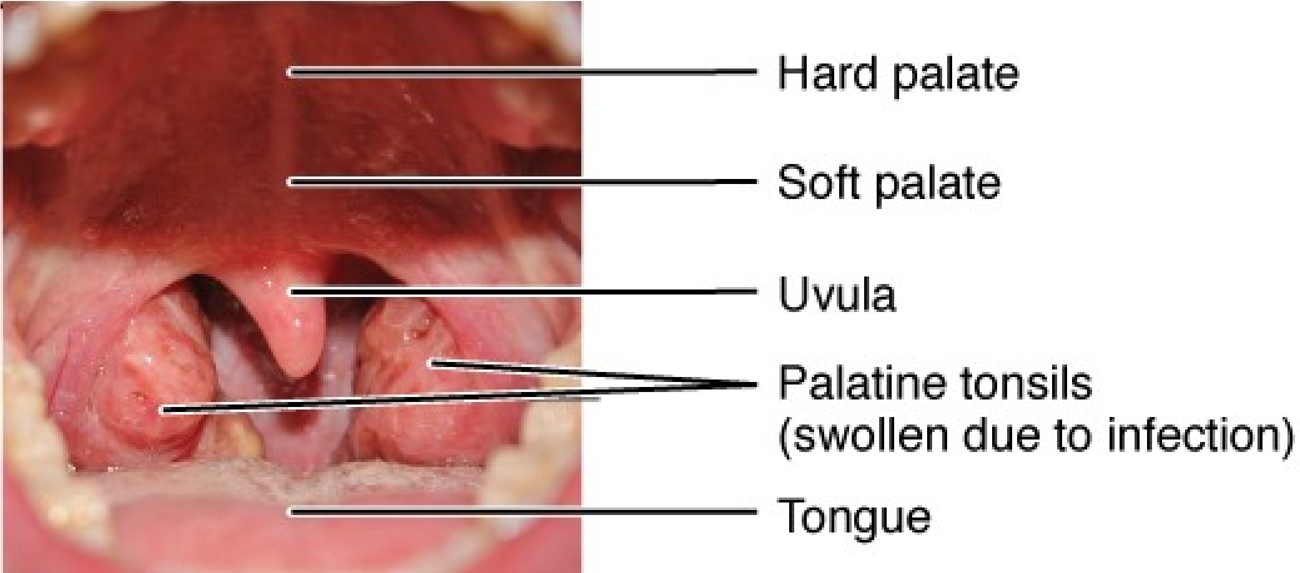

Figure 7.6 Oral Cavity and Oropharynx

The **laryngopharynx** is inferior to the oropharynx and posterior to the larynx. It continues the route for ingested material and air until its inferior end where the digestive and respiratory systems diverge. Anteriorly, the laryngopharynx opens into the larynx, and posteriorly, it enters the esophagus that leads to the stomach. The **larynx** connects the pharynx to the trachea and helps regulate the volume of air that enters and leaves the lungs. It also contains the vocal cords that vibrate as air passes over them to produce the sound of a person's voice. The **trachea** extends from the larynx to the lungs. The **epiglottis** is a flexible piece of cartilage that covers the opening of the trachea during swallowing to prevent ingested material from entering the trachea.[14]

Muscles and Nerves of the Head and Neck

FACIAL MUSCLES

Several nerves innervate the facial muscles to create facial expressions.

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See Figure 7.7[15] for an illustration of nerves innervating facial muscles. These nerves and muscles are tested during a cranial nerve exam. See more information about performing a cranial nerve exam in the "Neurological Assessment" chapter.

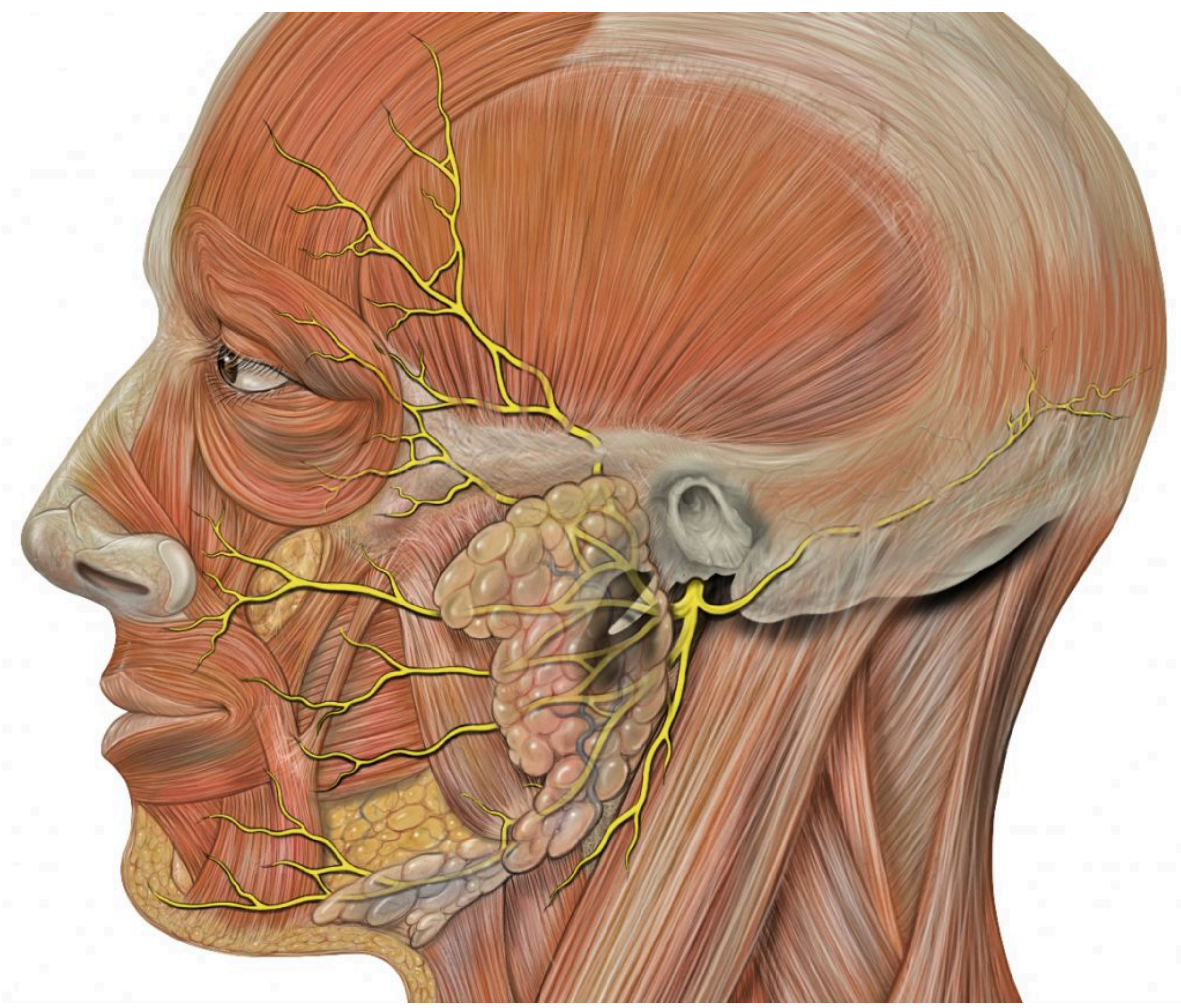

Figure 7.7 Nerve Branches Innervating Facial Muscles

When a patient is experiencing a cerebrovascular accident (i.e., stroke), it is common for facial drooping to occur. **Facial drooping** is an asymmetrical facial expression that occurs due to damage of the nerve innervating a

15. "Head facial nerve branches.jpg" by Patrick J. Lynch, medical illustrator is licensed under CC BY 2.5

specific part of the face. See Figure 7.8[16] for an image of facial drooping occurring on the patient's right side of their face.

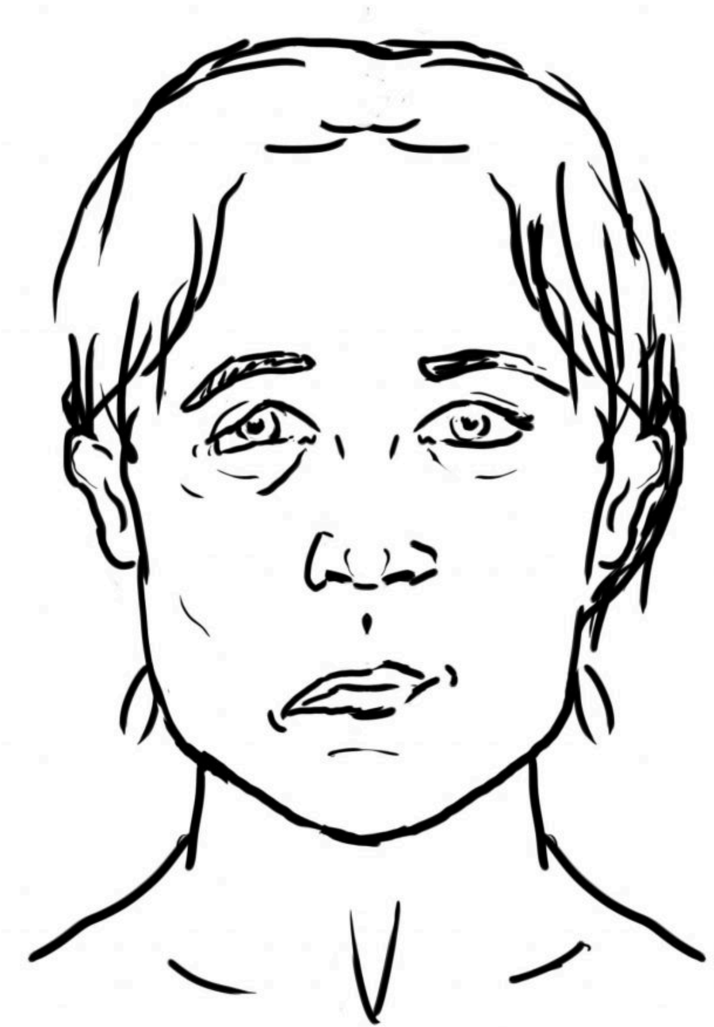

Figure 7.8 Facial Drooping

NECK MUSCLES

The muscles of the anterior neck assist in swallowing and speech by controlling the positions of the larynx and the hyoid bone, a horseshoe-

16. "Stroke-facial-droop.jpg" by Another-anon-artist-234 is licensed under CC0 1.0

shaped bone that functions as a solid foundation on which the tongue can move. The head, attached to the top of the vertebral column, is balanced, moved, and rotated by the neck muscles. When these muscles act unilaterally, the head rotates. When they contract bilaterally, the head flexes or extends. The major muscle that laterally flexes and rotates the head is the **sternocleidomastoid**. The **trapezius** muscle elevates the shoulders (shrugging), pulls the shoulder blades together, and tilts the head backwards. See Figure 7.9[17] for an illustration of the sternocleidomastoid and trapezius muscles.[18] Both of these muscles are tested during a cranial nerve assessment. See more information about cranial nerve assessment in the "Neurological Assessment" chapter.

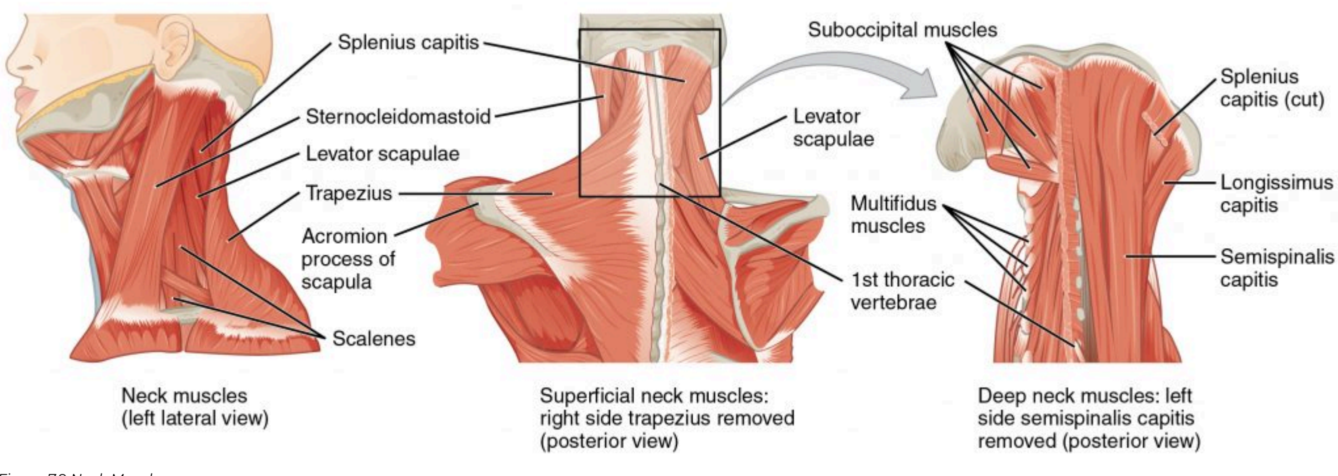

Figure 7.9 Neck Muscles

JAW MUSCLES

The **masseter** muscle is the main muscle used for chewing because it elevates the mandible (lower jaw) to close the mouth. It is assisted by the temporalis muscle that retracts the mandible. The **temporalis** muscle can

17. "1111 Posterior and Side Views of the Next.jpg" by OpenStax is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/11-3-axial-muscles-of-the-head-neck-and-back.
18. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

be felt moving by placing fingers on the patient's temple as they chew. See Figure 7.10[19] for an illustration of the masseter and temporalis muscles.[20]

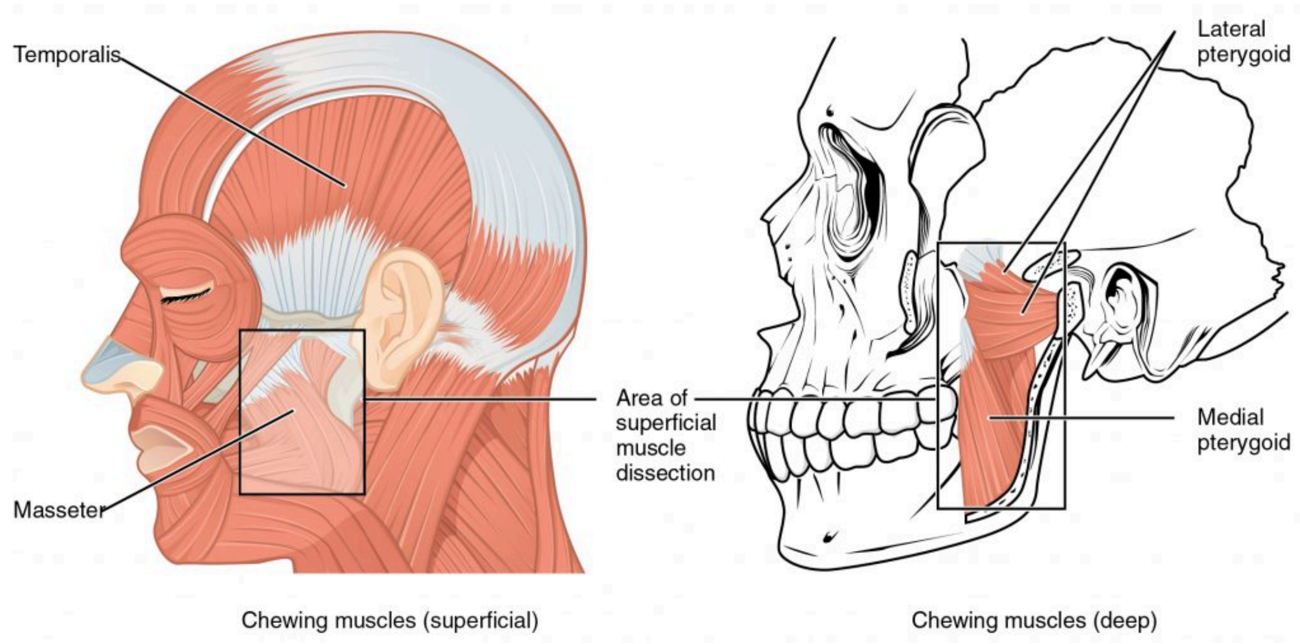

Figure 7.10 Masseter and Temporalis Muscles

TONGUE MUSCLES

Muscles of the tongue are necessary for chewing, swallowing, and speech. Because it is so moveable, the tongue facilitates complex speech patterns and sounds.[21]

19. "1108 Muscle that Move the Lower Jaw.jpg" by OpenStax is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/11-3-axial-muscles-of-the-head-neck-and-back
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21. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

Airway and Unconsciousness

When a patient becomes unconscious and is lying supine, the tongue often moves backwards and blocks the airway. This is why it is important to open the airway when performing CPR by using a chin-thrust maneuver. See Figure 7.11[22] for an image of the tongue blocking the airway. In a similar manner, when a patient is administered general anesthesia during surgery, the tongue relaxes and can block the airway. For this reason, endotracheal intubation is performed during surgery with general anesthesia by placing a tube into the trachea to maintain an open airway to the lungs. After surgery, patients often report a sore or scratchy throat for a few days due to the endotracheal intubation.[23]

22. "Airway closed in an unconscious patient because the head inflexed forward.jpg" by Dr. Lorimer is licensed under CC BY-SA 4.0
23. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

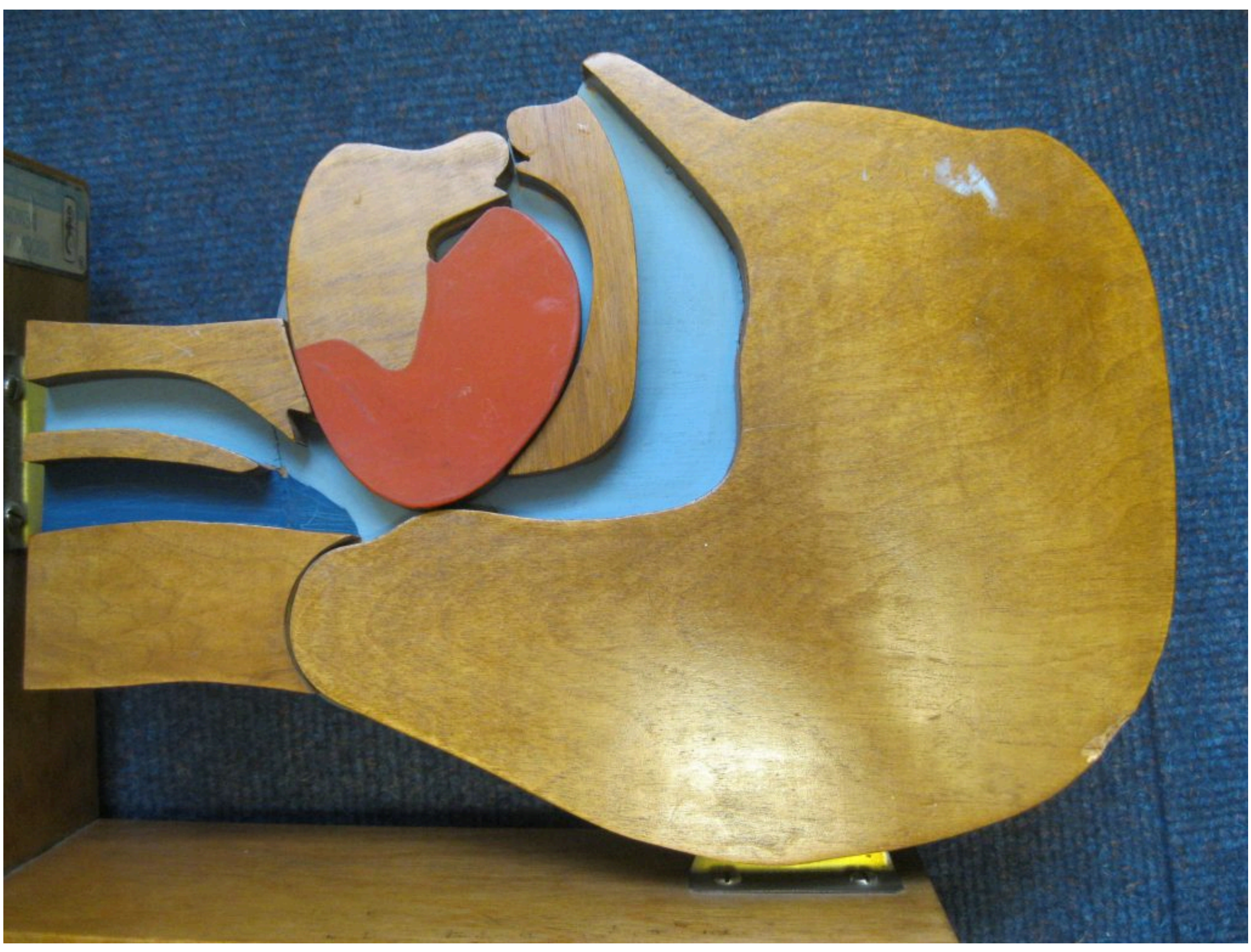

Figure 11 Airway Blocked by Tongue

SWALLOWING

Swallowing is a complex process that uses 50 pairs of muscles and many nerves to receive food in the mouth, prepare it, and move it from the mouth to the stomach. Swallowing occurs in three stages. During the first stage, called the oral phase, the tongue collects the food or liquid and makes it ready for swallowing. The tongue and jaw move solid food around in the mouth so it can be chewed and made the right size and texture to swallow by mixing food with saliva. The second stage begins when the tongue pushes the food or liquid to the back of the mouth. This triggers a swallowing response that passes the food through the pharynx. During this phase, called the pharyngeal phase, the epiglottis closes off the larynx and breathing stops to prevent food or liquid from entering the airway and lungs. The third stage begins when food or liquid enters the

esophagus, and it is carried to the stomach. The passage through the esophagus, called the esophageal phase, usually occurs in about three seconds.[24]

View the following video from Medline Plus on the swallowing process:

Swallowing[25]

Dysphagia is the medical term for swallowing difficulties that occur when there is a problem with the nerves or structures involved in the swallowing process.[26] Nurses are often the first to notice signs of dysphagia in their patients that can occur due to a multitude of medical conditions such as a stroke, head injury, or dementia. For more information about the symptoms, screening, and treatment for dysphagia, go to the "Common Conditions of the Head and Neck" section.

