Head and Neck Anatomy

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June 28, 2021
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Course format

1. Lectures at 1:00 pm on every Monday and Wednesday (via zoom)

2. Laboratory dissection sessions with TAs and faculty
   Group 1: 2:45 pm to 3:45 pm
   Group 2: 4:00 pm to 5:00 pm

3. Review sessions with TAs on July 17, 18 (before midterm) and July 31 and August 1 (before final) examinations
Anatomy Lab access code: 11111

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Authorized people only
1. All PPTs can be downloaded at ccmb.usc.edu/teaching-resources/ & Dropbox

2. Head and Neck Dissection Guide (PDF file)

3. Learning objectives in course syllabus

4. Study Guide for each session

5. Check-lists for midterm and final examinations
Dissection Videos

https://vimeo.com/showcase/7264128

Password: HeadNeckVideos
Examinations (ExamSoft)

- Midterm Examination
  July 19, 2021

- Final Examination
  August 4, 2021
Head and Neck Anatomy
Mandibular block and potential clinical complications
Anatomy and facial trauma
Odontogenic infection
Spread of Odontogenic Infection
Intraoral I&D
Extraoral I&D

Potential damage to the facial nerve (mandibular branch)
Pericoronitis and the spread of odontogenic infection
Maxillary sinus and dental implants
Alignment of posterior implants
Alignment of posterior implants
Anatomy of the Posterior Mandible

Mylohyoid shelf

Submandibular (submylohyoid) fossa
Important Anatomy for the Posterior Mandible

Lingual Nerve
Submandibular Fossa
Mandibular Canal
Mental Foramen
Learning objectives
1. Learn the anatomy of the neck, anterior & posterior triangles, cervical fascia and the associated clinical considerations
2. Identify and describe all branches of the external carotid artery, identify internal and common carotid arteries. Know the function and innervation of the carotid body and the carotid sinus.
3. Describe all venous structures and nerves in the neck.
4. Describe all muscles in the anterior and posterior triangles of the neck, know their innervations and functions.
5. Identify submandibular and sublingual glands, describe nerve innervations to these salivary glands
6. Learn the lymphatic drainage of the head and neck. Describe the spread of infection in the head and neck region.
7. Describe arteries, veins, nerves and muscles at the root of the neck.
Boundaries of the Neck

• Anterior Aspect:
  Superior: Inferior border of the mandible
  Inferior: Superior surface of the manubrium and clavicle

• Posterior Aspect:
  Superior: Superior nuchal line
  Inferior: Horizontal line between C7 and T1
Neck anatomy
Platysma

- Covers mainly anterior aspect of the neck.
- Origin: deltoid and pectoralis fasciae.
- Insertion: inferior border of mandible and skin as well as hypodermis in this region.
- Function: assist depression the lower lip and corner of mouth.
- Innervation: cervical br. of facial N. (VII).
Sensory Innervation of Neck

- C1, C2, C3, and most of C4 form the cervical plexus (Somatosensory)

- Front of neck:
  1. Great auricular N. (C2 & C3)
  2. Transverse cervical N. (C2 & C3)
  3. Supraclavicular N. (C2 & C4)
     a. Anterior (medial)
     b. Middle (intermediate)
     c. Posterior (lateral)
Posterior Aspect of Neck

- Greater occipital N. (C2)
- Lesser occipital N. (C2)
- Third occipital N. (C3)
- C4 and C5
Ansa Cervicalis

- **Two roots** (formed by C1, C2, and C3)
  - Superior root (travels with CN XII)
  - Inferior root (from cervical region)

*Function: Motor innervation of infrahyoid muscles*
Accessory Nerve (CN XI)

Two components of fibers
1. Cranial root
2. Spinal root

Function: motor innervation of
1. Sternocleidomastoid muscle (SCM)
2. Trapezius muscle
Phrenic Nerve (C3, C4, and C5)

- Motor: Diaphragm
- Sensory: Mediastinal pleura and pericardium of the heart
Cervical Plexus

1. Motor
2. Sensory

Cervical sympathetic trunk, vagus nerve, and glossopharyngeal nerve have been cut. The dashes line indicates a segment of the epineurium of the hypoglossal nerve.
Anterior Triangle of Neck

Boundaries:

Superior: Inferior border of mandible
Posterior: Anterior border of SCM
Anterior: Midline of the neck
Subdivisions of anterior triangle of the neck

1. Muscular Triangle
2. Carotid Triangle
3. Submandibular Triangle
4. Submental Triangle
Subdivisions of anterior triangle of the neck

1. Muscular Triangle

Boundaries:

- **Superior:** Superior belly of omohyoid
- **Inferior:** Anterior border of SCM
- **Anterior:** Midline

Contents:

