EXAM NUMBER_____

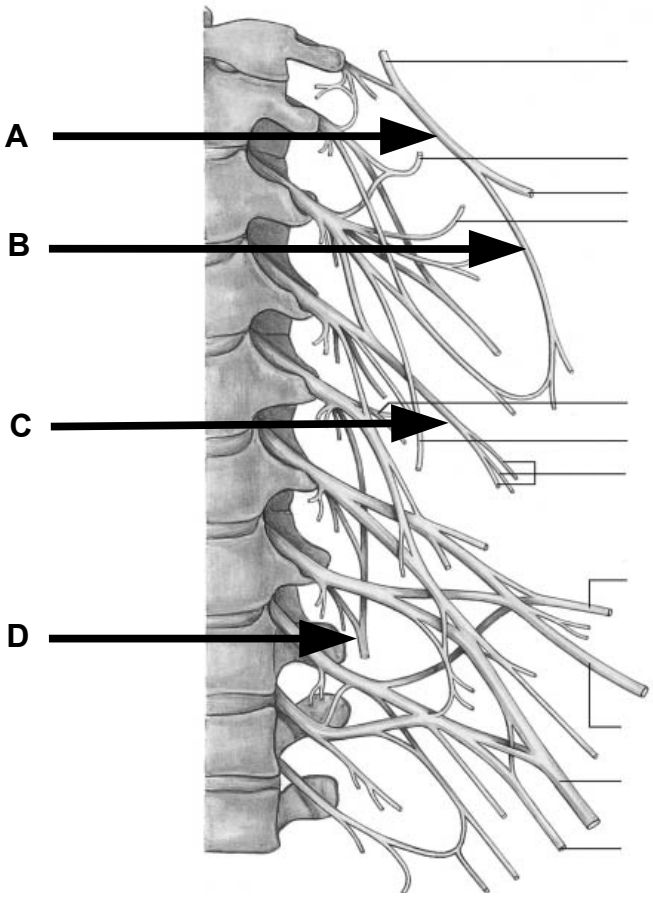
STRUCTURAL BASIS OF MEDICAL PRACTICE

EXAMINATION 7

October 19, 2012

PART I. Answer in the space provided. (12 pts)