Lymphatic System

The lymphatic system is the system of vessels, cells, and organs that carries excess interstitial fluid to the bloodstream and filters pathogens from the blood through **lymph nodes** found near the neck, armpits, chest,

24. National Institute on Deafness and Other Communication Disorders. (2017, March 6). *Dysphagia*. https://www.nidcd.nih.gov/health/dysphagia
25. A.D.A.M. Medical Encyclopedia [Internet]. Atlanta (GA): A.D.A.M. Inc.; c1997-2021. *Swallowing* [Video]. [updated 2019, July 11]. https://medlineplus.gov/ency/anatomyvideos/000126.htm
26. National Institute on Deafness and Other Communication Disorders. (2017, March 6). *Dysphagia*. https://www.nidcd.nih.gov/health/dysphagia

abdomen, and groin. See Figure 7.12[27] and Figure 7.13[28] for an illustration of the lymph nodes found in the head and neck regions. When a person is fighting off an infection, the lymph nodes in that region become enlarged, indicating an active immune response to infection.[29]

27. "2201 Anatomy of the Lymphatic System.jpg" by OpenStax College is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/21-1-anatomy-of-the-lymphatic-and-immune-systems
28. "Cervical lymph nodes and level.png" by Mikael Häggström, M.D. is licensed under CC0 1.0
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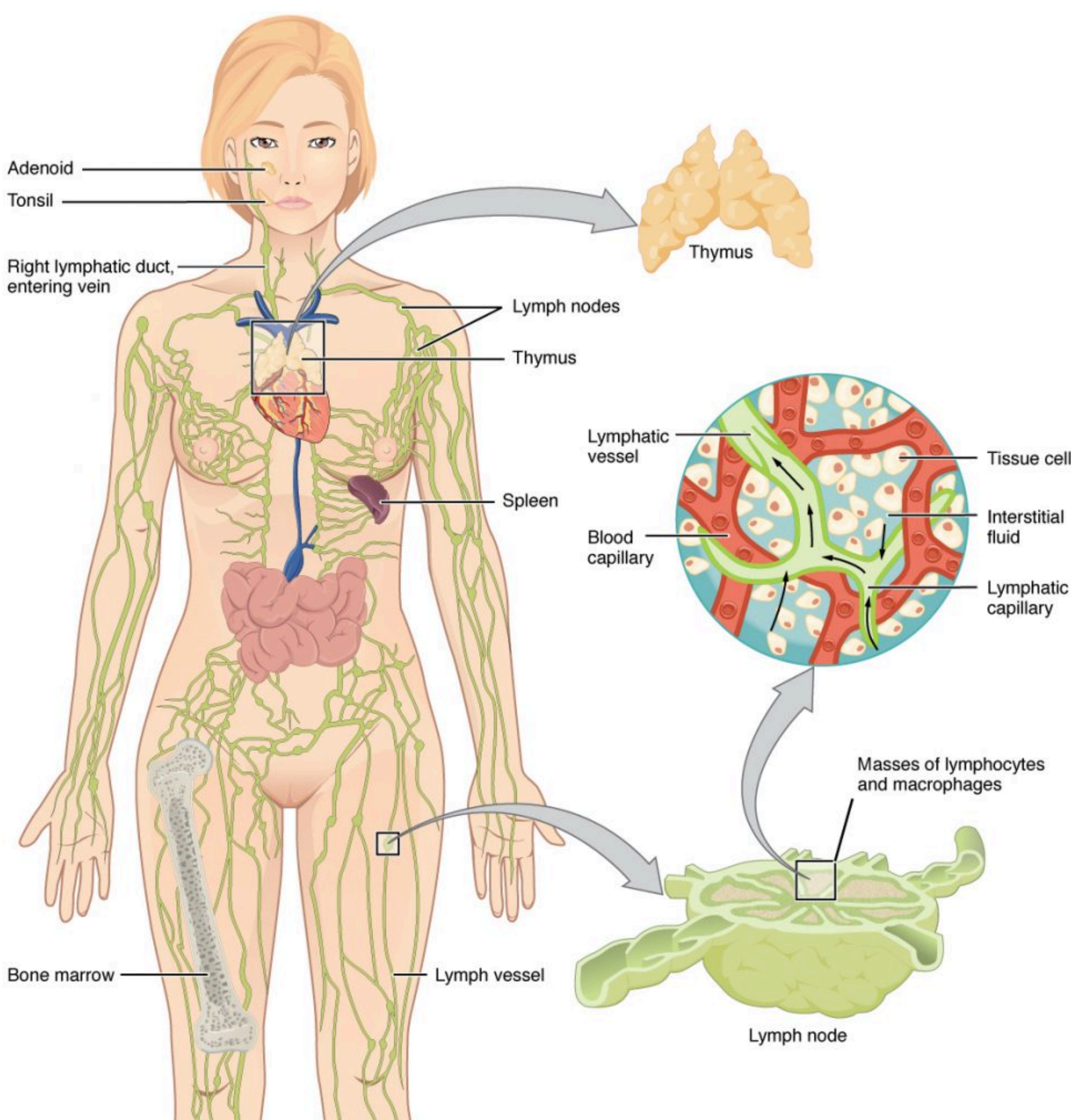

Figure 7.12 Lymphatic System

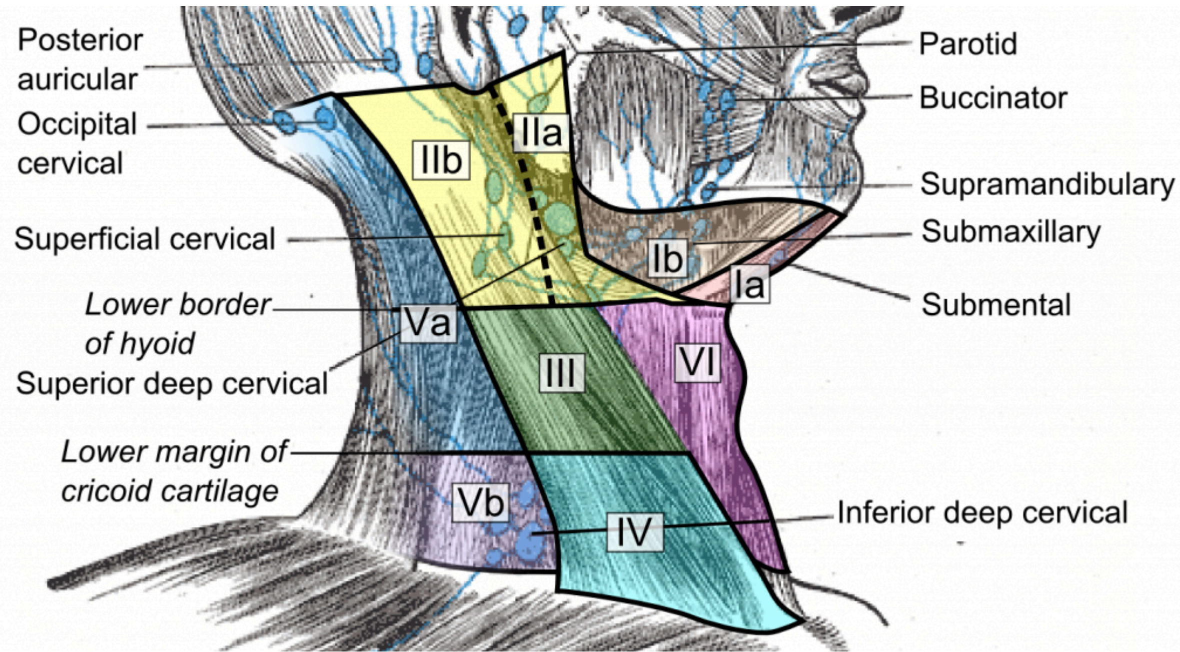

Figure 7.13 Lymph Nodes in Head and Neck

7.3 Common Conditions of the Head and Neck

Headache

A headache is a common type of pain that patients experience in everyday life and a major reason for missed time at work or school. Headaches range greatly in severity of pain and frequency of occurrence. For example, some patients experience mild headaches once or twice a year, whereas others experience disabling migraine headaches more than 15 days a month. Severe headaches such as migraines may be accompanied by symptoms of nausea or increased sensitivity to noise or light. Primary headaches occur independently and are not caused by another medical condition. Migraine, cluster, and tension-type headaches are types of primary headaches. Secondary headaches are symptoms of another health disorder that causes pain-sensitive nerve endings to be pressed on or pulled out of place. They may result from underlying conditions including fever, infection, medication overuse, stress or emotional conflict, high blood pressure, psychiatric disorders, head injury or trauma, stroke, tumors, and nerve disorders such as trigeminal neuralgia, a chronic pain condition that typically affects the trigeminal nerve on one side of the cheek.[1]

Not all headaches require medical attention, but some types of headaches can signify a serious disorder and require prompt medical care. Symptoms of headaches that require immediate medical attention include a sudden, severe headache unlike any the patient has ever had; a sudden headache associated with a stiff neck; a headache associated with convulsions, confusion, or loss of consciousness; a headache following a blow to the head; or a persistent headache in a person who was previously headache free.[2]

1. National Institute of Neurological Disorders and Stroke. (2019, December 31). *Headache information page*. https://www.ninds.nih.gov/Disorders/All-Disorders/Headache-Information-Page
2. National Institute of Neurological Disorders and Stroke. (2019, December 31). *Headache information page*. https://www.ninds.nih.gov/Disorders/All-Disorders/Headache-Information-Page

Concussion

A **concussion** is a type of traumatic brain injury caused by a blow to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement causes the brain to bounce around in the skull, creating chemical changes in the brain and sometimes damaging brain cells.[3] See Figure 7.14[4] for an illustration of a concussion.

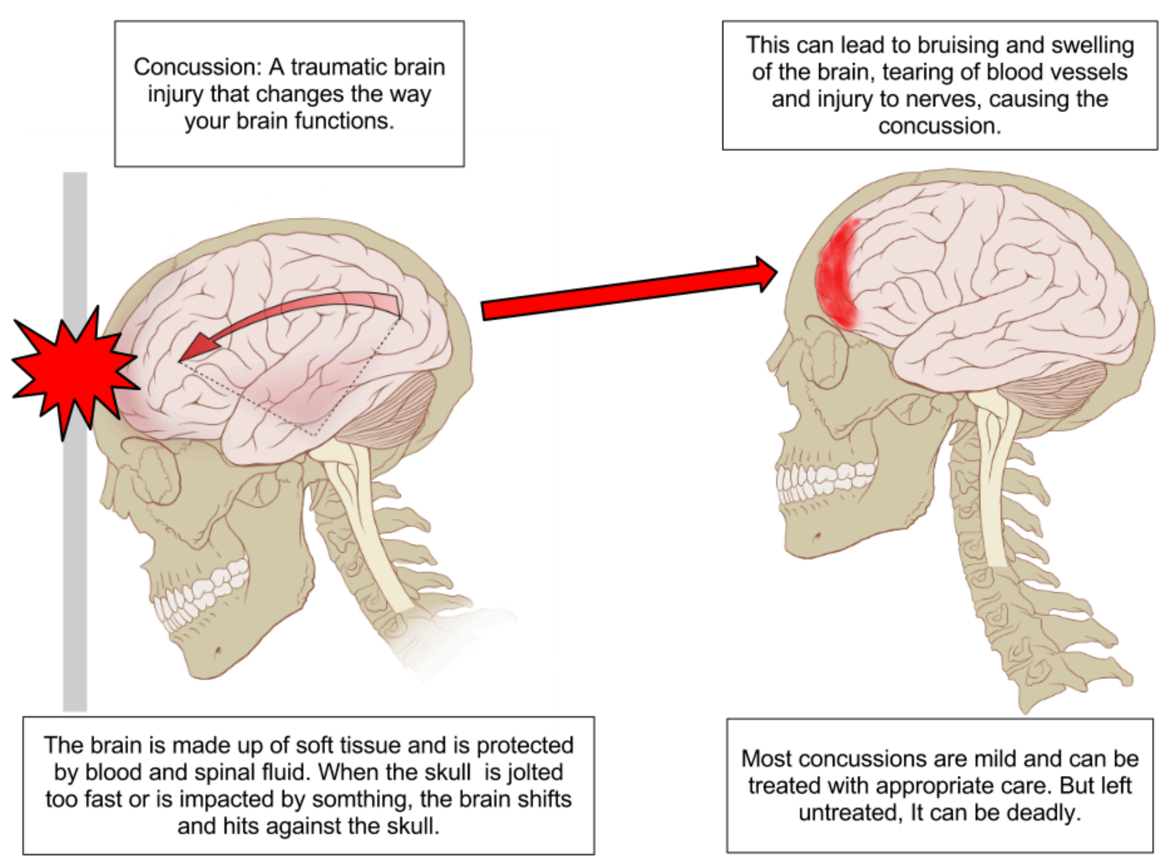

Figure 7.14 Concussion

3. Centers for Disease Control and Prevention. (2019, February 12). *Concussion signs and symptoms*. https://www.cdc.gov/headsup/basics/concussion_symptoms.html
4. "Concussion Anatomy.png" by Max Andrews is licensed under CC BY-SA 3.0

Review of Concussions on YouTube[5]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1288#oembed-1

A person who has experienced a concussion may report the following symptoms:

- Headache or "pressure" in head
- Nausea or vomiting
- Balance problems or dizziness or double or blurry vision
- Light or noise sensitivity
- Feeling sluggish, hazy, foggy, or groggy
- Confusion, concentration, or memory problems
- Just not "feeling right" or "feeling down"[6]

The following signs may be observed in someone who has experienced a concussion:

- Can't recall events prior to or after a hit or fall
- Appears dazed or stunned
- Forgets an instruction, is confused about an assignment or position, or

5. Centers for Disease Control and Prevention. (2013, October 24). *What is a concussion?* [Video]. YouTube. All rights reserved. https://youtu.be/Sno_0Jd8GuA
6. Centers for Disease Control and Prevention. (2019, February 12). *Concussion signs and symptoms*. https://www.cdc.gov/headsup/basics/concussion_symptoms.html

is unsure of the game, score, or opponent

- Moves clumsily
- Answers questions slowly
- Loses consciousness (even briefly)
- Shows mood, behavior, or personality changes[7]

Anyone suspected of experiencing a concussion should immediately be seen by a health care provider or go to the emergency department for further testing.

> Read more information about concussion signs and symptoms on the CDC's Concussion Signs and Symptoms webpage.

Head Injury

Head and traumatic brain injuries are major causes of immediate death and disability. Falls are the most common cause of head injuries in young children (ages 0–4 years), adolescents (15–19 years), and the elderly (over 65 years). Strong blows to the brain case of the skull can produce fractures resulting in bleeding inside the skull. A blow to the lateral side of the head may fracture the bones of the pterion. If the underlying artery is damaged, bleeding can cause the formation of a hematoma (collection of blood) between the brain and interior of the skull. As blood accumulates, it will put pressure on the brain. Symptoms associated with a hematoma may not be apparent immediately following the injury, but if untreated, blood

7. Centers for Disease Control and Prevention. (2019, February 12). *Concussion signs and symptoms*. https://www.cdc.gov/headsup/basics/concussion_symptoms.html

accumulation will continue to exert increasing pressure on the brain and can result in death within a few hours.[8]

See Figure 7.15[9] for an image of an epidural hematoma indicated by a red arrow associated with a skull fracture.

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9. "EpiduralHeatoma.jpg" by James Heilman, MD is licensed under CC BY-SA 4.0

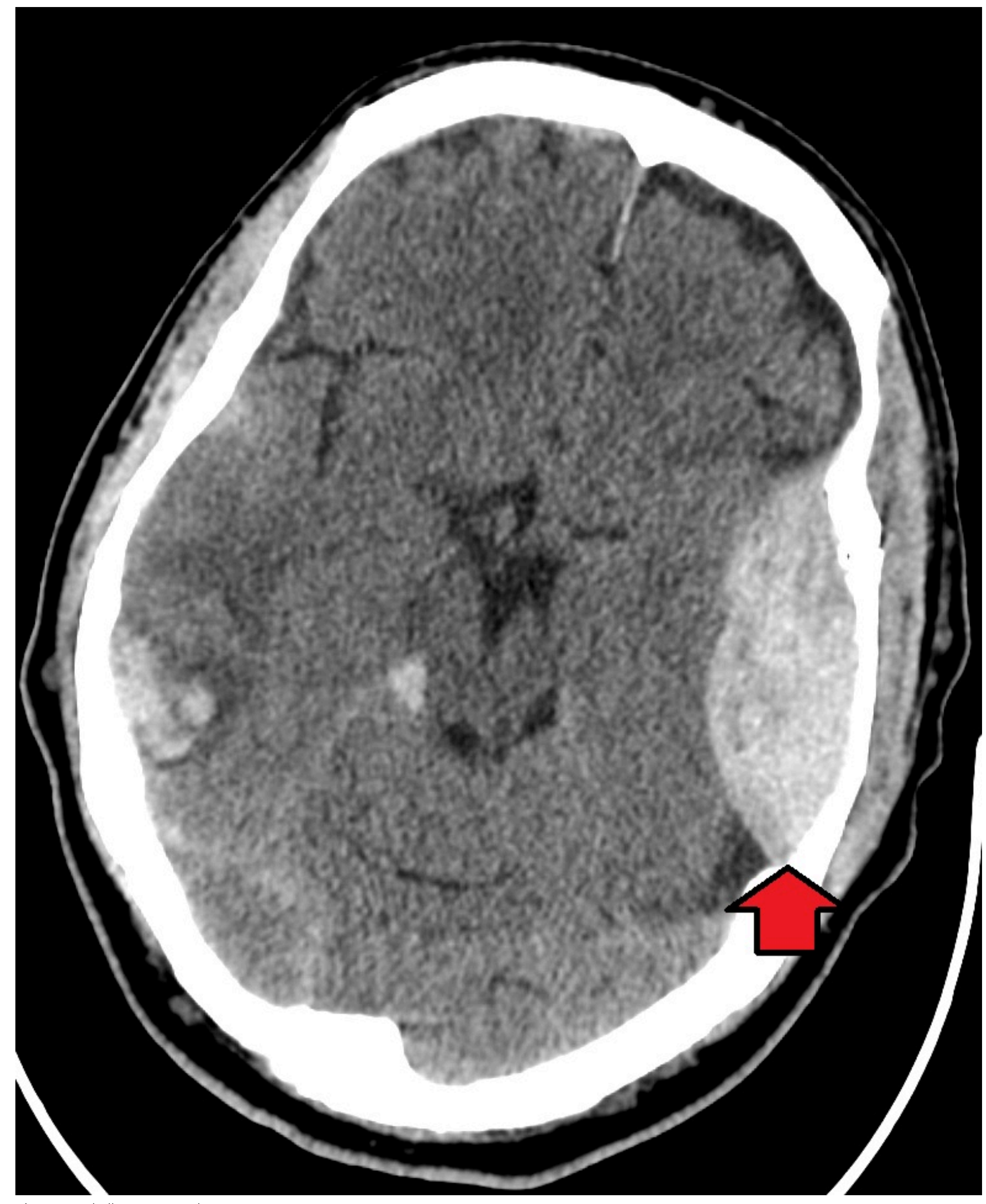

Figure 7.15 Skull Fracture and Hematoma

Sinusitis

Sinusitis is the medical diagnosis for inflamed sinuses that can be caused by a viral or bacterial infection. When the nasal membranes become swollen, the drainage of mucous is blocked and causes pain.

