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 \(\PageIndex{1}\)\(^1\) 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.\(^2\)
The brain case surrounds and protects the brain that occupies the cranial cavity. See Figure \(\PageIndex{2}\)\(^3\) 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.\(^4\)

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 \(\PageIndex{3}\)\(^5\) 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 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.

![Coronal Sutures in Lateral View of Skull](https://med.libretexts.org/Bookshelves/Nursing/Nursing_Skills_(OpenRN)/07%3A_Head_and_Neck_Assessment/7.02%3A_H…)

**Paranasal Sinuses**

The paranasal sinuses are hollow, air-filled spaces located within the skull. See Figure 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.

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.
Anatomy of Nose, Pharynx, and Mouth

See Figure \(\PageIndex{5}\)\(^{[9]}\) 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 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.\(^{[10]}\)
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 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 \(\PageIndex{6}\)\(^{[13]}\) for an image of the oral cavity and oropharynx with enlarged palatine tonsils.

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.\footnote{14}

### Muscles and Nerves of the Head and Neck

#### Facial Muscles

Several nerves innervate the facial muscles to create facial expressions. See Figure \ref{PageIndex7} 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 \ref{PageIndex7}: Nerve Branches Innervating Facial Muscles](https://med.libretexts.org/Bookshelves/Nursing/Nursing_Skills_(OpenRN)/07%3A_Head_and_Neck_Assessment/7.02%3A_H…)

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 specific part of the face. See Figure \ref{PageIndex8} for an image of facial drooping occurring on the patient's right side of their face.
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-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 \(\PageIndex{9}\) for an illustration of the sternocleidomastoid and trapezius muscles. Both of these muscles are tested during a cranial nerve assessment. See more information about cranial nerve assessment in the “Neurological Assessment” chapter.

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 be felt moving by placing fingers on the patient’s temple as they chew. See Figure \(\PageIndex{10}\) for an illustration of the 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.\cite{21}

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 \ref{PageIndex{11}}\cite{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.\cite{23}

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.

**Note**

View the following video from Medline Plus on the Swallowing Process:

[Swallowing](https://www.medlineplus.gov/ency/images/00099.html)

**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. 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, abdomen, and groin. See Figure 12 and Figure 13 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.
Figure \(\PageIndex{12}\): Lymphatic System

Figure \(\PageIndex{13}\): Lymph Nodes in Head and Neck


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