1. **Identify the structures. (2 pts)**



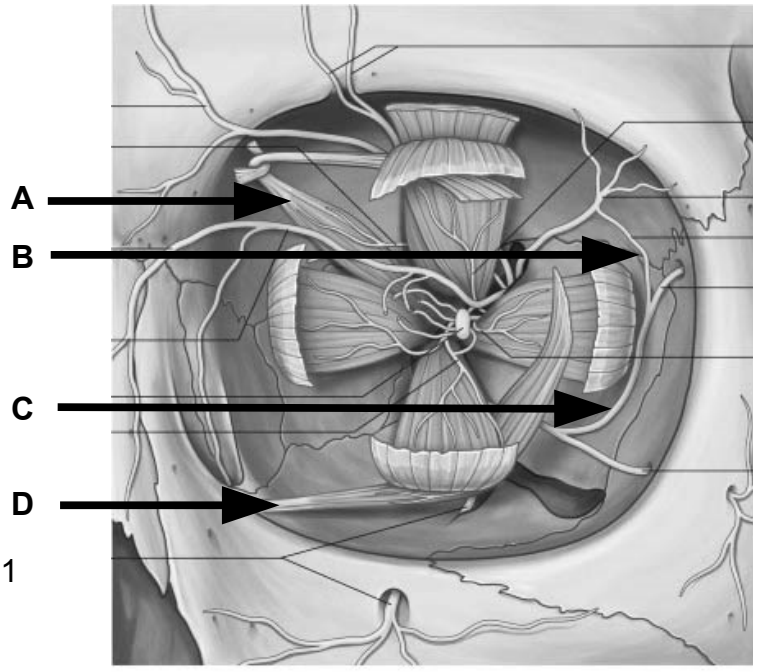
   a. _____

   b. _____

   c. _____

   d. _____

2. **Identify the structures. (2 pts)**



   a. _____

   b. _____

   c. _____

   d. _____

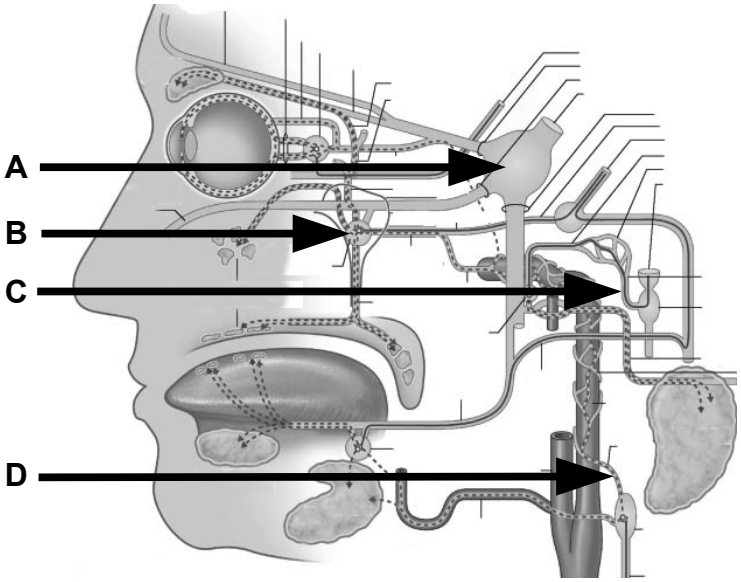
3. **Identify the structures. (2 pts)**

   a. _____

   b. _____

   c. _____

   d. _____



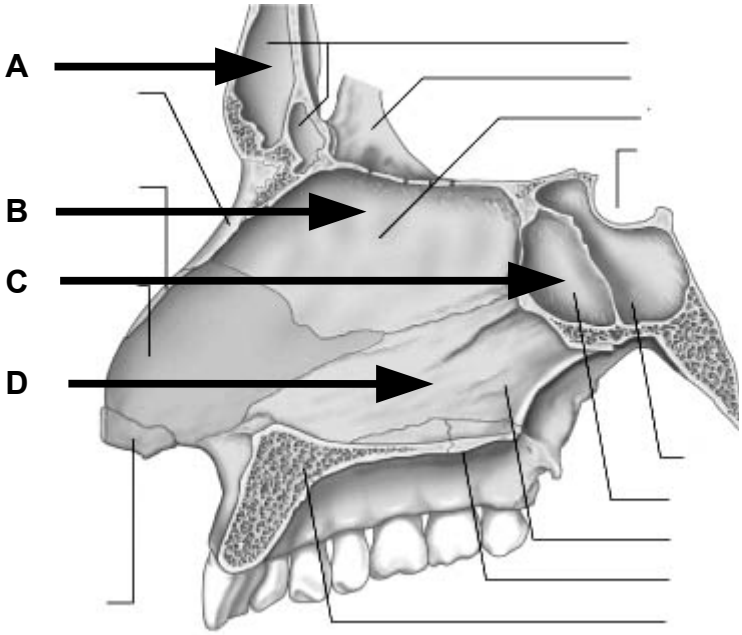
4. **Identify the structures. (2 pts)**

   a. _____

   b. _____

   c. _____

   d. _____



EXAM NUMBER_____

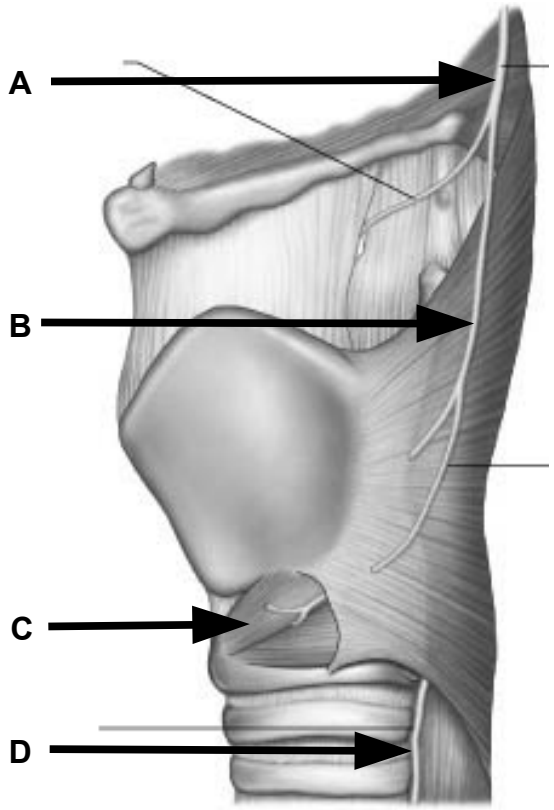
5. **Identify the structures. (2 pts)**

   a. _____

   b. _____

   c. _____

   d. _____



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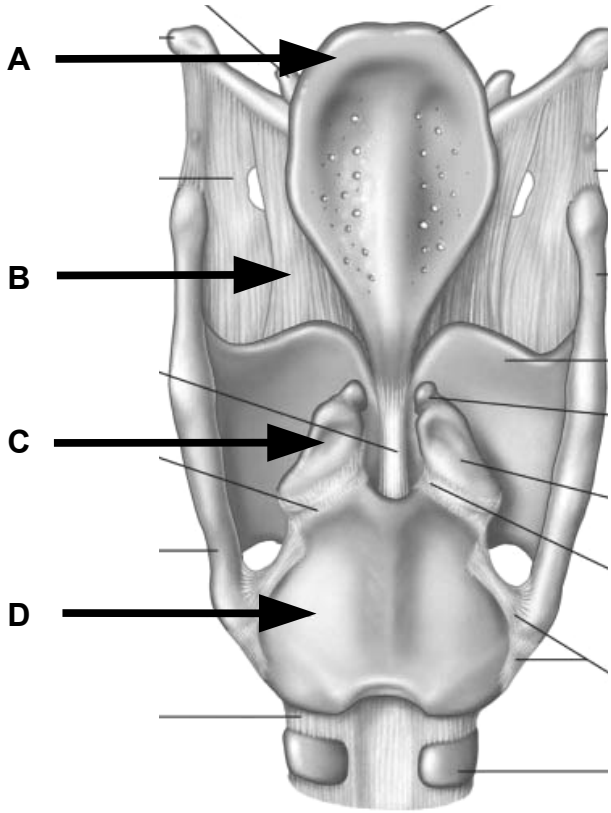
6. **Identify the structures. (2 pts)**

   a. _____

   b. _____

   c. _____

   d. _____



Part II. Circle the correct answer. All, none, or some may apply. (18 pts)

1. **With regard to the cranial nerves:**

   a. A pituitary tumor may compress the optic nerves and disrupt peripheral vision

   b. The deep petrosal nerve combines with the lesser superficial petrosal nerve to form the nerve of the pterygoid canal.

   c. A lesion of the lingual nerve at the floor of the mouth disrupts temperature, touch, and pain sensation (GSA) to the ipsilateral anterior two thirds of the tongue but does not disrupt taste sensation (SVA).

   d. The SVE functional component of the trigeminal nerve provides the muscles of mastication.