There are several types of sinusitis, including these types:

- Acute Sinusitis: Infection lasting up to 4 weeks
- Chronic Sinusitis: Infection lasting more than 12 weeks
- Recurrent Sinusitis: Several episodes of sinusitis within a year

Symptoms of sinusitis can include fever, weakness, fatigue, cough, and congestion. There may also be mucus drainage in the back of the throat, called postnasal drip. Health care providers diagnose sinusitis based on symptoms and an examination of the nose and face. Treatments include antibiotics, decongestants, and pain relievers.[10]

Pharyngitis

Pharyngitis is the medical term used for infection and/or inflammation in the back of the throat (pharynx). Common causes of pharyngitis are the cold viruses, influenza, strep throat caused by group A *streptococcus*, and mononucleosis. Strep throat typically causes white patches on the tonsils with a fever and enlarged lymph nodes. It must be treated with antibiotics to prevent potential complications in the heart and kidneys. See Figure 7.16[11] for an image of strep throat in a child.

10. MedlinePlus [Internet]. Bethesda (MD): National Library of Medicine (US); [updated 2020, Aug 17]. Sinusitis; [updated 2020, Jun 10; reviewed 2016, Oct 26]; [cited 2020, Sep 4]; https://medlineplus.gov/sinusitis.html
11. "Strep throat2010.JPG" by James Heilman, MD is licensed under CC BY-SA 3.0

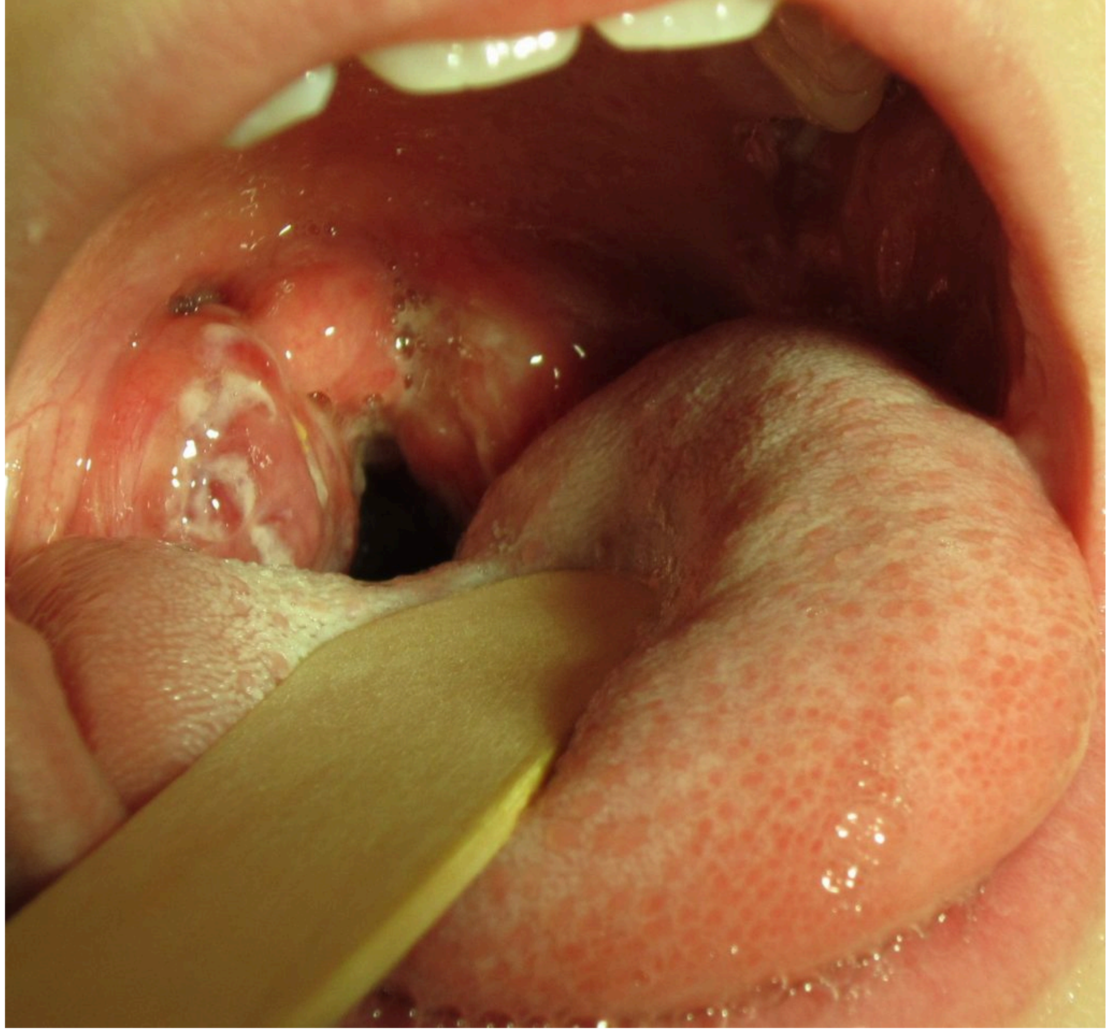

Figure 7.16 Strep Throat

If not diagnosed as strep throat, most cases of pharyngitis are caused by viruses, and the treatment is aimed at managing the symptoms. Nurses can teach patients the following ways to decrease the discomfort of a sore throat:

- Drink soothing liquids such as lemon tea with honey or ice water.
- Gargle several times a day with warm salt water made of 1/2 tsp. of salt in 1 cup of water.
- Suck on hard candies or throat lozenges.
- Use a cool-mist vaporizer or humidifier to moisten the air.
- Try over-the-counter pain medicines, such as acetaminophen.[12]

Epistaxis

Epistaxis, the medical term for a nosebleed, is a common problem affecting up to 60 million Americans each year. Although most cases of epistaxis are minor and manageable with conservative measures, severe cases can become life-threatening if the bleeding cannot be stopped.[13] See Figure 7.17[14] for an image of a severe case of epistaxis.

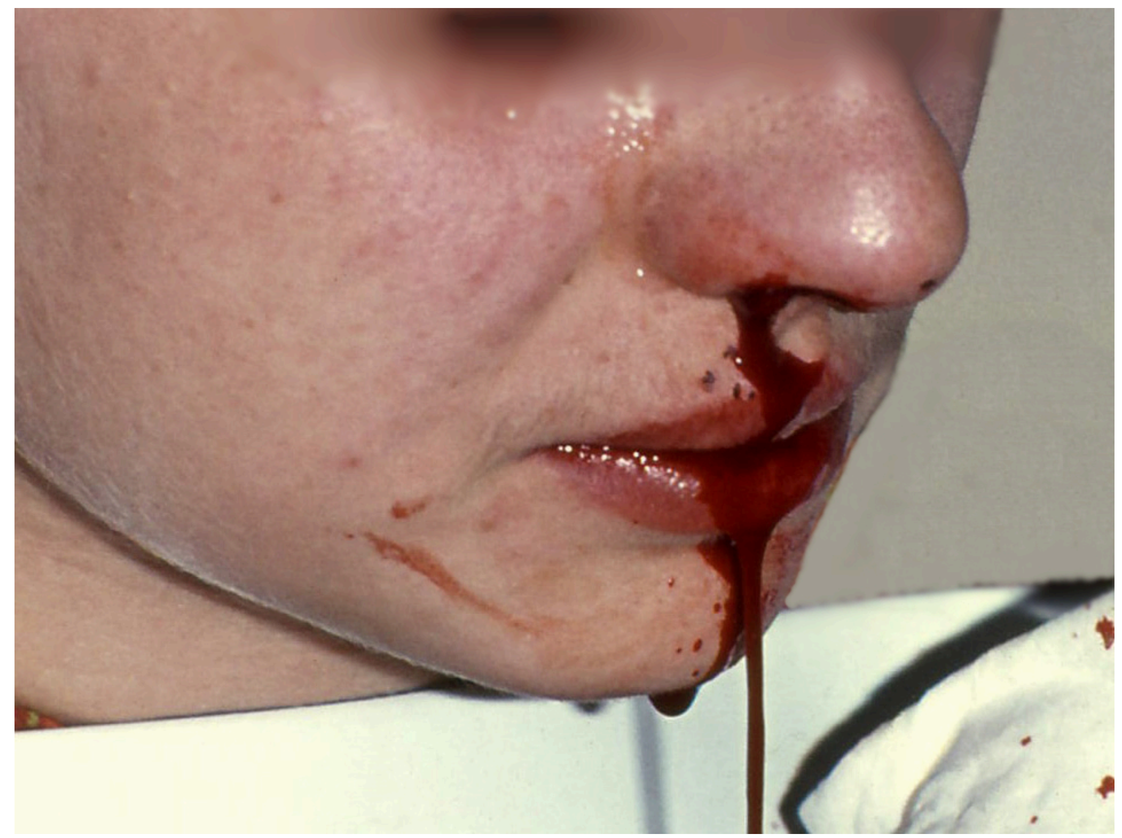

Figure 7.17 Serious Epistaxis

The most common cause of epistaxis is dry nasal membranes in winter months due to low temperatures and low humidity. Other common causes are picking inside the nose with fingers, trauma, anatomical

12. Centers for Disease Control and Prevention. (2020, May 1). *Disparities in oral health*. https://www.cdc.gov/OralHealth/oral_health_disparities/
13. Fatakia, A., Winters, R., & Amedee, R. G. (2010). Epistaxis: A common problem. *The Ochsner Journal, 10*(3), 176–178. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3096213/
14. “Epstaxis1.jpg” by Welleschik is licensed under CC BY-SA 3.0

deformity, high blood pressure, and clotting disorders. Medications associated with epistaxis are aspirin, clopidogrel, nonsteroidal anti-inflammatory drugs, and anticoagulants.[15]

To treat a nosebleed, have the victim lean forward at the waist and pinch the lateral sides of the nose with the thumb and index finger for up to 15 minutes while breathing through the mouth.[16] Continued bleeding despite this intervention requires urgent medical intervention such as nasal packing.

Cleft Lip and Palate

During embryonic development, the right and left maxilla bones come together at the midline to form the upper jaw. At the same time, the muscle and skin overlying these bones join together to form the upper lip. Inside the mouth, the palatine processes of the maxilla bones, along with the horizontal plates of the right and left palatine bones, join together to form the hard palate. If an error occurs in these developmental processes, a birth defect of cleft lip or cleft palate may result.

Cleft lip is a common developmental defect that affects approximately 1:1,000 births, most of which are male. This defect involves a partial or complete failure of the right and left portions of the upper lip to fuse together, leaving a cleft (gap). See Figure 7.18[17] for an image of an infant with a cleft lip.

15. Fatakia, A., Winters, R., & Amedee, R. G. (2010). Epistaxis: A common problem. *The Ochsner Journal, 10*(3), 176–178. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3096213/
16. American Heart Association. (2000). Part 5: New guidelines for first aid. *Circulation, 102(*supplement 1). https://www.ahajournals.org/doi/10.1161/circ.102.suppl_1.I-77
17. "Cleftlipandpalate.JPG" by James Heilman, MD is licensed under CC BY-SA 3.0

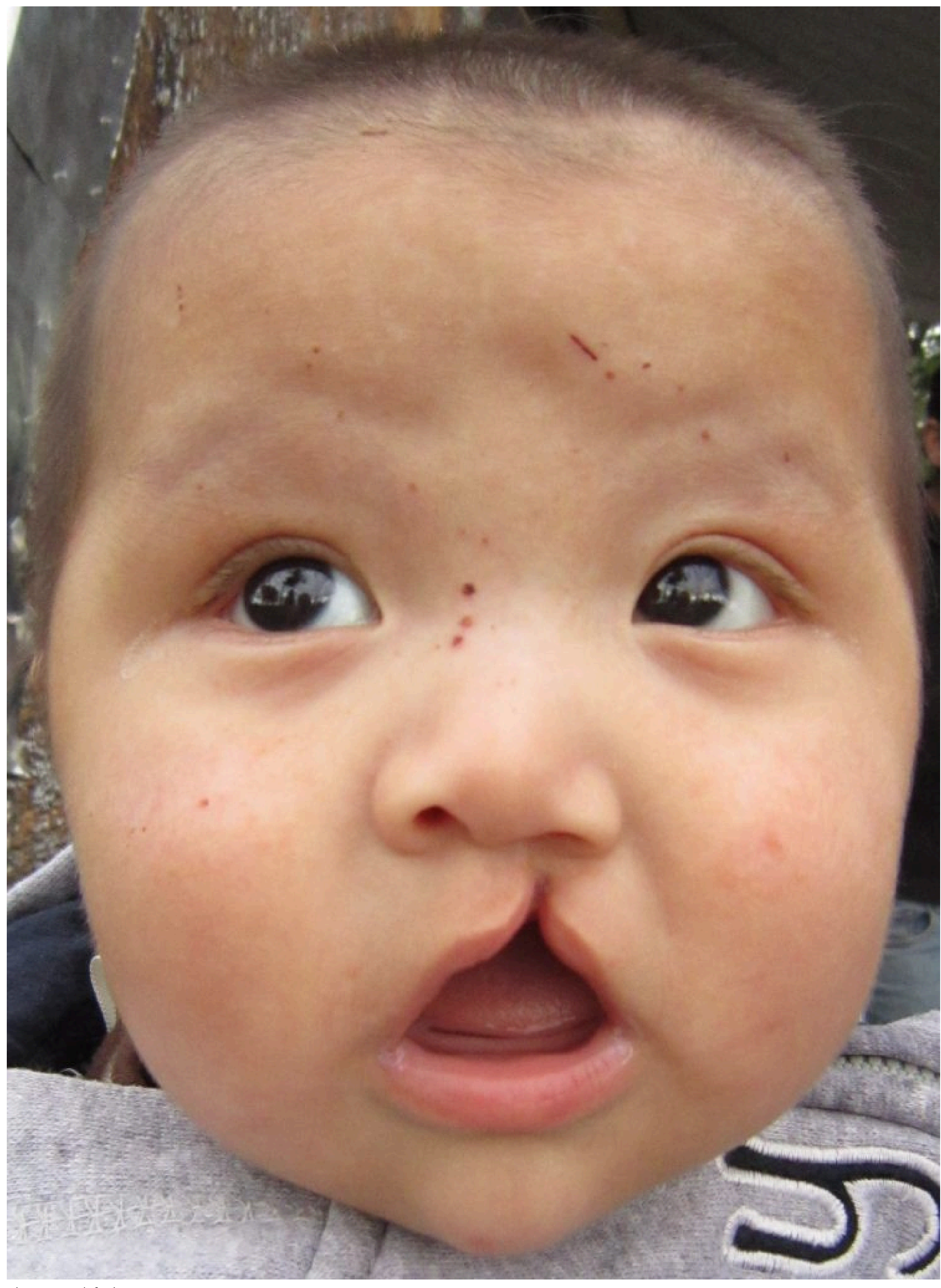

Figure 7.18 Cleft Lip

A more severe developmental defect is a cleft palate that affects the hard palate, the bony structure that separates the nasal cavity from the oral

cavity. See Figure 7.19[18] for an illustration of a cleft palate. **Cleft palate** affects approximately 1:2,500 births and is more common in females. It results from a failure of the two halves of the hard palate to completely come together and fuse at the midline, thus leaving a gap between the nasal and oral cavities. In severe cases, the bony gap continues into the anterior upper jaw where the alveolar processes of the maxilla bones also do not properly join together above the front teeth. If this occurs, a cleft lip will also be seen. Because of the communication between the oral and nasal cavities, a cleft palate makes it very difficult for an infant to generate the suckling needed for nursing, thus creating risk for malnutrition. Surgical repair is required to correct a cleft palate.[19]

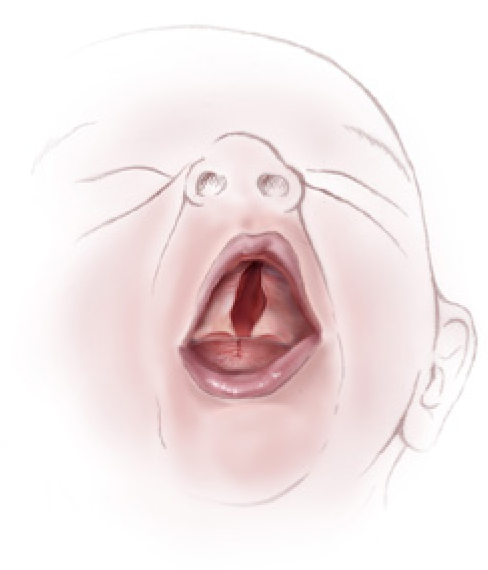
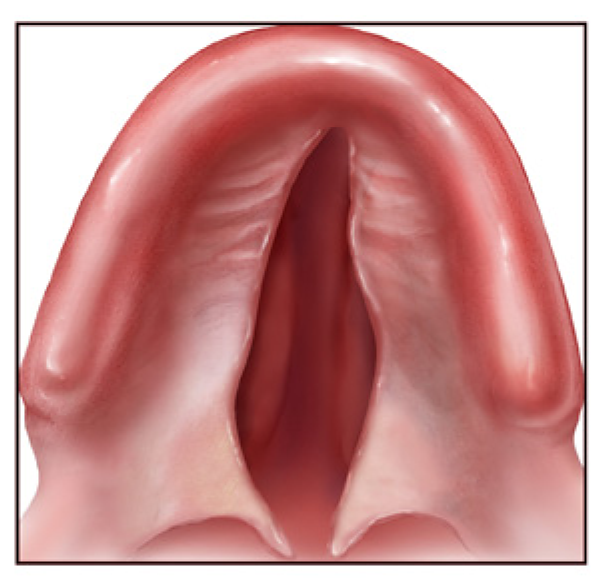

Figure 7.19 Cleft Palate

18. "Cleft palate.jpg" by Centers for Disease Control and Prevention is licensed under CC0 1.0
19. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

Poor Oral Health

Despite major improvements in oral health for the population as a whole, oral health disparities continue to exist for many racial, ethnic, and socioeconomic groups in the United States. Healthy People 2020, a nationwide initiative geared to improve the health of Americans, identified improved oral health as a health care goal. A growing body of evidence has also shown that periodontal disease is associated with negative systemic health consequences. Periodontal diseases are infections and inflammation of the gums and bone that surround and support the teeth. Red, swollen, and bleeding gums are signs of periodontal disease. Other symptoms of periodontal disease include bad breath, loose teeth, and painful chewing.[20] In 2020, the Centers for Disease Control and Prevention (CDC) reported that 42% of U.S. adults have some form of periodontitis, and almost 60% of adults aged 65 and older have periodontitis. See Figure 7.20[21] for an image of a patient with periodontal disease. Nurses may encounter patients who complain of bleeding gums, or they may discover other signs of periodontal disease during a physical assessment.

