

Applied Human Structure and Function PAS-703**Head and Neck – 100 Points****Due February 8, 2021****PART I. Circle statements that are correct. (20 pts (1/2 pt ea))**

1. The pretracheal space can spread infection to the superior mediastinum and the retropharyngeal space can spread infection to the posterior mediastinum.
2. A puncture wound to the oral pharynx invades the retropharyngeal space before invading the prevertebral space.
3. Infections within the cervical spaces are indicated by stridor.
4. The nerve to mylohyoid is a branch off the hypoglossal nerve within the submandibular triangle, and supplies SVE innervation to both mylohyoid and the anterior belly of digastric.
5. The ansa cervicalis can be distinguished from the right recurrent laryngeal nerve because it travels anterior to the subclavian artery.
6. The great auricular nerve provides SVE innervation to the auricularis and GSA innervation to the opening of the external acoustic meatus.
7. Muscles in the circumorbital/palpebral group are innervated by the temporal and zygomatic branches of the facial nerve
8. Muscles that elevate the upper lip are innervated by the zygomatic and buccal branches of the facial nerve
9. The ophthalmic division of the trigeminal nerve (V1) subserves the afferent limb of the corneal blink reflex.
10. Iatrogenic injury to the right recurrent laryngeal nerve may result in ipsilateral vocal fold paralysis.
11. A lesion of the right hypoglossal nerve (CN XII) causes tongue deviation to the contralateral (left) side of the lesion.
12. The inferior alveolar nerve travels through the mandibular foramen and canal.
13. The mandibular nerve goes through the foramen spinosum to enter the infratemporal fossa.
14. The medial pterygoid muscle and lateral pterygoid muscle are contents of the infratemporal fossa.
15. Translational movements (protraction and retraction) are predominately movements of the superior synovial cavity.
16. The posterior auricular nerve emerges prior to the facial nerve entering the parotid gland.
17. The posterior opening of the pterygoid canal is into the region of the lacerate foramen within the cavernous sinus.
18. The intracranial region of the pterion is grooved by the posterior branch of the middle meningeal artery.

19. The sphenoparietal sinus is located along the lesser wing of the sphenoid bone and drains into the cavernous sinus.
20. The articular disc of the triangular fibrocartilage complex (TFCC) limits wrist adduction and is located between the distal ulna and the triquetrum.
21. The basilar venous plexus communicates with the inferior petrosal sinus and with the marginal sinus.
22. The pterygoid canal provides a bony communication between the pterygopalatine fossa and the middle cranial fossa.
23. The cerebral aqueduct connects the 3rd and 4th ventricles.
24. The post-central gyrus is also known as primary motor cortex.
25. Unilateral cavernous sinus thrombosis/infection is indicated by adduction of the contralateral eye.
26. The mucosa of the tympanic cavity is innervated by the recurrent tympanic nerve and tympanic plexus.
27. The depression in the center of the optic disc is called the fovea centralis.
28. The nasolacrimal duct extends inferiorly from the lacrimal sac and opens into the superior meatus of the nasal cavity.
29. Aqueous humor is absorbed into the scleral venous sinus (the canal of Schlemm).
30. The lateral rectus muscle adducts the globe and is the sole innervation of the abducens nerve.
31. The superior oblique muscle moves the globe in abduction, depression, and medial rotation (intorsion).
32. The frontal nerve, lacrimal nerve, and trochlear nerve all enter the orbit without passing through the annulus tendineus.
33. Contraction of the cricothyroid muscle rocks the thyroid cartilage anterior with respect to the cricoid cartilage, causing decreased tension of the true vocal folds.
34. The internal branch of the superior laryngeal nerve pierces the cricothyroid membrane to enter the larynx.
35. During whispering the true vocal folds are adducted and air escapes between the arytenoid cartilages. There is no vibration of the vocal folds.
36. The levator veli palatini, tensor veli palatini, and salpingopharyngeus muscles contribute to the movements of swallowing and to the equalization of air pressure in the middle ear.
37. The gag reflex is mediated by the GVA component of the glossopharyngeal nerve.
38. The median and lateral glossoepiglottic folds define the vallecula.
39. The tympanic canaliculus transmits the recurrent tympanic nerve.
40. The phrenic nerve descends along the anterior surface of the anterior scalene muscle deep to the prevertebral fascia and, therefore, may be affected by brachial plexus anesthesia within the axillary sheath.