- a. sternohyoid (ansa)
- b. sternothyroid (ansa)
- c. thyrohyoid (C1 via CN XII)
- d. omohyoid (ansa)
Fig. 707: Infrahyoid and Scalene Muscles of the Neck
2. Carotid Triangle

Boundaries:

Superior: Posterior belly of digastric muscle
Inferior: Superior belly of omohyoid
Posterior: Anterior border of SCM
28. Common carotid artery
29. Internal carotid artery
30. External carotid artery
31. Superior thyroid artery
32. External branch of the superior laryngeal nerve
33. Thyrohyoid
34. Superior laryngeal artery
35. Internal branch of the superior laryngeal nerve
36. Thyrohyoid membrane
Carotid triangle continued:

Contents:

a. common carotid  
   - internal carotid artery  
   - external carotid artery  
b. internal jugular vein  
c. vagus N (CN X)  
d. ansa cervicalis

Carotid Sinus and Carotid Body  
- Carotid sinus: BP regulator, CN IX  
- Carotid body: Chemoreceptor, CN IX
Branching of the superior laryngeal nerve (SLN)
3. Submandibular Triangle

Boundaries:

Superior: Inferior border of mandible
Anterior: Anterior belly of digastric muscle
Posterior: Posterior belly of digastric muscle

Contents:

a. SMG (submandibular gland)
b. lymph nodes (submandibular group)
c. facial artery
d. facial vein
Innervation of submandibular and sublingual glands
SS
Para pre & taste
SS, Para pre & taste
4. Submental Triangle

Boundaries:

Lateral: both anterior bellies of digastric muscle

Inferior: hyoid bone
Branches of the external carotid artery
Branches of External Carotid Artery

1. Superior Thyroid Artery
2. Ascending Pharyngeal Artery
3. Lingual Artery
4. Facial Artery
5. Occipital Artery
6. Posterior Auricular Artery
7. Maxillary Artery
8. Superficial Temporal Artery
Branches of External Carotid Artery
Superior thyroid artery
Ascending pharyngeal artery (#3)
  a. pharyngeal
  b. meningeal
  c. inferior tympanic (to tympanic cavity)

Lingual artery (#4)
  travels deep to hypoglossal nerve (CN XII) to the muscles of tongue.

Facial artery (#5)
Occipital artery (#6)
Posterior auricular artery (#7)
Maxillary artery
Superficial temporal artery

Terminal branches of the external carotid artery
Common facial vein
Posterior auricular and retromandibular veins contribute to the external jugular vein.
Root of the neck

- Longus capitis
- Middle scalene
- Anterior scalene
- Ascending cervical artery
- Inferior thyroid artery
- Longus colli
- Vertebral artery
- Cervicodorsal trunk
- Suprascapular artery
- Right phrenic nerve
- Right and left vagus nerves (CN X)
- Right subclavian artery
- Right common carotid artery
- Right subclavian vein
- Right recurrent laryngeal nerve
- 1st rib
- Cervical pleura overlying lung
- Right brachiocephalic vein
- Left brachiocephalic vein
- Left common carotid artery

- Esophagus
- Carotid tubercle (C6)
- Trachea
- Left recurrent laryngeal nerve
- Left phrenic nerve
- C5
- C6
- C7
- C8
- T1
- Anterior rami forming roots of brachial plexus
- Left subclavian artery
- Vertebral artery (entering foramen transversarium of C6 superiorly)
- Thyrocervical trunk
- Cervical pleura
- Left subclavian vein
- Thoracic duct
- Internal thoracic artery
- Costal parietal pleura

(A) Anterior view
Review of lymph formation:

- Blood passes through capillaries
- Net loss of fluid into extracellular space
- Fluid moves into tiny lymph capillaries, bringing **cellular debris and antigenic material** into lymphatic circulation, where it is captured in the **lymph nodes**
Lymphatics in the head & neck
Lymphatics:

**Thoracic duct** receives lymph from the lower extremities, abdomen, left upper extremity, left chest, left side of the head & neck.

**Right lymphatic duct** receives lymph from the right chest, right upper extremity and right side of the head and neck.
Lymphatics of Head & Neck

Superficial Lymphatics

Pericervical collar (encircling the cranial base)
Deep Cervical Lymphatics

- Jugulodigastric node
- Internal Jugular vein
- Transverse cervical nodes
- R. lymphatic duct
- Jugulo-omohyoid node
- Jugular tr.
- Transverse cervical tr.
Cervical Fasciae

A. Superficial
   1. Superficial cervical fascia

B. Deep
   1. Superficial layer of deep cervical fascia
   2. Cervical visceral fascia (pretracheal fascia)
   3. Alar fascia
   4. Carotid sheath
   5. Prevertebral fascia