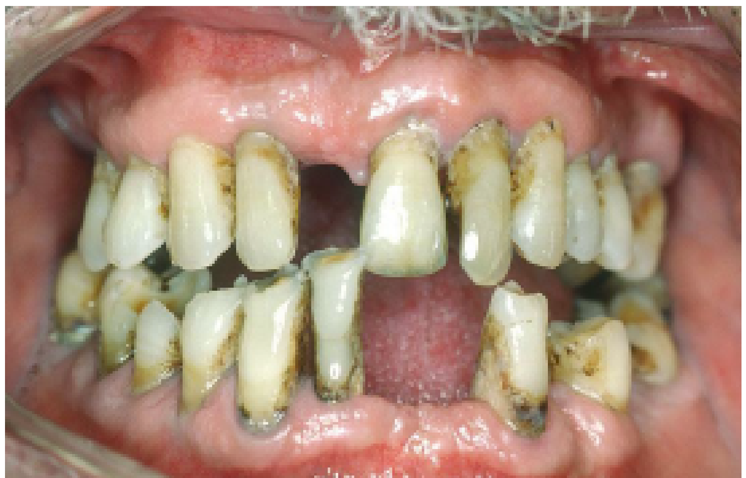

Figure 7.20 Periodontal Disease

20. Bencosme, J. (2018). Periodontal disease: What nurses need to know. *Nursing, 48*(7), 22-27. https://doi.org/10.1097/01.nurse.0000534088.56615.e4
21. "Periodontal Disease.png" by Warren Schnider is licensed under CC BY-SA 4.0

Because many Americans lack access to oral care, it is important for nurses to perform routine oral assessment and identify needs for follow-up. If signs and/or symptoms indicate potential periodontal disease, the patient should be referred to a dental health professional for a more thorough evaluation.[22]

Thrush/Candidiasis

Candidiasis is a fungal infection caused by *Candida*. *Candida* normally lives on the skin and inside the body without causing any problems, but it can multiply and cause an infection if the environment inside the mouth, throat, or esophagus changes in a way that encourages fungal growth.[23] See Figure 7.21[24] for an image of candidiasis.

22. Bencosme, J. (2018). Periodontal disease: What nurses need to know. *Nursing, 48*(7), 22-27. https://doi.org/10.1097/01.nurse.0000534088.56615.e4.
23. Centers for Disease Control and Prevention. (2020, June 15). *Candida infections of the mouth, throat, and esophagus*. https://www.cdc.gov/fungal/diseases/candidiasis/thrush/index.html
24. "Human tongue infected with oral candidiasis.jpg" by James Heilman, MD is licensed under CC BY-SA 3.0

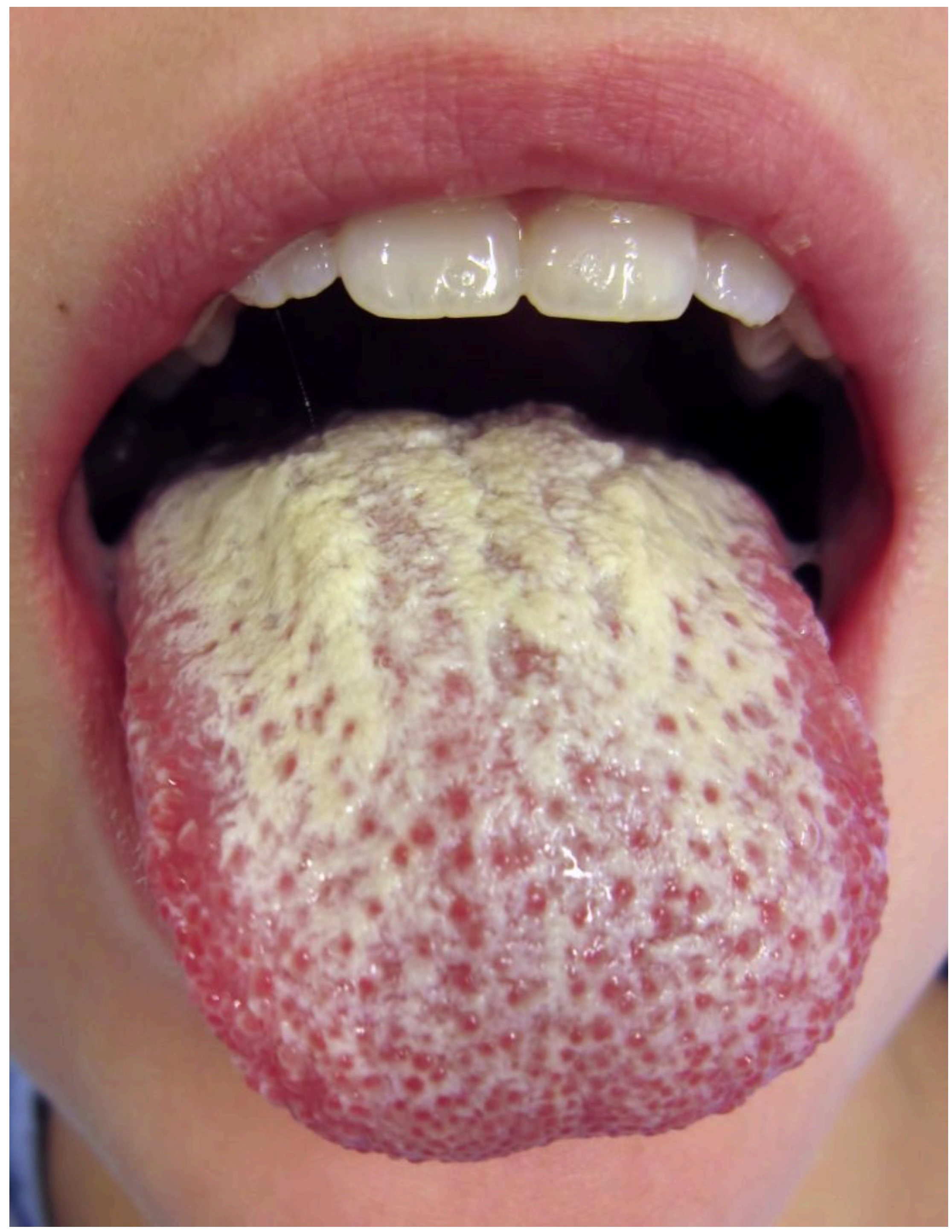

Figure 7.21 Candidiasis

Candidiasis in the mouth and throat can have many symptoms, including the following:

- White patches on the inner cheeks, tongue, roof of the mouth, and throat

- Redness or soreness
- Cotton-like feeling in the mouth
- Loss of taste
- Pain while eating or swallowing
- Cracking and redness at the corners of the mouth[25]

Candidiasis in the mouth or throat is common in babies but is uncommon in healthy adults. Risk factors for getting candidiasis as an adult include the following:

- Wearing dentures
- Diabetes
- Cancer
- HIV/AIDS
- Taking antibiotics or corticosteroids including inhaled corticosteroids for conditions like asthma
- Taking medications that cause dry mouth or have medical conditions that cause dry mouth
- Smoking

The treatment for mild to moderate cases of candidiasis infections in the mouth or throat is typically an antifungal medicine applied to the inside of the mouth for 7 to 14 days, such as clotrimazole, miconazole, or nystatin.

"Meth Mouth"

The use of methamphetamine (i.e., meth), a strong stimulant drug, has become an alarming public health issue in the United States. A common sign of meth abuse is extreme tooth and gum decay often referred to as "Meth Mouth." See Figure 7.22[26] for an image of Meth Mouth.

25. Centers for Disease Control and Prevention. (2020, June 15). *Candida infections of the mouth, throat, and esophagus*. https://www.cdc.gov/fungal/diseases/candidiasis/thrush/index.html
26. "Suspectedmethmouth09-19-05closeup.jpg" by Dozenist is licensed under CC BY-SA 3.0

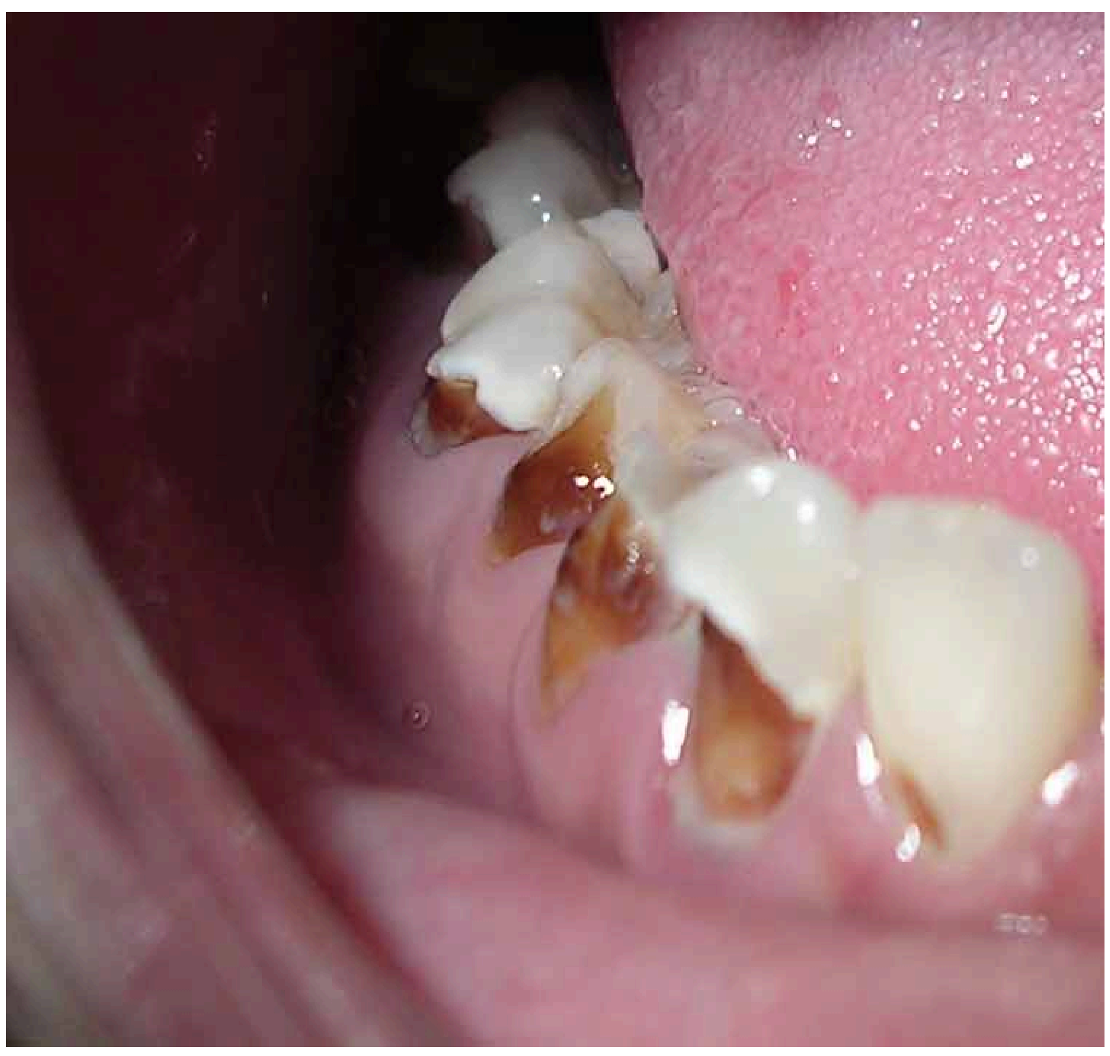

Figure 7.22 Meth Mouth

Signs of Meth Mouth include the following:

- Dry Mouth. Methamphetamines dry out the salivary glands, and the acid content in the mouth will start to destroy the enamel on the teeth. Eventually this will lead to cavities.
- Cracked Teeth. Methamphetamine can make the user feel anxious, hyper, or nervous, so they clench or grind their teeth. You may see severe wear patterns on their teeth.
- Tooth Decay. Methamphetamine users crave beverages high in sugar while they are "high." The bacteria that feed on the sugars in the mouth will secrete acid, which can lead to more tooth destruction.

With methamphetamine users, tooth decay will start at the gum line and eventually spread throughout the tooth. The front teeth are usually destroyed first.

- Gum Disease. Methamphetamine users do not seek out regular dental treatment. Lack of oral health care can contribute to periodontal disease. Methamphetamines also cause the blood vessels that supply the oral tissues to shrink in size, reducing blood flow, causing the tissues to break down.
- Lesions. Users who smoke methamphetamine may present with lesions and/or burns on their lips or gingival inside the cheeks or on the hard palate. Users who snort may present with burns in the back of their throats.[27]

Nurses who notice possible signs of "Meth Mouth" should report their concerns to the health care provider, not only for a referral for dental care, but also for treatment of suspected substance abuse.

Dysphagia

Dysphagia is the medical term for difficulty swallowing that can be caused by many medical conditions. Nurses are often the first health care professionals to notice a patient's difficulty swallowing as they administer medications or monitor food intake. Early identification of dysphagia, especially after a patient has experienced a cerebrovascular accident (i.e., stroke) or other head injury, helps to prevent aspiration pneumonia.[28] **Aspiration pneumonia** is a type of lung infection caused by material from the stomach or mouth entering the lungs and can be life-threatening.

27. Maine Center for Disease Control and Prevention. (n.d.). *Meth mouth*. https://www.maine.gov/dhhs/mecdc/population-health/odh/documents/meth-mouth.pdf
28. Edmiaston, J., Connor, L. T., Steger-May, K., & Ford, A. L. (2014). A simple bedside stroke dysphagia screen, validated against videofluoroscopy, detects dysphagia and aspiration with high sensitivity. *Journal of Stroke and Cerebrovascular Diseases: The Official Journal of National Stroke Association, 23(*4), 712–716. https://doi.org/10.1016/j.jstrokecerebrovasdis.2013.06.030

Signs of dysphagia include the following:

- Coughing during or right after eating or drinking
- Wet or gurgly sounding voice during or after eating or drinking
- Extra effort or time required to chew or swallow
- Food or liquid leaking from mouth
- Food getting stuck in the mouth
- Difficulty breathing after meals[29]

The Barnes-Jewish Hospital-Stroke Dysphagia Screen (BJH-SDS) is an example of a simple, evidence-based bedside screening tool that can be used by nursing staff to efficiently identify swallowing impairments in patients who have experienced a stroke. See internet resource below for an image of the dysphagia screening tool. The result of the screening test is recorded as a "fail" if any of the five items tested are abnormal (Glasgow Coma Scale < 13, facial/tongue/palatal asymmetry or weakness, or signs of aspiration on the 3-ounce water test) or "pass" if all five items tested were normal. Patients with a failed screening result are placed on nothing-by-mouth (NPO) status until further evaluation is completed by a speech therapist. For more information about using the Glasgow Coma Scale, see the "Assessing Mental Status" section in the "Neurological Assessment" chapter.

▸ View a PDF sample of a Nursing Bedside Swallow Screen.

Enlarged Lymph Nodes

Lymphadenopathy is the medical term for swollen lymph nodes. In a

29. American Speech-Language-Hearing Association. (n.d.). *Swallowing disorders in adults.* https://www.asha.org/public/speech/swallowing/Swallowing-Disorders-in-Adults/

child, a node is considered enlarged if it is more than 1 centimeter (0.4 inch) wide. See Figure 7.23[30] for an image of an enlarged cervical lymph node.

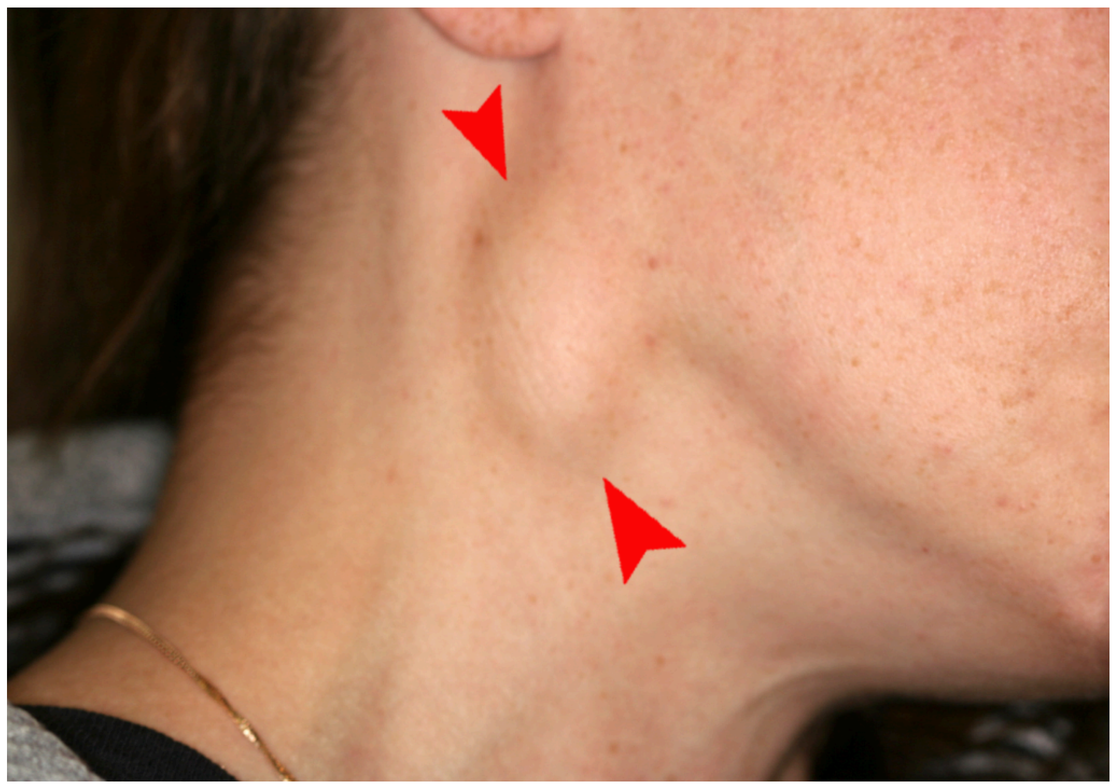

Figure 7.23 Enlarged Cervical Lymph Node

Common infections such as a cold, pharyngitis, sinusitis, mononucleosis, strep throat, ear infection, or infected tooth often cause swollen lymph nodes. However, swollen lymph nodes can also signify more serious conditions. Notify the health care provider if the patient's lymph nodes have the following characteristics:

- Do not decrease in size after several weeks or continue to get larger
- Are red and tender

30. "Cervical lymphadenopathy right neck.png" by Coronation Dental Specialty Group is licensed under CC BY-SA 4.0

- Feel hard, irregular, or fixed in place
- Are associated with night sweats or unexplained weight loss
- Are larger than 1 centimeter in diameter

The health care provider may order blood tests, a chest X-ray, or a biopsy of the lymph node if these signs occur.[31]

Thyroid

The thyroid is a butterfly-shaped gland located at the front of the neck that controls many of the body's important functions. The thyroid gland makes hormones that affect breathing, heart rate, digestion, and body temperature. If the thyroid makes too much or not enough thyroid hormone, many body systems are affected. In hypothyroidism, the thyroid gland doesn't produce enough hormone and many body functions slow down. When the thyroid makes too much hormone, a condition called hyperthyroidism, many body systems speed up.[32]

A **goiter** is an abnormal enlargement of the thyroid gland that can occur with hypothyroidism or hyperthyroidism. If you find a goiter when assessing a patient's neck, notify the health care provider for additional testing and treatment. See Figure 7.24[33] for an image of a goiter.