PART II. Answer in the space provided (including back of page). (80 pts)

1. Question Number _____ (10 pts)

2. Question Number _____. (10 pts)

3. Question Number _____. (10 pts)

4. Question Number _____. (10 pts)

5. Question Number _____. (10 pts)

6. Question Number _____. (10 pts)

7. Question Number _____. (10 pts)

8. Question Number _____. (10 pts)

List of Questions

1. **Lecture 37.** An apical abscess of the lower molars may erupt into the floor of the mouth and then enter the submandibular space by way of the posterior free edge of the mylohyoid muscle. This infection may then erode into deeper cervical regions. **Discuss the spaces defined by the cervical fasciae. Include boundaries, contents, relationships, lymphatic drainage, and clinical significance.**
2. **Lecture 38.** A 56 year-old female presents with miosis, mild ptosis, anhidrosis, flushed skin and conjunctival injection on the left side of the face. She has left upper limb weakness, hiccups, and hoarseness. She is diagnosed with a Pancost tumor of the left lung. **Describe the boundaries and contents (including nerves, vasculature, fascia, and lymphatic structures) of the left vertebral triangle. Explain the presentation of her symptoms.**
3. **Lecture 38.** A 31-year-old patient is suspected of having bacterial meningitis. A lumbar puncture is performed. A neck dissection is performed to remove a tumor within the carotid triangle. **Discuss the anatomical structures which may be affected by the tumor. Include in your answer boundaries, contents, fascial layers, vasculature, and nerves of the carotid triangle.**
4. **Lecture 39.** A 50-year-old female presents to the ED with ptosis and drooping on the left side of her face. Upon examination, she cannot fully close her eye and has the inability to smile. **Describe the anatomy of the facial nerve and muscles of facial expression. What muscle does each branch innervate? What are the functions of these muscles and how do they convey expression?**
5. **Lecture 39.** A 30-year-old male with multiple head lacerations is rushed to the Emergency Department. One wound is superficial and bleeding profusely, the other is a large scalp avulsion with minimal bleeding. Describe the anatomy of the scalp including fascial layers, vasculature, and lymphatics. **Include how those layers relate to the fascial layers of the face. Why does one bleed more than the other?**
6. **Lecture 40.** A 34-year-old female has hoarseness, dysphagia, weakness of the left sternocleidomastoid muscle, and weakness of the tongue. There is uvular deviation to the right, tongue deviation to the left upon protrusion, and left vocal cord paralysis. Radiographic studies confirm a glomus tumor near the jugular foramen. **Describe the anatomy of the posterior cranial fossa, with emphasis on cranial nerve anatomy. Account for the patient's symptoms. If the tumor is left untreated, discuss additional deficits this patient might experience.**
7. **Lecture 40.** A 26-year-old male has drooping of his left face and hyperacusis of his left ear. He has a "scratchy" painful sensation in his left eye and decreased taste on the left side of his anterior tongue. **Describe the anatomy of the facial nerve. Account for the symptoms described above. What is your diagnosis? Define a lesion location that accounts for these symptoms.**
8. **Lecture 41.** A 16-year-old patient presents with trismus (painful muscle spasms) of the medial pterygoid muscle and a dental abscess of the 3rd mandibular molar. The patient has an infection in the infratemporal fossa. **Discuss the anatomy of the infratemporal fossa including muscles, vasculature, nerves, and autonomic ganglia. Account for the spread of infection from the infected molar into the infratemporal fossa.**
9. **Lecture 41.** A 35-year-old patient has an inability to sense temperature, pain, or touch on the anterior 2/3 of the tongue. They have no taste deficits on their tongue. The lingual branch of the trigeminal nerve is affected, while the chorda tympani nerve is unaffected. **Discuss the branches of the mandibular division of the trigeminal nerve and their functions. Describe the function of chorda tympani and lingual nerve. Where is the lesion located?**