   e. The SVE functional component of the trigeminal nerve contributes to the elevation of the soft palate towards Passavant's ridge and the equalization of air pressure within the middle ear.

   f. Bilateral lesions of the recurrent laryngeal nerves may lead to airway obstruction due to abduction of the true vocal cords.

   g. A deviated protrusion of the tongue indicates a lesion of the hypoglossal nerve that is on the same side as the deviation.

   h. The lesser superficial petrosal nerve controls watery, but not thick, salivary secretion from the submandibular gland.

   i. A lesion of the glossopharyngeal nerve at the posterior margin of the tongue disrupts elevation of the larynx during swallowing, the gag reflex, and taste sensation to the posterior one-third of the tongue.

   j. The GSA fibers that ultimately make up the external nasal nerve pass through three cranial fossae, the cavernous sinus, orbit, anterior ethmoidal air cells, anterior cranial fossa, cribriform plate, and nasal cavity before entering the face.

   k. The maxillary nerve exits the middle cranial fossa to enter the pterygopalatine fossa by passing through the pterygoid canal.

   l. The lacrimal, frontal, and trochlear nerves do not typically pass through the annulus tendineus (of Zinn).

   m. A lesion of the inferior division of the oculomotor nerve at the annulus tendineus is expected to disrupt GSE and GVE components.

   n. The recurrent tympanic nerve, a branch of the chorda tympani, enters the tympanic cavity to provide SVE inneravtion to the stapedius muscle.