31. A.D.A.M. Medical Encyclopedia [Internet]. Johns Creek (GA): Ebix, Inc., A.D.A.M.; c1997-2020. Swollen lymph nodes; [updated 2020, Aug 25; cited 2020, Sep 4]; https://medlineplus.gov/ency/article/003097.htm
32. National Institutes of Health. (2015). *Thinking about your thyroid*. https://newsinhealth.nih.gov/2015/09/thinking-about-your-thyroid
33. "Struma 00a.jpg" by Drahreg01 is licensed under CC BY-SA 3.0

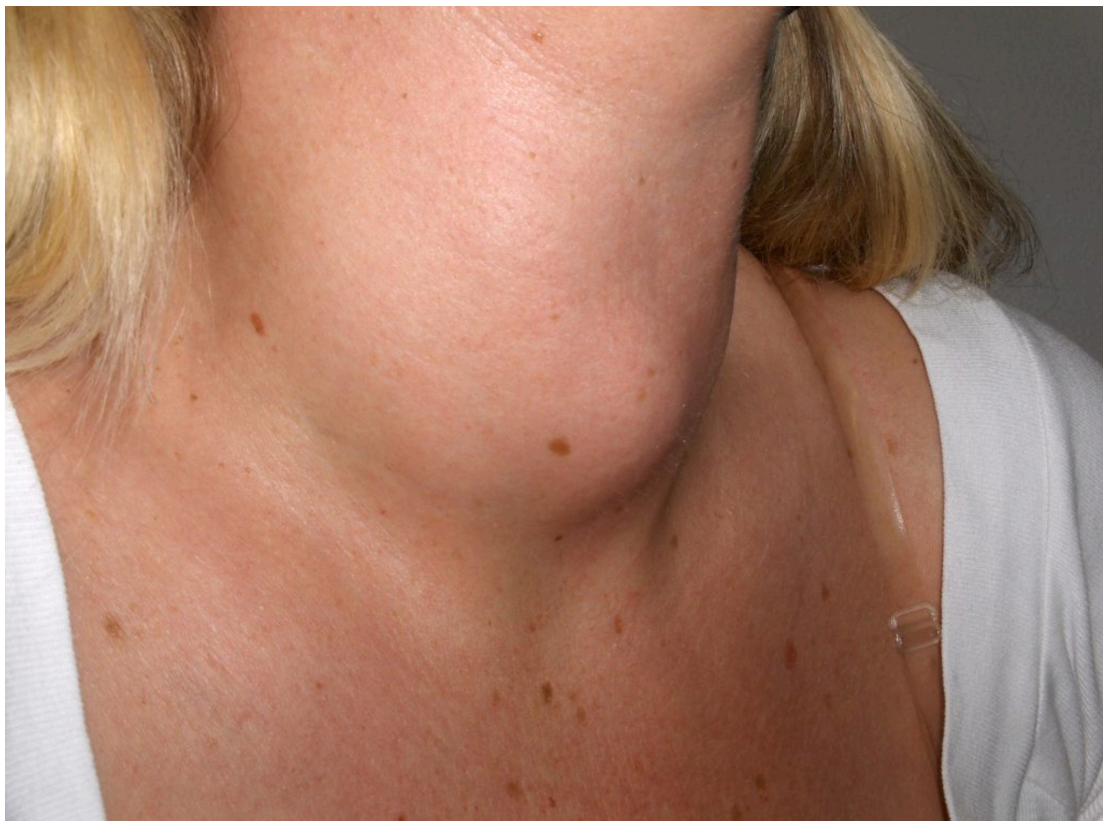
Figure 7.24 Goiter

7.4 Head and Neck Assessment

Subjective Assessment

Begin the head and neck assessment by asking focused interview questions to determine if the patient is currently experiencing any symptoms or has a previous medical history related to head and neck issues.

Table 7.4a Interview Questions for Subjective Assessment of the Head and Neck

Interview Questions	Follow-up
Have you ever been diagnosed with a medical condition related to your head such as headaches, a concussion, a stroke, or a head injury?	Please describe.
Have you ever been diagnosed with a medical condition related to your neck such as a thyroid or swallowing issue?	Please describe.
Are you currently taking any medications, herbs, or supplements for headaches or for your thyroid?	Please describe.
Have you had any symptoms such as headaches, nosebleeds, nasal drainage, sinus pressure, sore throat, or swollen lymph nodes?	If yes, use the PQRSTU method to gather additional information regarding each symptom.
Specific oral assessment questions[1]: • **Are you having any pain, bleeding, or other problems with your teeth or gums?** • **Do you have any loose or sensitive teeth?** • **Do you experience bleeding after brushing or flossing your teeth?** • **Are you wearing dentures? Do they fit properly?** • **Are you experiencing bad breath that won't go away?** • **Have your eating patterns changed due to mouth pain or discomfort with chewing?**	

1. Bencosme, J. (2018). Periodontal disease: What nurses need to know. *Nursing, 48(*7), 22-27. https://doi.org/10.1097/01.nurse.0000534088.56615.e4

Life Span Considerations

INFANTS AND CHILDREN

For infants, observe head control and muscle strength. Palpate the skull and fontanelles for smoothness. Ask the parents or guardians if the child has had frequent throat infections or a history of cleft lip or cleft palate. Observe head shape, size, and symmetry.

OLDER ADULTS

Ask older adults if they have experienced any difficulties swallowing or chewing. Document if dentures are present. Muscle atrophy and loss of fat often cause neck shortening. Fat accumulation in the back of the neck causes a condition referred to as "Dowager's hump."

Objective Assessment

Use any information obtained during the subjective interview to guide your physical assessment.

Inspection

- Begin by inspecting the head for skin color and symmetry of facial movements, noting any drooping. If drooping is noted, ask the patient to smile, frown, and raise their eyebrows and observe for symmetrical movement. Note the presence of previous injuries or deformities.
- Inspect the nose for patency and note any nasal drainage.
- Inspect the oral cavity and ask the patient to open their mouth and say "Ah." Inspect the patient's mouth using a good light and tongue blade.
    - Note oral health of the teeth and gums.
        - If the patient wears dentures, remove them so you can assess

the underlying mucosa.
        - Assess the oral mucosa for color and the presence of any abnormalities.
        - Note the color of the gums, which are normally pink. Inspect the gum margins for swelling, bleeding, or ulceration.
        - Inspect the teeth and note any missing, discolored, misshapen, or abnormally positioned teeth. Assess for loose teeth with a gloved thumb and index finger, and document halitosis (bad breath) if present.[2]
    - Assess the tongue. It should be midline and with no sores or coatings present.
    - Assess the uvula. It should be midline and should rise symmetrically when the patient says "Ah."
    - Is the patient able to swallow their own secretions? If the patient has had a recent stroke or you have any concerns about their ability to swallow, perform a brief bedside swallow study according to agency policy before administering any food, fluids, or medication by mouth.
- Inspect the neck. The trachea should be midline, and there should not be any noticeable enlargement of lymph nodes or the thyroid gland.
- Note the patient's speech. They should be able to speak clearly with no slurring or garbled words.

If any neurological concerns are present, a cranial nerve assessment may be performed. Read more about a cranial nerve assessment in the "Neurological Assessment" chapter.

Auscultation

Auscultation is not typically performed by registered nurses during a

2. Bencosme, J. (2018). Periodontal disease: What nurses need to know. *Nursing, 48*(7), 22-27. https://doi.org/10.1097/01.nurse.0000534088.56615.e4

routine neck assessment. However, advanced practice nurses and other health care providers may auscultate the carotid arteries for the presence of a swishing sound called a bruit.

Palpation

Palpate the neck for masses and tenderness. Lymph nodes, if palpable, should be round and movable and should not be enlarged or tender. See the figure illustrating the location of lymph nodes in the head and neck in the "Head and Neck Basic Concepts" section earlier in this chapter. Advanced practice nurses and other health care providers palpate the thyroid for enlargement, further evaluate lymph nodes, and assess the presence of any masses.

See Table 7.4b for a comparison of expected versus unexpected findings when assessing the head and neck.

Table 7.4b Expected Versus Unexpected Findings on Adult Assessment of the Head and Neck

Assessment	Expected Findings	Unexpected Findings (to document and notify provider if new finding*)
Inspection	Skin tone is appropriate for ethnicity, and skin is dry. Facial movements are symmetrical. Nares are patent and no drainage is present. Uvula and tongue are midline. Teeth and gums are in good condition. Patient is able to swallow their own secretions. Trachea is midline. If dentures are present, there is a good fit, and the patient is able to appropriately chew food.	Skin is pale, cyanotic, or diaphoretic (inappropriately perspiring). New asymmetrical facial expressions or drooping is present. Nares are occluded or nasal drainage is present. Uvula and/or tongue is deviated to one side. White coating or lesions on the tongue or buccal membranes (inner cheeks) are present. Teeth are missing or decay is present that impacts the patient's ability to chew. After swallowing, the patient coughs, drools, chokes, or speaks in a gurgly/wet voice. Trachea is deviated to one side. Dentures have poor fit and/or the patient is unable to chew food contained in a routine diet.
Palpation	No unusual findings regarding lymph nodes are present.	Cervical lymph nodes are enlarged, tender, or nonmovable. Report any concerns about lymph nodes to the health care provider.

***CRITICAL CONDITIONS to report immediately**		New asymmetry of facial expressions, tracheal deviation to one side, slurred or garbled speech, signs of impaired swallowing, coughing during or after swallowing, or a “wet” voice after swallowing.

7.5 Sample Documentation

Sample Documentation of Expected Findings

Patient's skin tone appropriate for ethnicity. Skin warm and dry. Facial movements symmetrical. Nares patent without drainage. Uvula and tongue midline. Teeth and gums healthy. Able to swallow without difficulty. Trachea midline. No enlargement of lymph nodes.

Sample Documentation of Unexpected Findings

Patient has history of asthma and uses fluticasone inhaler daily. White patches present on tongue and inner buccal membranes. Dr. Smith notified at 1530 of presence of white patches on tongue and inner buccal membranes. Order for nystatin received and administered. Patient instructed to rinse mouth with water and spit out after using fluticasone to prevent reoccurrence of thrush.

7.6 Checklist for Head and Neck Assessment

Use the checklist below to review the steps for completion of a "Head and Neck Assessment."

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather supplies: penlight, tongue blade, and nonsterile gloves.
2. Perform safety steps:
    - Perform hand hygiene.
    - Check the room for transmission-based precautions.
    - Introduce yourself, your role, the purpose of your visit, and an estimate of the time it will take.
    - Confirm patient ID using two patient identifiers (e.g., name and date of birth).
    - Explain the process to the patient and ask if they have any questions.
    - Be organized and systematic.
    - Use appropriate listening and questioning skills.
    - Listen and attend to patient cues.
    - Ensure the patient's privacy and dignity.
    - Assess ABCs.
3. Inspect the head and facial expressions for symmetrical movement.
4. Inspect the nose with a penlight for drainage and occlusion.
5. Inspect the oral cavity for lesions, tongue position, movement of uvula, and oral health using a penlight.
6. Inspect the throat and note any enlargement of the tonsils.
7. Palpate the lymph nodes of the head and neck, including

submaxillary, anterior cervical, posterior cervical, and preauricular.

8. Ask the patient to swallow their own saliva and note any signs of difficulty swallowing.
9. Assist the patient to a comfortable position, ask if they have any questions, and thank them for their time.
10. Ensure safety measures when leaving the room:
    - CALL LIGHT: Within reach
    - BED: Low and locked (in lowest position and brakes on)
    - SIDE RAILS: Secured
    - TABLE: Within reach
    - ROOM: Risk-free for falls (scan room and clear any obstacles)
11. Perform hand hygiene.
12. Document the assessment findings and report any concerns according to agency policy.

7.7 Supplementary Video on Head and Neck Assessment

Review of Head and Neck Assessment on YouTube[1]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1296#oembed-1

1. RegisteredNurseRN. (2017, November 27). *Head and neck assessment nursing | Head to toe assessment of head neck ENT lymphatic cranial nerves* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/MkqCjH-BlMo

7.8 Learning Activities

Learning Activities

(Answers to "Learning Activities'" can be found in the "Answer Key" at the end of the book. Answers to interactive activity elements will be provided within the element as immediate feedback.)

1. You are working as a triage nurse in a primary care clinic. You just received a phone call from a young woman who is complaining of significant discomfort related to newly diagnosed strep throat. **What instructions can you provide to her to aid in symptom management in order to alleviate discomfort?**

2. You are assessing a patient's head and neck and note the following findings. **Which should be reported to the health care provider?**

   a. Tongue is midline
   b. White patches noted on both tonsils
   c. Uvula raises when patient says "Ahhh"
   d. Speech is slurred
   e. Thyroid enlarged

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1298#h5p-121

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1298#h5p-115

Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 7, Assignment 1.

Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 7, Assignment 2.

VII Glossary

Aspiration pneumonia: A type of lung infection caused by material from the stomach or mouth inadvertently entering the lungs that can be life-threatening.

Cranium: Eight bones that protect the brain in the cranial cavity.

Candidiasis: A fungal infection often referred to as “thrush” when it occurs in the oral cavity in children.

Cleft lip: A birth defect caused by a partial or complete failure of the right and left portions of the upper lip to fuse together, leaving a gap in the lip.

Cleft palate: A birth defect caused when two halves of the hard palate fail to completely come together and fuse at the midline, leaving a gap between them, and making it very difficult for an infant to generate the suckling needed for nursing.

Concussion: A type of traumatic brain injury caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the brain to bounce around or twist in the skull, creating chemical changes in the brain and damaging brain cells.

Dysphagia: Difficulty swallowing.

Epiglottis: A flexible piece of cartilage that covers the opening of the trachea during swallowing to prevent ingested material from entering the trachea.

Epistaxis: Nosebleed.

Facial drooping: An asymmetrical facial expression that occurs due to damage of the nerve innervating a particular part of the face.

Goiter: An abnormal enlargement of the thyroid gland that can occur with hypothyroidism or hyperthyroidism.

Hematoma: Collection of blood.

Laryngopharynx: The portion of the pharynx inferior to the oropharynx and posterior to the larynx that is a passageway for ingested material and air until its inferior end where the digestive and respiratory systems diverge into the esophagus and the larynx.

Larynx: The structure connecting the pharynx to the trachea that helps regulate the volume of air that enters and leaves the lungs and contains the vocal cords.

Lymphadenopathy: Enlarged lymph nodes.

Lymph nodes: Structures in the lymphatic system that filter pathogens.

Mandible: Lower jawbone.

Masseter: Main muscle used for chewing because it elevates the mandible to close the mouth.

Maxilla: Bone that forms the upper jaw and supports the upper teeth.

Nares: Nostril openings into the nasal cavity.

Nasal septum: Bone and cartilage that separate the nasal cavity into two compartments.

Nasopharynx: The upper region of the pharynx that connects to the nasal cavity and is a passageway for air.

Orbit: The bony socket that houses the eyeball and muscles that move the eyeball.

Oropharynx: The middle region of the pharynx bordered superiorly by the

nasopharynx and anteriorly by the oral cavity that is a passageway for air and ingested material.

Pharyngitis: Infection and/or inflammation in the back of the throat (pharynx).

Pharynx: A tube lined with mucous membrane that begins at the nasal cavity and is divided into three major regions: the nasopharynx, the oropharynx, and the laryngopharynx.

Sinusitis: Inflamed sinuses caused by a viral or bacterial infection.

Sternocleidomastoid: The major muscle that laterally flexes and rotates the head.

Suture: An interlocking joint between adjacent bones of the skull.

Temporalis: Muscle that assists in chewing by retracting the mandible. The temporalis muscle can be felt moving by placing fingers on the patient's temple as they chew.

Trachea: A tube lined with mucus membrane that carries air from the larynx to the lungs.

Trapezius: The muscle that elevates the shoulders (shrugs), pulls the shoulder blades together, and tilts the head backwards.

Uvula: A small, teardrop-shaped structure located at the apex of the soft palate that swings upward during swallowing to close off the nasopharynx and prevent ingested materials from entering the nasal cavity.

PART VIII

CHAPTER 8 EYE AND EAR ASSESSMENT

8.1 Eye and Ear Assessment Introduction

Learning Objectives

- Perform an eye and ear assessment, including visual acuity, extraocular motion, and hearing acuity
- Modify assessment techniques to reflect variations across the life span
- Document actions and observations
- Recognize and report significant deviations from norms

The ability to see, hear, and maintain balance are important functions of our eyes and ears. Let's begin by reviewing the anatomy of the eye and ear and their common disorders.

8.2 Eye and Ear Basic Concepts

Anatomy of the Eye

Our sense of vision occurs due to transduction of light stimuli received through the eyes. The eyes are located within either orbit in the skull. See Figure 8.1[1] for an illustration of the eye. The eyelids, with lashes at their leading edges, help to protect the eye from abrasions by blocking particles that may land on the surface of the eye. The inner surface of each lid is a thin membrane known as the **conjunctiva**. The conjunctiva extends over the white areas of the eye called the **sclera**, connecting the eyelids to the eyeball. The **iris** is the colored part of the eye. The iris is a smooth muscle that opens and closes the **pupil**, the hole at the center of the eye that allows light to enter. The iris constricts the pupil in response to bright light and dilates the pupil in response to dim light. The **cornea** is the transparent front part of the eye that covers the iris, pupil, and anterior chamber. The cornea, with the anterior chamber and **lens**, refracts light and contributes to vision. The cornea can be reshaped by surgical procedures such as LASIK. The innermost layer of the eye is the **retina** that contains the nervous tissue and specialized cells called photoreceptors for the initial processing of visual stimuli. Two types of photoreceptors within the retina are the rods and the cones. The cones are sensitive to different wavelengths of light and provide color vision. These nerve cells of the retina leave the eye and enter the brain via the **optic nerve** (cranial nerve II).[2]

1. "1411 Eye in The Orbit.jpg" by OpenStax College is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/14-1-sensory-perception
2. Giddens, J. (2007). A survey of physical examination techniques performed by RNs: Lessons for nursing education. *Journal of Nursing Education, 46*(2), 83-87.

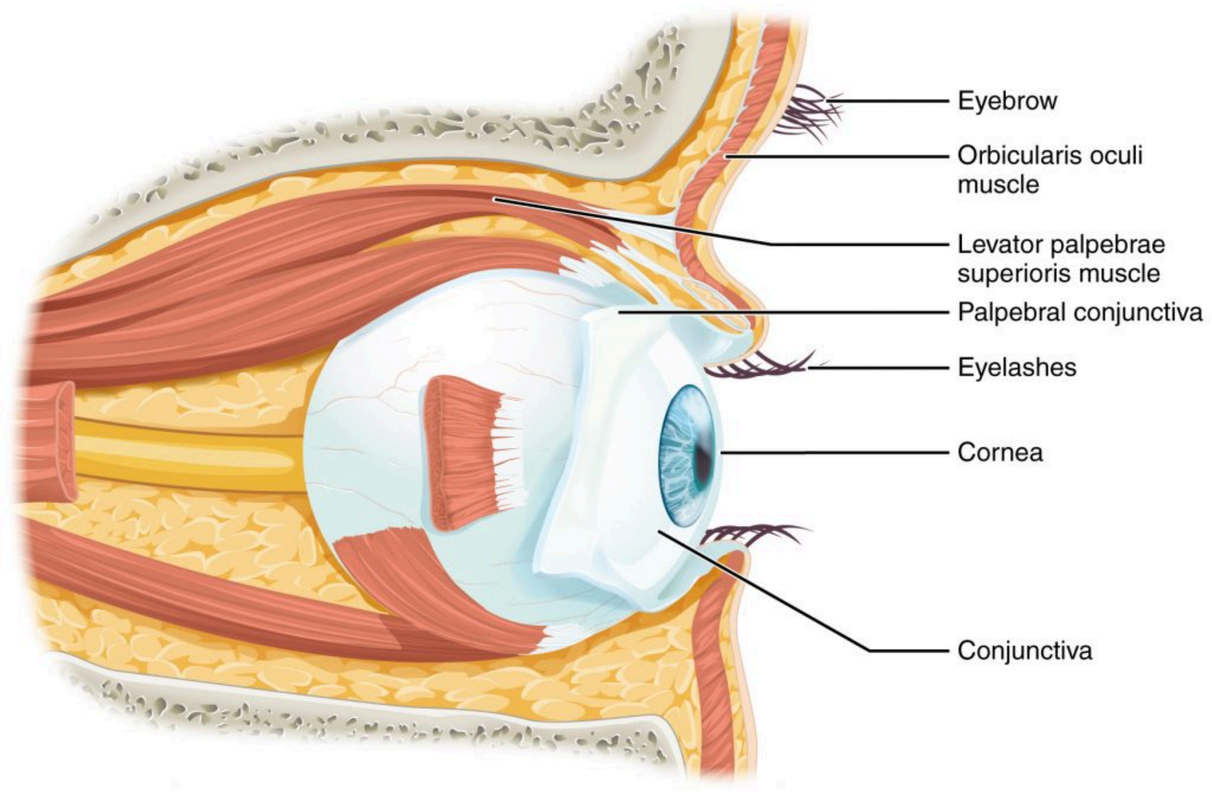

Figure 8.1 The Eye

Tears are produced by the lacrimal gland that is located beneath the lateral edges of the nose. Tears flow through the **lacrimal duct** to the medial corner of the eye and flow over the conjunctiva to wash away foreign particles. Movement of the eye within the orbit occurs by the contraction of six **extraocular muscles** that originate from the bones of the orbit and insert into the surface of the eyeball. The extraocular muscles are innervated by the abducens nerve, the trochlear nerve, and the oculomotor nerve (cranial nerves III, IV, and V).[3] See the illustration of the extraocular muscles in Figure 8.2.[4]

3. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction
4. “1412 Extraocular Muscles.jpg” by OpenStax is licensed under CC BY 3.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/14-1-sensory-perception

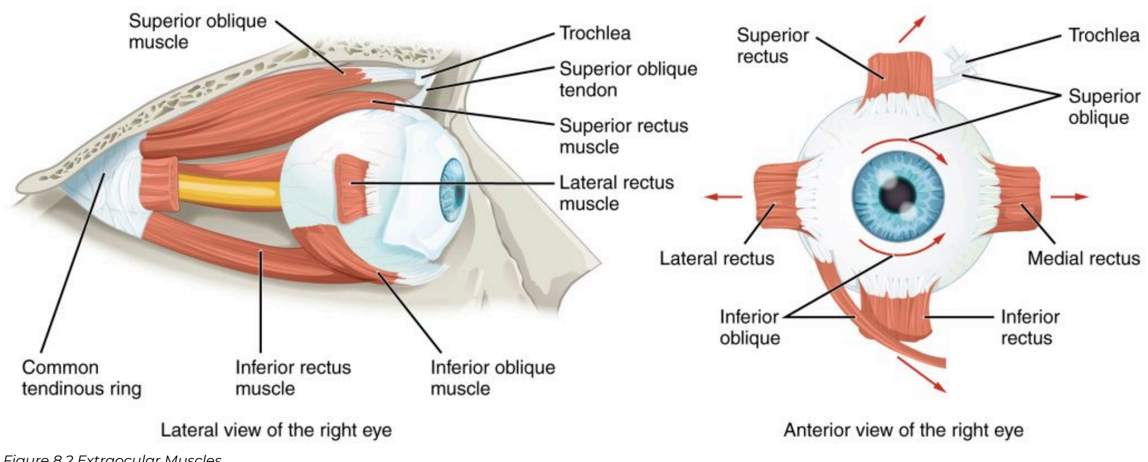

Figure 8.2 Extraocular Muscles

Review for Anatomy of the Eye on YouTube[5]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1011#oembed-1

Common Disorders of the Eye

Eye disorders that nurses commonly see in practice include myopia, presbyopia, color blindness, dry eye, conjunctivitis, styes, cataracts, macular degeneration, and glaucoma.