10. **Lecture 42.** A patient has pain, swelling and stiffness of the jaw and face. There is difficulty with jaw closure. The mandible is misaligned. **Discuss the anatomy of the temporomandibular joint, including bones, ligaments, muscles, movements, cavities and contents. Provide a diagnosis for the patient.**
11. **Lecture 42.** A patient had a large tumor in their left parotid gland and underwent parotidectomy. Following surgery, the patient suffered moderate left-sided facial paralysis. **Discuss the anatomy of the parotid region, including boundaries, contents, relationships, innervation and function. What may have caused the facial paralysis.**
12. **Lecture 43.** A weekend warrior, not wearing a batter's helmet, is hit on the side of the head by a wild pitch. Initially, she is "knocked out." She regains consciousness. Then, thirty minutes later she, once again, loses consciousness. **Discuss the anatomy of the pterion and epidural hematoma.**
13. **Lecture 44.** A 38 year-old male presents to the Emergency Department with a swollen left eye. He denies trauma to the eye. He initially reports having a headache "on the top of my head." He now has a generalized headache, fever, pain behind his eye, and double vision. On exam, there is ptosis, proptosis, conjunctival injection, and inability to track with his left eye. He has hyperesthesia of his left face, from the lateral forehead to the upper lip. His fundoscopic exam displays papilledema. **Discuss the anatomy of the cavernous sinus. Include boundaries, contents, and relationships. Account for symptoms caused by damage to structures within the cavernous sinus?**
14. **Lecture 45.** A 19-year-old baseball player is hit in the side of the head by a wild pitch. He lost consciousness immediately. He is now lucid and reports of a headache. Radiographic examination shows that he has an epidural hematoma. **What artery was most likely ruptured to cause this epidural hematoma? Describe the layers and spaces of the meninges that surround the brain. Compare and contrast epidural and subdural hematomas.**
15. **Lecture 45.** A 65-year-old has sudden onset of a severe headache and stiff neck. Radiographic examination shows a ruptured aneurysm at the proximal aspect of the middle cerebral artery. **Where would blood collect? Discuss the blood supply to the brain. Define the arteries that make up the circle of Willis.**
16. **Lecture 47.** A patient has a tumor on the cranial floor at the entrance to the internal acoustic meatus. Another patient has a tumor within the parotid gland. Both patients have facial muscle paralysis. **Discuss the anatomy, functional components, and distribution of the facial nerve. Compare the deficits caused by a lesion of the facial nerve at the internal auditory meatus to the deficits caused by a lesion of the facial nerve at the parotid gland.**
17. **Lecture 47.** Damage to the lingual nerve disrupts GSA (touch, temperature, pain, and pressure) sensation to the tongue. SVA (taste) sensation and GVE (salivation) may be intact, or not, depending on the location where the lingual nerve is damaged. For example, the patient may appreciate sweetness, but not temperature. **Provide an anatomical account for the dissociation of the GSA, GVE, and SVA functional components supplying the tongue based on the location of damage to the lingual nerve.**
18. **Lecture 48.** A 60-year-old woman is diagnosed with glaucoma, a condition of increased intra-ocular pressure due to an increased volume of aqueous humor in the anterior and posterior chambers of the globe. **Discuss the anatomy of the globe. Be sure to describe the refracting media of the globe, including the aqueous humor.**
19. **Lecture 48.** Blinking of the eyelids spreads tears across the surface of the eyeball. **Discuss the anatomy of the eyelid and the lacrimal apparatus. Consider describing the path of a tear.**
20. **Lecture 49.** **Discuss the anatomy of the annulus tendineus. Include relationships to superior orbital fissure and nerves, arteries, and veins.**

- 21. Lecture 49.** Discuss the autonomic innervation to the orbit and globe. Include preganglionic and postganglionic pathways leading to the orbit.
- 22. Lecture 50.** A 53 year old female opera singer presents has a goiter. During a thyroidectomy procedure, the surgeon accidentally transects the right recurrent laryngeal nerve. The left recurrent laryngeal nerve remains intact. **List the specific functions of the recurrent laryngeal nerve with respect to the larynx (including sensory and motor innervation). Describe the potential deficits the patient may experience. Would the patient still be able to speak? Is her operatic career over?**
- 23. Lecture 51.** A sugar-crazed 27-year-old female had an apical root infection of the second lower molar that erupted into a space deep to the mucosa of the floor of the mouth. Infection spread to adjacent cervical spaces. Subsequent swelling caused stridor and death. **Discuss the retropharyngeal space and danger space. Define the facial layers defining these spaces. Why is an infection into the danger space life threatening?**
- 24. Lecture 51.** A 55-year-old male was drinking a soda, when his colleague made a hilarious joke. As he began laughing, the soda shot out his nose and he began coughing. The pharynx participates in swallowing and respiration, it is essential that swallowed contents do not enter the larynx or nasopharynx. **Review the anatomy of pharyngeal regions and movements during swallowing that separate the pathway of swallowed contents from the pathway of respiration. Account for the cough reflex.**
- 25. Lecture 52.** A seventy two year-old male complains of hoarseness and postnasal drip. There is a distinct smell of tobacco. He has ptosis of the left eye and the left pupil is smaller than the right. There is fullness over the left supraclavicular region. A Pancoast tumor is highly suspected. **Discuss the anatomy of the left vertebral triangle. Include boundaries, contents, relationships, fascial specializations, vasculature, innervation, lymphatic drainage, and the clinical significance of damage to structures in the area.**
- 26. Lecture 53.** A 45-year-old patient reports to the clinic with ear pain. Nasal, oral, pharyngeal, or laryngeal cancers may present with the chief concern of ear pain as an initial symptom. **Discuss the sensory innervation to the external and middle ear that may mediate referred pain from the nasal cavity, oral cavity, pharynx, and larynx.**
- 27. Lecture 53.** A 4-year-old boy had a cold and now complains of an ear ache. There are increased air-fluid levels in the tympanic cavity and an inflamed tympanic membrane. He is diagnosed with otitis media. **Discuss the anatomy of the tympanic cavity including bones, muscles, vasculature, and innervation.**
- 28. Lecture 54.** A treatment for trigeminal neuralgia is to inject nerve blocking agents into the pterygopalatine fossa. This procedure blocks neural transmission for all nerves within the pterygopalatine fossa. Thereafter, the patient may suffer from a disruption of functional components (GVA, SVA, GVE, GSA) within the nervous distributions of the pterygopalatine fossa. **Review the distribution of nervous pathways of the pterygopalatine fossa.**