2. **With regard to the anterior and posterior triangles of the neck:**

   a. The phrenic nerve is deep to the prevertebral fascia and anterior to the transverse cervical artery.

   b. The nerve to geniohyoid travels, in part, with the hypoglossal nerve.

   c. The hypoglossal nerve hosts non-native fibers derived from the cervical plexus.

   d. The cricothyroid muscle, when fully contracted, raises the pitch of the voice.

   e. The lingula of the mandible is a site of attachment for the sphenomandibular ligament.

   f. The superior laryngeal nerve passes through the thyrohyoid membrane with the superior laryngeal artery.

3. **With regard to the skull, face, and scalp:**

   a. The buccal branch of the facial nerve provides GVA fibers to the mucosa lining of the buccinator muscle and GVE fibers to the parotid ganglion.

   b. Condylar emissary veins participate in spreading infections from the “loose areolar space” of the scalp to intracranial locations.

   c. The buccal nerve, derived from the mandibular division of the trigeminal nerve, provides SVE fibers to the buccinator muscle.

   d. The parotid duct pierces the buccinator muscle adjacent to the upper second molar.

4. **With regard to the temporomandibular joint, temporal fossa, and infratemporal fossa:**

   a. The lingula of the mandible is a site of attachment for the stylohyoid ligament.

   b. Injury to the auriculotemporal nerve at a location medial to the neck of the mandible disrupts salivation from the parotid gland.

5. **With regard to the cranial fossae and dural sinuses:**

   a. The superior petrosal sinus passes inferior to the trigeminal nerve.

   b. The foramen cecum of the skull provides a venous communication between the superior sagittal sinus and the nasal cavity.

6. With regard to the larynx, pharynx, and oral cavity:

a. The mylohyoid muscle has a posterior free edge that allows infections of the upper molar teeth to spread to the spaces defined by cervical fascia.

b. The buccinator muscle and the middle constrictor muscle have a common site of attachment at the pterygomandibular raphe.

c. The lateral cricoarytenoid muscle abducts the false vocal fold.

d. The palatoglossus and salpingopharyngeus muscles are innervated by the vagus nerve.

7. With regard to the temporal bone and ear:

a. Excavation of the the mastoid air cells may endanger the sigmoid sinus.

b. The tensor tympani muscle is innervated by SVE fibers from the trigeminal nerve and the stapedius muscle is innervated by GSE fibers from the facial nerve.

c. The footplate of the stapes is oval shaped and attaches to the round window.

d. The chorda tympani nerve passes through the inner ear on the lateral side of the incus and the medial side of the malleus.

Part III. Questions for Clinical Correlations. (4 pts)

1. A 45 year old male undergoes arthroscopic temporomandibular joint surgery due to chronic pain. An incision is made into the lateral joint space capsule and the articular disc is freed of its muscle attachments prior to placement back into the articular space. **As a result of this procedure, which of the following mandibular movements is most likely to be affected?**

a. Elevation and protrusion

b. Elevation and retraction

c. Depression and protrusion

d. Depression and retraction

2. A 44 year old female is injured during a fall while rock climbing. She is brought to the emergency department obtunded. A CT scan reveals a skull fracture and an epidural hematoma causing increased intracranial pressure. **A fracture through which of the following structures is most likely the cause of the resulting hematoma?**

a. Cavernous sinus

b. Jugular foramen

c. Floor of the orbit

d. Squamous portion of the temporal bone

e. Lesser wing of the sphenoid bone

3. A 76 year old male presents to his physician with complaints of decreased taste over the last 3 months. On exam, his tongue protrudes without deviation. He has normal distribution of the papillae but decreased sensation to touch and taste over the posterior tongue surface. An MRI of the brain shows a 2 x 2 centimeter tumor adjacent to the jugular foramen. **Which of the following is most likely to occur as a result of this tumor?**