5. Forciea, B. (2015, May 12). *Anatomy of the eye (v2.0)* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/HmKGyJUcRLw

Myopia

Myopia is impaired vision, also known as nearsightedness that makes far-away objects look blurry. It happens when the eyeball grows too long from front to back or when there are problems with the shape of the cornea or the lens. These problems make light focus in front of the retina, instead of on it, causing blurriness. See Figure 8.3[6] for a simulated image of a person's vision with myopia. Nearsightedness usually becomes apparent between ages 6 and 14. It is corrected with glasses, contacts, or LASIK surgery.[7]

6. "Eye disease simulation, myopia.jpg" by National Eye Institute, National Institutes of Health is in the Public Domain.
7. National Eye Institute. (2019, July 9). *Types of refractive errors*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/refractive-errors/types-refractive-errors#section-id-6802

Figure 8.3 Simulated Vision with Myopia

Presbyopia

Presbyopia is impaired near vision. It commonly occurs in middle-aged and older adults, making it difficult to clearly see objects up close. As people age, the lens in the eye gets harder and less flexible and stops focusing light correctly on the retina.[8] Presbyopia can be corrected with

8. National Eye Institute. (2019, July 9). *Types of refractive errors*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/refractive-errors/types-refractive-errors#section-id-6802

glasses and/or contacts. See Figure 8.4[9] for a simulated image of a person's vision with presbyopia.

Figure 8.4 Simulated Vision with Presbyopia

Color Blindness

Color blindness makes it difficult to differentiate between certain colors. Color blindness can occur due to damage to the eye or to the brain. There's no cure for color blindness, but special glasses and contact lenses can help people differentiate between colors. Most people who have color blindness are able to use visual strategies related to color selection and don't have problems participating in everyday activities.[10]

Dry Eye

Dry eye is a very common eye condition that occurs when the eyes don't

9. "Pesto ingredients - blurred.jpg" by Colin is licensed under CC BY-SA 4.0
10. National Eye Institute. (2019, July 3). *Color blindness*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/color-blindness

make enough tears to stay wet or the tears don't work correctly. Symptoms of dry eye include a scratchy feeling, stinging, and burning. Treatment includes over-the-counter and prescription eye drops, as well as lifestyle changes to decrease the dryness of the eyes.[11]

Conjunctivitis

Conjunctivitis is a viral or bacterial infection that causes swelling and redness in the conjunctiva and sclera. See Figure 8.5[12] for an image of conjunctivitis. The eye may feel itchy and painful with crusty yellow drainage present. Conjunctivitis is very contagious, so the nurse should educate the patient and family caregivers to wash hands frequently. Additionally, the patient should not share items like pillowcases, towels, or makeup. Bacterial conjunctivitis is treated with antibiotic eye drops.[13]

11. National Eye Institute. (2019, July 5). *Dry eye*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/dry-eye
12. "Swollen eye with conjunctivitis.jpg" by Tanalai at English Wikipedia is licensed under CC BY 3.0
13. National Eye Institute. (2019, July 8). *Causes of pink eye*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/pink-eye/causes-pink-eye

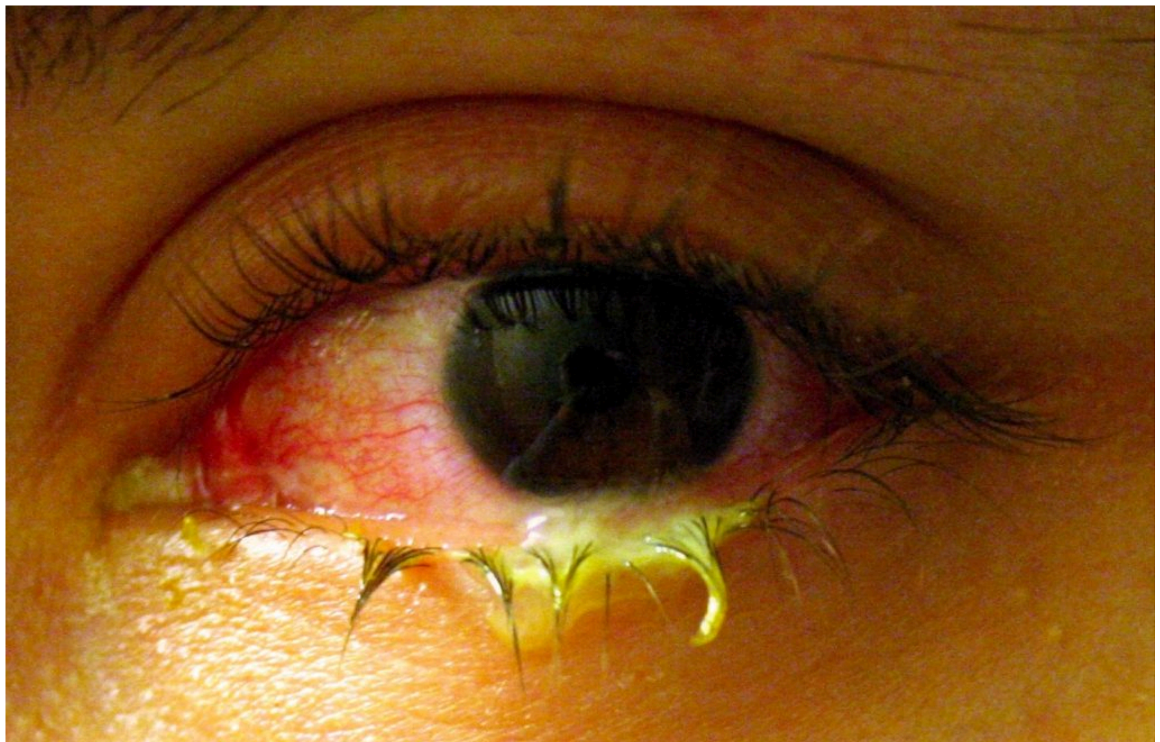

Figure 8.5 Conjunctivitis

Stye

A stye is a bacterial infection of an oil gland in the eyelid, causing a red, tender bump at the edge of the eyelid. See Figure 8.6[14] for an image of a stye. Treatment includes applying warm compresses to the eyelid and prescription eyedrops.[15]

14. "External hordeolum.jpg" by Inrankabirhossain is licensed under CC BY-SA 4.0
15. National Eye Institute. (2019, July 2). *Blepharitis*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/blepharitis

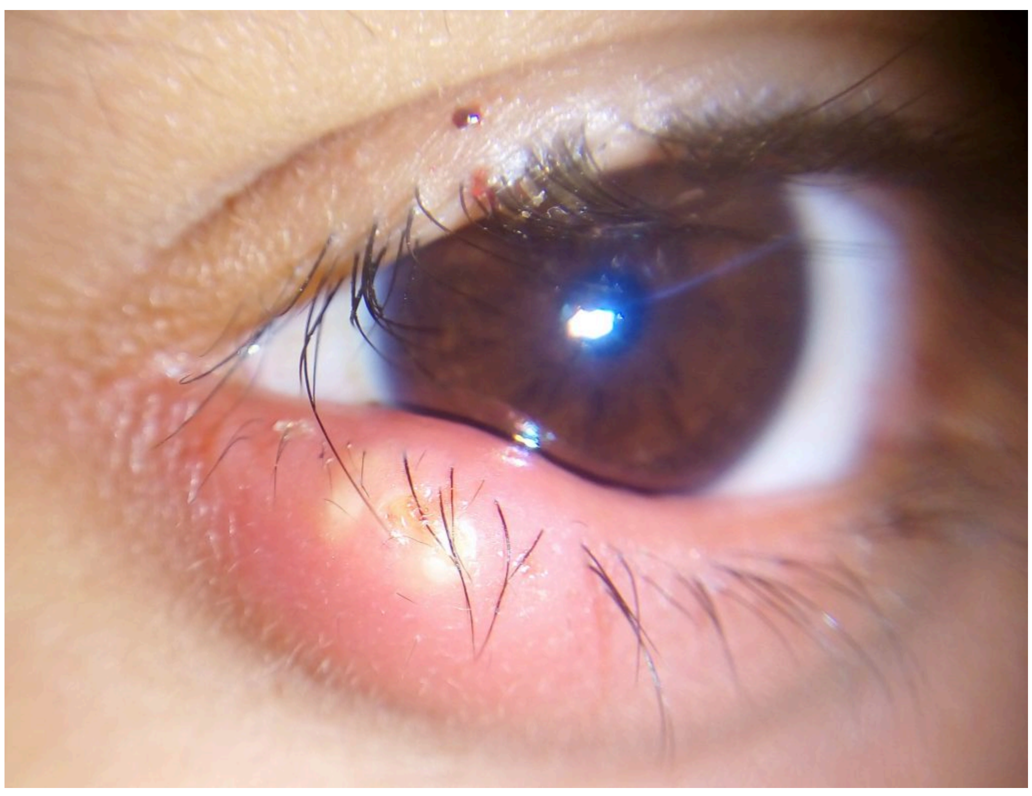

Figure 8.6 Stye

Cataracts

A cataract is a cloudy area on the lens of the eye. Cataracts are very common in older adults. Over half of all Americans age 80 or older either have cataracts or have had surgery to remove cataracts. See Figure 8.7[16] for an image of a cataract. Cataracts develop slowly and symptoms include faded colors, blurred or double vision, halos around light, and trouble seeing at night. See Figure 8.8[17] for a simulated image of a person's vision with cataracts. Decreased vision due to cataracts may result in trouble reading and driving and increases the risk of falling. Patients often undergo surgery for cataracts. During cataract surgery, the doctor removes the clouded lens and replaces it with a new, artificial lens.[18]

16. "Cataract in human eye.png" by Rakesh Ajuja, MD is licensed under CC BY-SA 3.0
17. "Eye disease simulation, cataract.jpg" by National Eye Institute, National Institutes of Health is in the Public Domain.
18. National Eye Institute. (2019, August 3). *Cataracts*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/cataracts

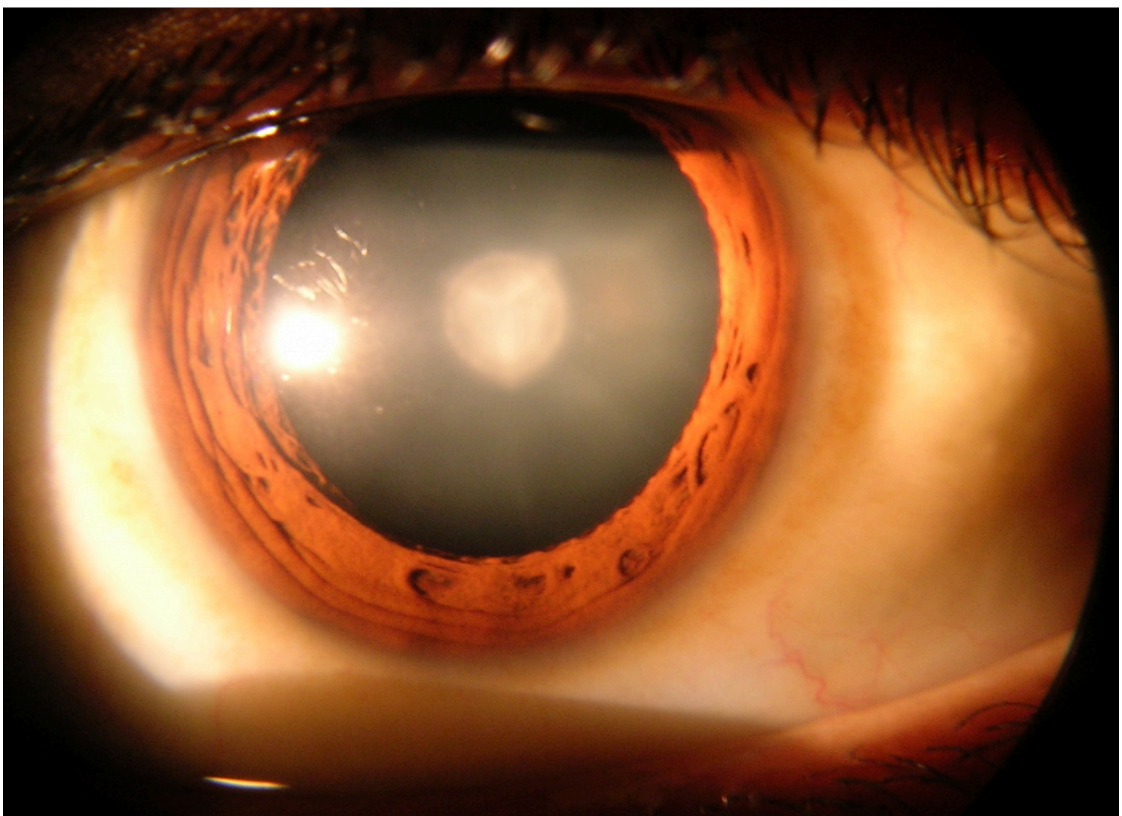

Figure 8.7 Cataracts

Figure 8.8 Simulated Vision with Cataracts

Macular Degeneration

Age-related macular degeneration is a common condition that causes blurred central vision. It is the leading cause of vision loss for people 50 and older. See Figure 8.9[19] for a simulated image of a person's vision with macular degeneration. There are two types of macular degeneration: dry (nonexudative) and wet (exudative). During dry macular degeneration, cellular debris called drusen accumulates and scars the retina. In the wet (exudative) form, which is more severe, blood vessels grow behind the retina that leak exudate fluid, causing hemorrhaging and scarring. There is

19. "Eye disease simulation, age-related macular degeneration.jpg" by National Eye Institute, National Institutes of Health is in the Public Domain.

no treatment for dry macular degeneration, but laser therapy can be used to help treat wet (exudative) macular degeneration.[20]

Figure 8.9 Simulated Vision with Macular Degeneration

Glaucoma

Glaucoma is a group of eye diseases that causes vision loss by damaging the optic nerve due to increased intraocular pressure. Treatment includes prescription eye drops to lower the pressure inside the eye and slow the progression of the disease. If not treated appropriately, glaucoma can cause blindness. Symptoms of glaucoma include gradual loss of peripheral vision. See Figure 8.10[21] for a simulated image of a person's vision with glaucoma. Because the loss of vision occurs so slowly, many

20. National Eye Institute. (2020, August 17). *Age-related macular degeneration*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/age-related-macular-degeneration
21. "Eye disease simulation, glaucoma.jpg" by National Eye Institute, National Institutes of Health is in the Public Domain.

people don't realize they have symptoms until the disease is well-progressed or it is discovered during an eye exam.[22]

Figure 8.10 Simulated Vision with Glaucoma

Screening Tools for Eye Exams

Common screening tools used during an eye exam are the Snellen chart, a near vision chart, and Ishihara plates. Nurses working in outpatient settings or school settings use these tools when screening patients for vision problems. If a vision problem is identified, the patient is referred to an optometrist for further testing. When performing a vision assessment, be sure to provide adequate lighting.

22. National Eye Institute. (2020, July 28). *Glaucoma*. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/glaucoma

Snellen Chart

Distant vision is tested by using the **Snellen chart**. See Figure 8.11[23] for an image of the Snellen chart. Place the patient 20 feet away from the Snellen chart. Ask them to cover one eye and read the letters from the lowest line they can see clearly. Record the corresponding fraction in the furthermost right-hand column. Repeat with the other eye. If the patient is wearing glasses or contact lens during this assessment, document the results as "corrected vision" when wearing these assistive devices.

A person with no visual impairment is documented as having 20/20 vision. A person with impaired vision has a different lower denominator of this fraction. For example, a vision measurement of 20/30 indicates the patient can see letters clearly at 20 feet that a person with normal vision can see clearly at 30 feet.[24] Alternative charts are also available for children or adults who can't read letters in English. See Figure 8.12[25] for an alternative eye chart.

23. "Snellen chart.jpg" by Jeff Dahl is licensed under CC BY-SA 3.0
24. Sue, S. (2007). Test distance vision by using a Snellen chart. *Community Eye Health, 20*(63), 52. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2040251/
25. "US Navy 070808-N-6278K-128 Hospital Corpsman 3rd Class Edward Mace, an optician attached to the Military Sealift Command (MSC) hospital ship USNS Comfort (T-AH 20), instructs a patient on how to read an eye chart.jpg" by Mass Communication Specialist 2nd Class Joan E. Kretschmer for U.S. Navy is in the Public Domain.

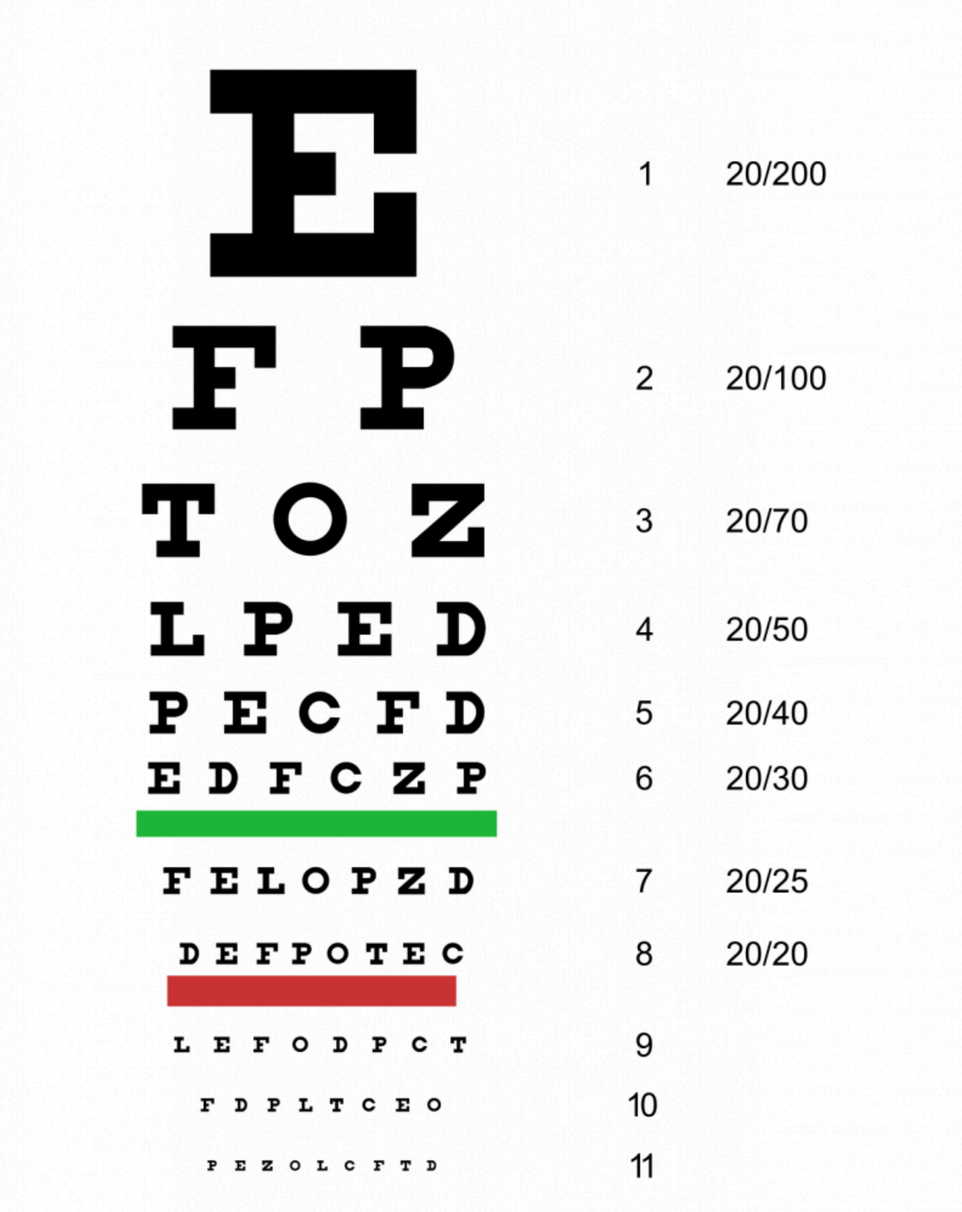

Figure 8.11 Snellen Chart

Figure 8.12 Alternative Eye Chart

Near Vision

Near vision is assessed by having a patient read from a prepared card that is held 14 inches away from the eyes. If a card is not available, the patient can be asked to read from a newspaper as an alternative quick screening tool. See Figure 8.13[26] for an image of a prepared card used to assess near vision.

26. "111012-F-ZT401-067.JPG" by Airman 1st Class Brooke P. Beers for U.S. Air Force is in the Public Domain. Access for free at https://www.pacaf.af.mil/News/Article-Display/Article/593609/keeping-sight-all-right/

Figure 8.13 Assessing Near Vision

Ishihara Plates

Ishihara plates are commonly used to assess color vision. Each of the colored dotted plates shows either a number or a path. See Figure 8.14[27] for an example of Ishihara plates. A person with color blindness is not able to distinguish the numbers or paths from the other colored dots on the plate.

27. This work is a derivative of “Ishihara 9.png” and "Ishihara_1.png" by Shinobu Ishihara and in the Public Domain.

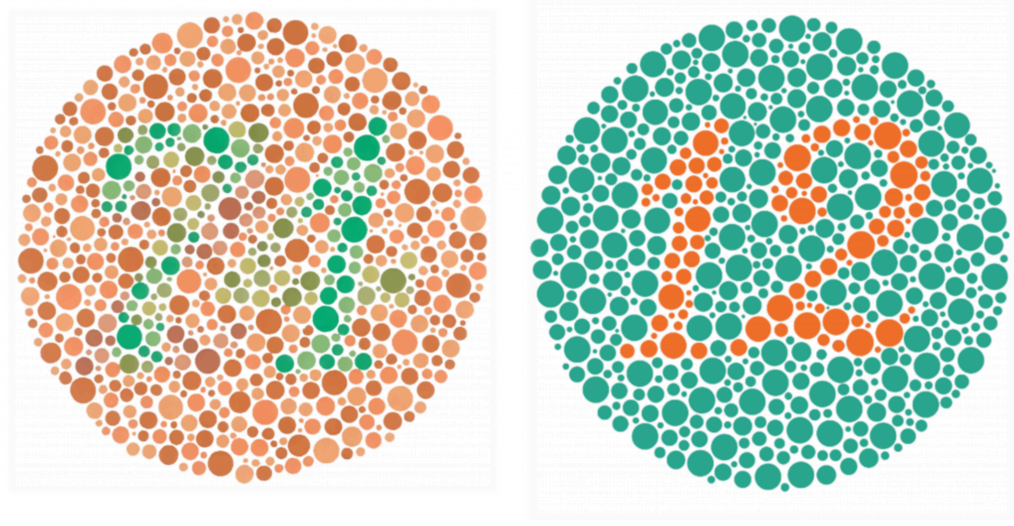

Figure 8.14 Ishihara Color Test Plates

Anatomy of the Ear

Hearing is the transduction of sound waves into a neural signal by the structures of the ear. See Figure 8.15[28] for an image of the anatomy of the ear. The large, fleshy structure on the lateral aspect of the head is known as the **auricle**. The C-shaped curves of the auricle direct sound waves toward the ear canal. At the end of the ear canal is the **tympanic membrane**, commonly referred to as the eardrum, that vibrates after it is struck by sound waves. The auricle, ear canal, and tympanic membrane are referred to as the external ear. The middle ear consists of a space with three small bones called the malleus, incus, and stapes, the Latin names that roughly translate to "hammer," "anvil," and "stirrup." The malleus is attached to the tympanic membrane and articulates with the incus. The incus, in turn, articulates with the stapes. The stapes is attached to the inner ear, where the sound waves are transduced into a neural signal. The middle ear is also connected to the pharynx through the **Eustachian tube** that helps equilibrate air pressure across the tympanic membrane. The Eustachian tube is normally closed but will pop open when the muscles of the pharynx contract during swallowing or yawning. The inner ear is often described as a bony labyrinth because it is composed of a series of

28. "1404 The Structure of the Ear.jpg" by OpenStax is licensed under CC BY 4.0

semicircular canals. The semicircular canals have two separate regions, the cochlea and the vestibule, that are responsible for hearing and balance. The neural signals from these two regions are relayed to the brain stem through separate fiber bundles. However, they travel together from the inner ear to the brain stem as the **vestibulocochlear nerve** (cranial nerve VIII).[29]

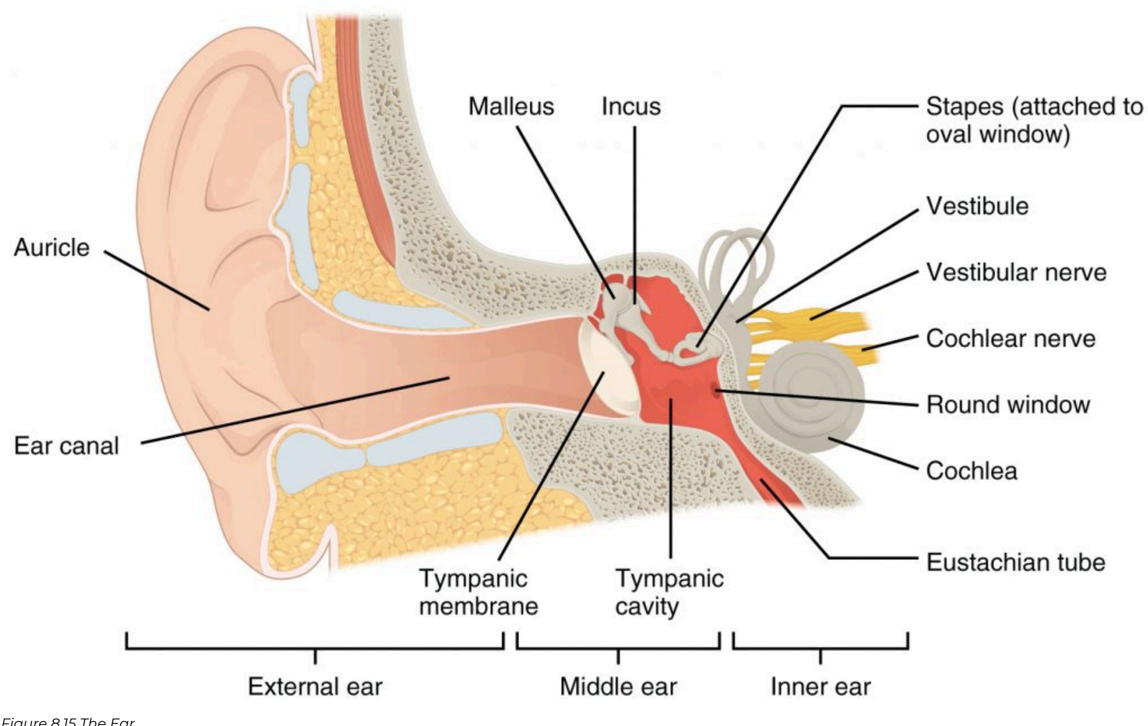

Figure 8.15 The Ear

Hearing

Sound waves cause the tympanic membrane to vibrate. This vibration is amplified as it moves across the malleus, incus, and stapes and into the cochlea. Within the inner ear, the cochlear duct contains sound-transducing neurons. As the frequency of a sound changes, different hair cells within the cochlear duct are sensitive to a particular frequency. In this manner, the cochlea separates auditory stimuli by frequency and sends

29. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

impulses to the brain stem via the cochlear nerve. The cochlea encodes auditory stimuli for frequencies between 20 and 20,000 Hz, the range of sound that human ears can detect.[30]

Balance

Along with hearing, the inner ear is also responsible for the sense of balance. Semicircular canals in the vestibule have three ring-like extensions. One extension is oriented in the horizontal plane, and the other two are oriented in the vertical plane. Hair cells within the vestibule sense head position, head movement, and body motion. By comparing the relative movements of both the horizontal and vertical planes, the vestibular system can detect the direction of most head movements within three-dimensional space. However, medical conditions affecting the semicircular canals cause incorrect signals to be sent to the brain, resulting in a spinning type of dizziness called vertigo.

Review of Anatomy of the Ear on YouTube[31]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1011#oembed-2

30. This work is a derivative of Anatomy & Physiology by OpenStax and is licensed under CC BY 4.0. Access for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction
31. Forciea, B. (2105, May 12). *Anatomy of the ear (v2.0)* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/A2ji_Vd8cuE

Common Ear Disorders

HEARING LOSS

Hearing loss is classified as conductive hearing loss or sensorineural hearing loss. **Conductive hearing loss** occurs when something in the external or middle ear is obstructing the transmission of sound. For example, cerumen impaction or a perforated tympanic membrane can cause conductive hearing loss. **Sensorineural hearing loss** is caused by pathology of the inner ear, cranial nerve VIII, or auditory areas of the cerebral cortex. **Presbycusis** is sensorineural hearing loss that occurs with aging due to gradual nerve degeneration. **Ototoxic medications** can also cause sensorineural hearing loss by affecting the hair cells in the cochlea.

ACUTE OTITIS MEDIA

Acute otitis media is the medical diagnosis for a middle ear infection. Ear infections are a common illness in the pediatric population. Children between the ages of 6 months and 2 years are more susceptible to ear infections because of the size and shape of their Eustachian tubes. Acute otitis media typically occurs after an upper respiratory infection when the Eustachian tube becomes inflamed and the middle ear fills with fluid, causing ear pain and irritability. This fluid can become infected, causing purulent fluid and low-grade fever. Acute otitis media is diagnosed by a health care provider using an otoscope to examine the tympanic membrane for bulging and purulent fluid. If not treated, acute otitis media can potentially cause perforation of the tympanic membrane. Treating early acute otitis media with antibiotics is controversial in the United States due to the effort to prevent antibiotic resistance. However, the treatment goals are to control pain and treat infection with antibiotics if a bacterial infection is present.[32]

32. This work is a derivative of StatPearls by Danishyar and Ashurst and is licensed under CC BY 4.0

Some children develop recurrent ear infections that can cause hearing loss affecting their language development. For children experiencing recurring cases, a surgery called myringotomy surgery is performed by an otolaryngologist. During myringotomy surgery, a tympanostomy tube is placed in the tympanic membrane to drain fluid from the middle ear and prevent infection from developing. If a child has a tympanostomy tube in place, it is expected to see clear fluid in their ear canal as it drains out of the tube. See Figure 8.16[33] for an image of a tympanostomy tube in the ear.[34]

33. "Ear Tube.png" by BruceBlaus is licensed under CC BY-SA 4.0
34. This work is a derivative of StatPearls by Danishyar and Ashurst and is licensed under CC BY 4.0

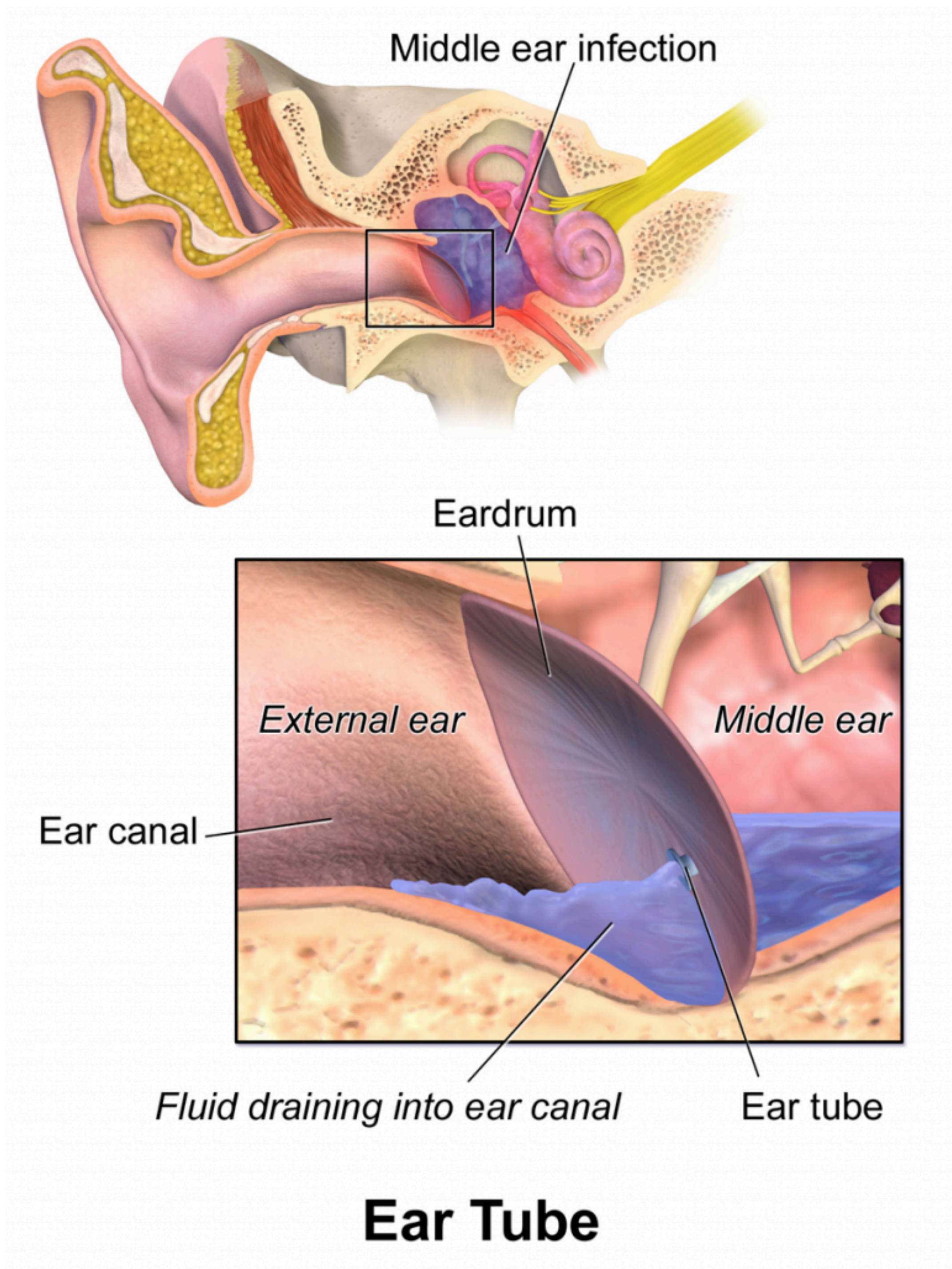

Figure 8.16 Tympanostomy Tube

OTITIS EXTERNA

Otitis externa is the medical diagnosis for external ear inflammation and/

or infection. See Figure 8.17[35] for an image of otitis externa. It is commonly known as “swimmer’s ear” because it commonly occurs in swimmers, especially in summer months. Otitis externa can occur in all age groups and causes an erythematous and edematous ear canal with associated yellow, white, or grey debris. Patients often report itching in the ear canal with pain that is worsened by pulling upwards and outwards on the auricle. Otitis externa is treated with antibiotic drops placed in the ear canals.[36]

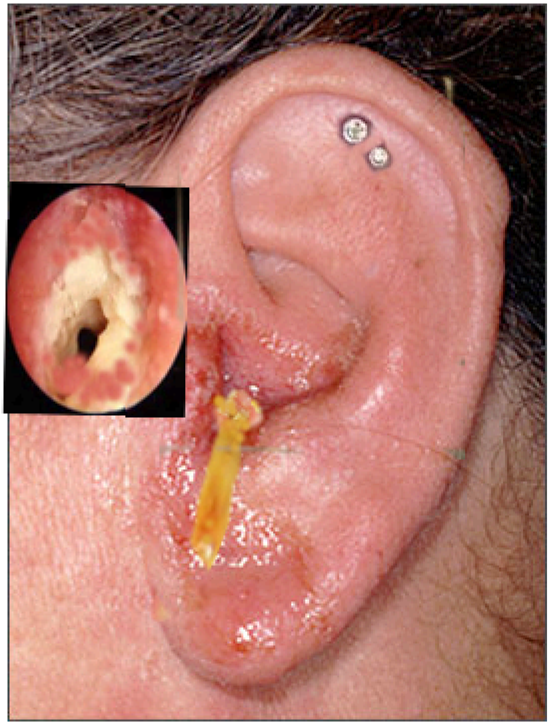

Figure 8.17 Otitis Externa

CERUMEN IMPACTION

Cerumen impaction refers to a buildup of earwax causing occlusion of the ear canal. This occlusion often causes symptoms such as hearing loss, ear fullness, and itching. See Figure 8.18[37] for an image of cerumen impaction.

35. “Otitis externa.gif” by S. Bhjimji MD is licensed under CC BY 4.0. Access for free at https://www.ncbi.nlm.nih.gov/books/NBK556055/
36. This work is a derivative of StatPearls by Medina-Blasini and Sharman and is licensed under CC BY 4.0
37. “Ear Wax.JPG” by Anand2202 is licensed under CC BY-SA 4.0

Cerumen can be removed via irrigation of the ear canal, ear drops to dissolve the wax, or manual removal.[38] In outpatient settings, nurses often assist with ear irrigation to remove cerumen impaction according to agency policy. See Figure 8.19[39] for an image of an ear irrigation procedure.