a. Weakness in swallowing

b. Reduced taste in the anterior 2/3's of the tongue

c. Deviation of the uvula to the side of the tumor

d. Increased gag reflex

e. Decreased saliva production from the submandibular gland

4. A 76 year old male is admitted to the intensive care unit due to sepsis from urinary tract infection. Vital signs show his temperature = 39.5 degrees Celsius, heart rate =120 beats per minute, blood pressure is 80/40 mmHg and his respiratory rate = 22 per minute. He is dehydrated on examination and a decision is made to place a large bore catheter in his left internal jugular vein for intravenous fluids. During the placement of the catheter at the level of the sternohyoid muscle, the needle is passed through the internal jugular vein striking a structure medial to the vessel. The patient immediately complains of nausea. **Which of the following would most likely be expected to change in this patient's vital signs due to irritation of the structure the needle encountered?**

a. Increase in the temperature

b. Increase in the blood pressure

c. Decrease in the heart rate

d. Decrease in the respiratory rate

e. Numbness in the distal aspect of the left arm

f. Change in the pitch of the voice

Part IV. Indicate your understanding of the following. Answer in the space provided. (30 pts)

1. A 61-year-old female complains of coughing when she swallows. Her physical examination reveals weakness in elevating the floor of the mouth and larynx. **Provide a developmental account for the adult anatomy, innervation, and function of the digastric muscle. (6 pts)**

2. A 45-year-old female complains of numbness along the left side of her chin and tongue. Her physical examination reveals a unilateral loss of touch sensation to the anterior two-thirds of her tongue. Her ability to taste is unimpaired. A tumor of the left mandibular nerve at the foramen ovale is highly suspected. **Provide a developmental account for the adult anatomy, function, and innervation of the tongue. (6 pts)**

3. Enlarged adenoids may disrupt the normal functioning of the auditory tube. **Review the anatomy, relationships, and functions of the auditory tube. (6 pts)**

4. Autonomic disturbances may disrupt the normal functioning of the pupil. **Review the anatomy, relationships, and significance of the ciliary ganglion. (6 pts)**

5. 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. **Review the anatomy, relationships, and significance of the retrophyarngeal space. (6 pts)**

Part V. Answer in the space provided. Include the back of each page. (36 pts)

1. A seventy two year-old male comes to your office with complaints of hoarseness and postnasal drip. You note the 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, and lymphatic drainage. (12 pts)**

2. A 38 year-old male presents to the E.D. with a swollen left eye. He denies any trauma to the eye. He does report, initially, having a headache "on the top of my head." He now has a generalized headache, fevers, pain behind his eye, and if you open his eyelid he reports double vision. On exam, the patient appears ill with obvious ptosis, proptosis, and inability to track with his left eye during extra-ocular muscle testing. He has hyperesthesia on the skin of his left face, from the forehead to just above the mandible. His fundoscopic exam displays papilledema. **Discuss the anatomy of the cavernous sinus. Include boundaries, contents, and relationships. What symptoms are caused by damage to the structures and cranial nerve functional components within the cavernous sinus?** (12 pts)

3. A 27 year-old male medical student presents with complaints of left sided headache. He has been studying for an upcoming neuroanatomy exam and is now convinced that he has a "brain tumor." He states it is "worse in the morning" and thinks it might be affecting his hearing because he has noted some pain in his left ear. On exam, the patient has some difficulty opening his mouth and it appears that his mandible deviates to the left side. His left external ear canal and tympanic membrane are normal in appearance and he has no hearing deficits on gross testing. When you palpate anterior to the tragus of the left ear it is tender and there is a "clicking" appreciated with jaw opening. **Review the anatomy of the temporomandibular joint and infratemporal fossa. Include bones, boundaries, contents, bony communications, ligaments, muscles, movements and limitations of movement, vasculature and venous communications, innervation and functional components, relationships to surrounding structures, lymphatic drainage, and significance. (12 pts)**