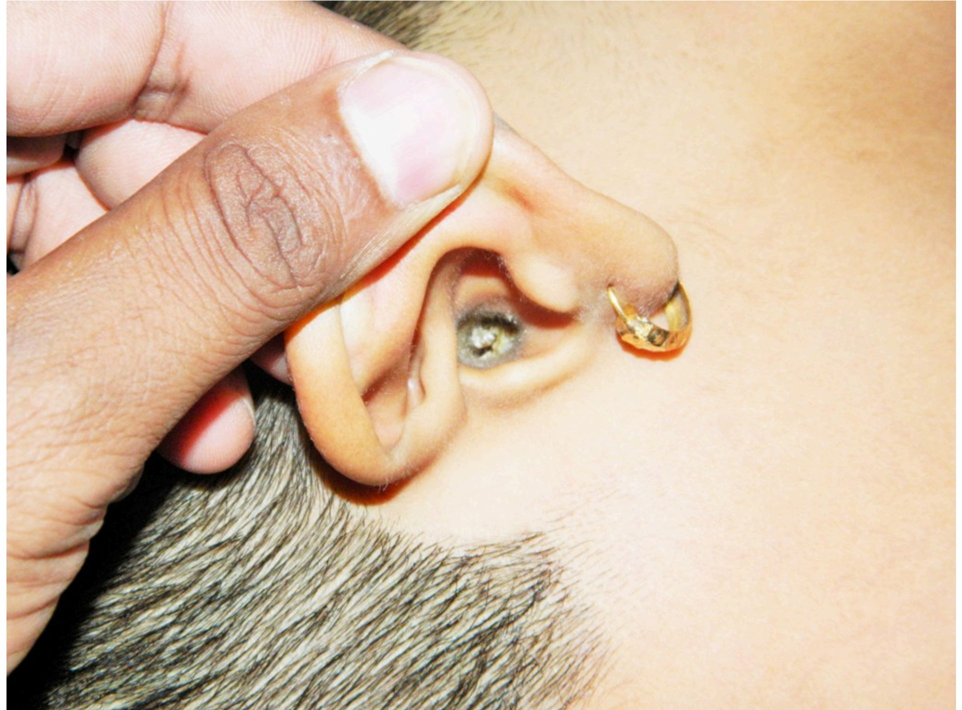

Figure 8.18 Cerumen Impaction

38. This work is a derivative of StatPearls by Mankowski and Raggio and is licensed under CC BY 4.0
39. "150915-F-GO352-025.jpg" by Staff Sgt. Jason Huddleston for U.S. Air Force is licensed under CC0. Access for free at https://www.59mdw.af.mil/News/Article-Display/Article/647342/photo-essay-559th-medical-group-at-a-glance/

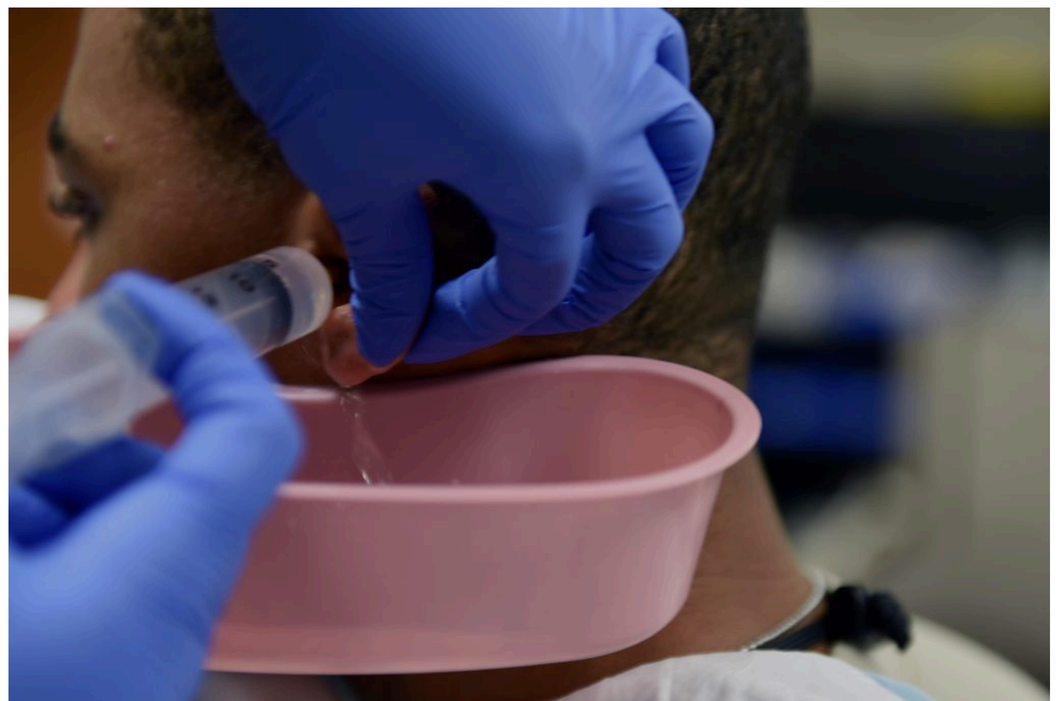

Figure 8.19 Ear Irrigation to Remove Cerumen Impaction

TINNITUS

Tinnitus is a ringing, buzzing, roaring, hissing, or whistling sound in the ears. The noise may be intermittent or continuous. Tinnitus can be caused by cerumen impaction, noise trauma, or ototoxic medications, such as diuretics or high doses of aspirin. Military personnel have a high incidence of tinnitus due to noise trauma from loud explosions and gunfire. There are no medications to treat tinnitus, but patients can be referred to an otolaryngologist for treatment such as cognitive therapy or noise masking.[40]

VERTIGO

Vertigo is a type of dizziness that is often described by patients as, "the room feels as if it is spinning." Benign positional vertigo (BPV) is a common condition caused by crystals becoming lodged in the semicircular canals in the vestibule of the inner ear that send false

40. This work is a derivative of StatPearls by Grossan and Peterson and is licensed under CC BY 4.0

movement signals to the brain. BPV can be treated by trained professionals using a specific set of maneuvers that guide the crystals back to the chamber where they are supposed to be in the inner ear.[41]

41. Woodhouse, S. (n.d.). *Benign paraoxysmal positional vertigo (BPPV)*. Vestibular Disorders Association. https://vestibular.org/article/diagnosis-treatment/types-of-vestibular-disorders/benign-paroxysmal-positional-vertigo-bppv/

8.3 Eye and Ear Assessment

Now that we have reviewed the anatomy of the eyes and ears and their common disorders, let's discuss common eye and ear assessments performed by nurses.

Subjective Assessment

Nurses collect subjective information from the patient and/or family caregivers using detailed questions and pay close attention to what the patient is reporting to guide the physical exam. Focused interview questions include inquiring about current symptoms, as well as any history of eye and ear conditions. See Table 8.3a for suggested interview questions related to the eyes and ears.

Table 8.3a Suggested Interview Questions for Subjective Assessment of the Eyes and Ears

Interview Questions
Eye Have you had any difficulty seeing or experienced blurred vision? Do you wear glasses or contact lenses? When was your last vision test? Have you had any redness, swelling, watering, or discharge from the eyes? Have you ever been diagnosed with an eye condition such as cataracts, glaucoma, or macular degeneration? Are you currently using any medication, eye drops, or supplements for your eyes?
Ear Have you had any trouble hearing? If so, do you wear hearing aids? Have you had any symptoms like ringing in the ears, drainage from the ears, or ear pain? Do you ever feel dizzy, off-balance, or like the room is spinning? Have you ever been diagnosed with an ear condition such as an infection, tinnitus, or vertigo? Are you currently using any medications, ear drops, or supplements for your ears?

Life Span Considerations

Pediatric

When collecting subjective data from children, information is also obtained from parents and/or legal guardians. Children aged 2-24 months commonly experience ear infections. Vision impairments may become apparent in school-aged children when they have difficulty seeing the

board from their seats. Additional subjective data may be obtained by asking these questions:

- Have you or your child's teachers noticed your child experiencing any problems seeing or hearing?
- Has your child experienced frequent ear infections or had tubes placed in their ears? If so, have you noticed any effects on their language development?

Older Adults

The aging adult experiences a general slowing in nerve conduction. Vision, hearing, fine coordination, and balance may also become impaired. Older adults may experience presbyopia (decreased near vision), presbycusis (hearing loss), cataracts, macular degeneration, or glaucoma. They may also experience feelings of dizziness or feeling off-balance, which can result in falls. Read more about these conditions in the "Eye and Ear Basic Concepts" section earlier in this chapter.

Educate all patients to have yearly eye examinations.

Objective Assessment

A routine assessment of the eyes and ears by registered nurses in inpatient and outpatient settings typically includes external inspection of eyes and ears for signs of a medical condition, as well as screening for vision and hearing problems. A vision screening test, whispered voice

hearing test, and assessment of pupillary response are often included in the physical exam based on the setting.[1] Additional assessments may be performed if the patient's status warrants assessment of the cranial nerves.

Inspection

EYES

Begin the assessment by inspecting the eyes. The sclera should be white and the conjunctiva should be pink. There should not be any drainage from the eyes. The patient should demonstrate behavioral cues indicating effective vision during the assessment.

EARS

Inspect the ears. There should not be any drainage from the ears or evidence of cerumen impaction. The patient should demonstrate behavioral cues indicating effective hearing.

Vision Tests

See more information about procedures for assessing vision in the "Eye and Ear Basic Concepts" section earlier in this chapter. Assess far vision using the Snellen eye chart. In outpatient settings, near vision may be assessed using a prepared card or a newspaper. Color vision may be assessed using a book containing Ishihara plates.

1. Giddens, J. (2007). A survey of physical examination techniques performed by RNs: Lessons for nursing education. *Journal of Nursing Education, 46*(2), 83-87.

Hearing Test

Nurses perform a basic hearing assessment during conversation with the patient. For example, the following patient cues during normal conversation can indicate hearing loss:

- Lip-reads or watches your face and lips closely rather than your eyes
- Leans forward or appears to strain to hear what you are saying
- Moves head in a position to catch sounds with the better ear
- Misunderstands your questions or frequently asks you to repeat
- Uses an inappropriately loud voice
- Demonstrates garbled speech or distorted vowel sounds[2]

WHISPER TEST

The whispered voice test is an effective screening test used to detect hearing impairment if performed accurately. Complete the following steps to accurately perform this test[3]:

- Stand at arm's length behind the seated patient to prevent lipreading.
- Test each ear individually. The patient should be instructed to occlude the nontested ear with their finger.
- Exhale before whispering and use as quiet a voice as possible.
- Whisper a combination of numbers and letters (for example, 4-K-2), and then ask the patient to repeat the sequence.
- If the patient responds correctly, their hearing is considered normal; if the patient responds incorrectly, the test is repeated using a different number/letter combination.
- The patient is considered to have passed the screening test if they

2. Jarvis, C. (2015). *Physical examination and health assessment* (7th ed.). Saunders. p. 330.
3. Pirozzo, S., Papinczak, T., & Glasziou, P. (2003). Whispered voice test for screening for hearing impairment in adults and children: Systematic review. *BMJ (Clinical research ed.), 327*(7421), 967. https://doi.org/10.1136/bmj.327.7421.967

repeat at least three out of a possible six numbers or letters correctly.
- The other ear is assessed similarly with a different combination of numbers and letters.

Pupillary Response, Extraocular Movement, and Cranial Nerves

When a patient is suspected of experiencing a neurological disease or injury, their pupils are assessed to ensure they are bilaterally equal, round, and responsive to light and accommodation (PERRLA). Extraocular movement and other cranial nerves that affect vision hearing, and balance may also be assessed. For more information about how to assess PERRLA, extraocular eye movement, and other cranial nerves, go to the "Assessing Cranial Nerves" section in the "Neurological Assessment" chapter.

See Table 8.3b for a comparison of expected versus unexpected findings when assessing the eyes and ears.

Table 8.3b Expected Versus Unexpected Findings on Eyes or Ears Assessment

Assessment	Expected Findings	Unexpected New Findings (Document and notify provider*)

<table>
<tr>
<td>Inspection</td>
<td>Eyes

Sclera is white.

Lens is clear.

Conjunctiva is pink.

Eyelids do not have redness, swelling, lumps, or discharge.

No drainage is present from the eyes.

Patient displays behavioral cues of effective vision.

Eyes appear appropriately placed in orbits.

Ears

No drainage or cerumen is present in the ear canals.

Conversation includes behavioral cues of effective hearing.

During the whispered voice test, the patient correctly reports at least three out of a possible six numbers for both ears.

Patient demonstrates good balance and a coordinated gait.</td>
<td>Eyes

Yellow sclera may indicate liver dysfunction. Cloudy lens indicates cataracts.

Red conjunctiva or drainage can indicate conjunctivitis.

Redness or crusting on the eyelids can indicate blepharitis.

A tender lump on the eye can indicate a stye.

Patient displays behavioral cues indicating vision loss that is not already corrected with glasses or contacts.

Sunken eyes can indicate dehydration.

Ears

Purulent drainage is present in ear canal. Cerumen impaction is present.

Conversation indicates behavioral cues of uncorrected hearing loss.

During the whispered voice test, the patient reports fewer than three out of a possible six numbers or letters correctly for both ears.

Patient demonstrates poor balance or an uncoordinated gait.</td>
</tr>
</table>

***CRITICAL CONDITIONS to report immediately**		New and sudden problems such as vision loss, blurred vision, eye pain, red eye, ear pain, vertigo, poor balance, or gait change

8.4 Sample Documentation

Sample Documentation of Expected Findings

The patient reports no previous history of ear or eye conditions. Eyes have white sclera and pink conjunctiva with no drainage present. Corrected vision with glasses using Snellen chart is 20/20 bilaterally. Ear canals are clear bilaterally. Whispered voice test indicates effective hearing with the patient reporting five out six numbers correctly for both ears. Patient demonstrates good balance and coordinated gait.

Sample Documentation of Unexpected Findings

The patient reports awakening with an irritated left eye and crusty drainage with no change in vision. Sclera in the left eye is pink, conjunctiva is read and yellow crusty drainage present. Patient able to read the newspaper without visual impairment. Dr. Smith notified and evaluated patient at 1400. Order for antibiotic eyes drops received and administered. Patient and family members educated to wash hands frequently to avoid spreading infection.

8.5 Checklist for Eye and Ear Assessment

Use the checklist below to review the steps for completing an "Eye and Ear Assessment."

Steps

Disclaimer: Always review and follow agency policy regarding this specific skill.

1. Gather supplies: penlight, Ishihara plates, Snellen chart, Rosenbaum card, or a newspaper to read.
2. Perform safety steps:
    - Perform hand hygiene.
    - Check the room for transmission-based precautions.
    - Introduce yourself, your role, the purpose of your visit, and an estimate of the time it will take.
    - Confirm patient ID using two patient identifiers (e.g., name and date of birth).
    - Explain the process to the patient and ask if they have any questions.
    - Be organized and systematic.
    - Use appropriate listening and questioning skills.
    - Listen and attend to patient cues.
    - Ensure the patient's privacy and dignity.
    - Assess ABCs.
3. Use effective interview questions to collect subjective data about eye or ear problems.
4. Inspect the external eye. Note any unexpected findings.
5. Assess that pupils are equally round and reactive to light and accommodation (PERRLA).

6. Assess extraocular movement.
7. Inspect the external ear. Note any unexpected findings.
8. Assess distance vision acuity using the Snellen eye chart and proper technique.
9. Assess near vision acuity using a prepared card or newspaper.
10. Asses for color blindness using the Ishihara plates.
11. Assess hearing by accurately performing the whisper test.
12. Assist the patient to a comfortable position, ask if they have any questions, and thank them for their time.
13. Ensure safety measures when leaving the room:
    - CALL LIGHT: Within reach
    - BED: Low and locked (in lowest position and brakes on)
    - SIDE RAILS: Secured
    - TABLE: Within reach
    - ROOM: Risk-free for falls (scan room and clear any obstacles)
14. Perform hand hygiene.
15. Document the assessment findings. Report any concerns according to agency policy.

8.6 Supplementary Video on Eye Assessment

Review for Eye Assessment on YouTube[1]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://wtcs.pressbooks.pub/nursingskills/?p=1021#oembed-1

1. RegisteredNurseRN. (2017, November 16). *Eye assessment nursing | How to assess eyes for head-to-toe assessment* [Video]. YouTube. All rights reserved. Video used with permission. https://youtu.be/pgSj3l9iV6k

8.7 Learning Activities

Learning Activities

(Answers to "Learning Activities" can be found in the '"Answer Key" at the end of the book. Answers to interactive activity elements will be provided within the element as immediate feedback.)

When conducting the general survey and patient health history, a nurse can look for many assessment cues that may indicate that the patient has hearing difficulty. **Describe three different cues that the nurse might identify to reflect an auditory challenge.**

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1024#h5p-124

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1024#h5p-45

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://wtcs.pressbooks.pub/nursingskills/?p=1024#h5p-96

Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 8, Assignment 1.

Test your clinical judgment with an NCLEX Next Generation-style question: Chapter 8, Assignment 2.

VIII Glossary

Acute otitis media: The medical diagnosis for a middle ear infection.

Auricle: The large, fleshy structure of the ear on the lateral aspect of the head.

Cerumen impaction: A buildup of earwax causing occlusion of the ear canal.

Conductive hearing loss: Hearing loss that occurs when something in the external or middle ear is obstructing the transmission of sound.

Conjunctiva: Inner surface of the eyelid.

Conjunctivitis: A viral or bacterial infection in the eye causing swelling and redness in the conjunctiva and sclera.

Cornea: The transparent front part of the eye that covers the iris, pupil, and anterior chamber.

Eustachian tube: The tube connecting the middle ear to the pharynx that helps equilibrate air pressure across the tympanic membrane.

Extraocular muscles: Six muscles that control the movement of the eye within the orbit. Extraocular muscles are innervated by three cranial nerves, the abducens nerve, the trochlear nerve, and the oculomotor nerve.

Iris: Colored part of the eye.

Lacrimal duct: Tears produced by the lacrimal gland flow through this duct to the medial corner of the eye.

Lens: An inner part of the eye that helps the eye focus.

Myopia: Impaired vision, also known as nearsightedness, that makes far-away objects look blurry.

Optic nerve: Cranial nerve II that conducts visual information from the retina to the brain.

Otitis externa: The medical diagnosis for external ear inflammation and/or infection.

Ototoxic medications: Medications that cause the adverse effect of sensorineural hearing loss by affecting the hair cells in the cochlea.

Presbycusis: Sensorineural hearing loss that occurs with aging due to gradual nerve degeneration.

Presbyopia: Impaired near vision that commonly occurs in middle-aged and older adults.

Pupil: The hole at the center of the eye that allows light to enter.

Retina: The nervous tissue and photoreceptors in the eye that initially process visual stimuli.

Sclera: White area of the eye.

Sensorineural hearing loss: Hearing loss caused by pathology of the inner ear, cranial nerve VIII, or auditory areas of the cerebral cortex.

Snellen chart: A chart used to test far vision.

Tinnitus: Ringing, buzzing, roaring, hissing, or whistling sound in the ears.

Tympanic membrane: The membrane at the end of the external ear canal, commonly called the eardrum, that vibrates after it is struck by sound waves.

Vertigo: A type of dizziness often described by patients as "the room feels as if it is spinning."

Vestibulocochlear nerve: Cranial nerve VIII that transports neural signals

from the cochlea and the vestibule to the brain stem regarding hearing and balance.

PART IX

CHAPTER 9 CARDIOVASCULAR ASSESSMENT

9.1 Cardiovascular Assessment Introduction

Learning Objectives

- Perform a cardiovascular assessment, including heart sounds; apical and peripheral pulses for rate, rhythm, and amplitude; and skin perfusion (color, temperature, sensation, and capillary refill time)
- Identify S1 and S2 heart sounds
- Differentiate between normal and abnormal heart sounds
- Modify assessment techniques to reflect variations across the life span
- Document actions and observations
- Recognize and report significant deviations from norms

The evaluation of the cardiovascular system includes a thorough medical history and a detailed examination of the heart and peripheral vascular system.[1] Nurses must incorporate subjective statements and objective findings to elicit clues of potential signs of dysfunction. Symptoms like fatigue, indigestion, and leg swelling may be benign or may indicate something more ominous. As a result, nurses must be vigilant when collecting comprehensive information to utilize their best clinical judgment when providing care for the patient.

1. Felner, J. M. (1990). An overview of the cardiovascular system. In Walker, H. K., Hall, W. D., & Hurst, J. W. (Eds.), *Clinical methods: The history, physical, and laboratory examinations* (3rd ed., Chapter 7). Butterworths. https://www.ncbi.nlm.nih.gov/books/NBK393/