Introduction to head and neck

Curricular Objectives
By the end of this session students are expected to:

Theory
1. Define the head and neck regions
2. List the bones forming the skeleton of head and neck
3. Describe the attachment, innervation & importance of sternocleidomastoid & trapezius
4. Divide the neck into triangles
5. Outline the different regions of the head
6. Summarize the cross sectional topography of the neck (fascia and compartments)
7. List the main features of cervical vertebra
8. Discuss the composition of the skull and its bones
9. Outline the major surface markings on the head and neck

Practical
1. Identify the head and neck regions
2. Distinguish and locate the bones forming the skeleton of head and neck
3. Identify the sternocleidomastoid and trapezius muscles
4. Locate the two main triangles of the neck
5. Identify the different regions of the head
6. Trace the different layers of the cervical fasciae in cross sections and gross specimens
7. Discriminate the two compartments of the neck and the structures within
8. Distinguish cervical vertebrae from all other vertebrae
9. Differentiate between the typical and atypical cervical vertebra
10. Name and identify the atypical cervical vertebra and their parts
11. Inspect and feel the different regions and surface markings of the head and neck
12. Count the cervical vertebra in a given X-ray

Lab advice
Whenever possible, try to practice finding the listed anatomical landmarks on yourself or on your colleagues to develop the skill of examination

Selected references and suggested resources
- Clinical Anatomy by Regions, Richard S. Snell, 9th edition
- Grant’s Atlas of Anatomy, 13th Edition
- Anatomy for Babylon medical students (facebook page)
- Human Anatomy Education (facebook page)
- Human anatomy education (youtube channel)

Session check list
- Clinical highlights
  - Common clinical conditions involving the head and neck frequently seen in clinical practice include head injuries, headache, facial palsy, tonsillitis, sinusitis, and goiter
  - Thorough understanding of head and neck anatomy is a must for all doctors in order to be able to examine and treat such patients
Head

- It encloses and protects many important structures, these include:
  1. Brain and meninges
  2. Special sense organs: the eyes, ears, nose, tongue

- Bones: skull
- It is divided into two parts: cranium and face
- Anatomical structures mark the lower limit of the head include
  - External occipital protuberance / Mastoid process / Lower border of the mandible

  **Task 1:** Identify the above structures, and then try to feel them on you or a colleague
  - The head is mobile. Why?

Neck

- It supports the head on the trunk and permits its movement
- It transmits vital structures between the head, thorax, and upper limb. Examples:
  1. Spinal cord (cervical part)
  2. Larynx and trachea
  3. Pharynx and esophagus
  4. Thyroid and parathyroid glands
  5. Major blood vessels
  6. Some of the cranial nerves

- Bones: 7 cervical vertebra, hyoid bone
- Extent:
  - It extends from ______________________ above, to ______________________ below

  **Task 2:** Ask a family member for permission to examine his neck so you can palpate the above marking

Sternocleidomastoid muscle

- It is the key muscle of the neck
- It takes origin from ______________________ to be inserted to ______________________

  **Task 3:** Use the atlas and specimens to identify the muscle, its attachment sites, and the lesser supravacicular fossa then feel the muscle on you or a colleague

- Its motor supply comes from ______________ nerve
- In addition to its actions on the head, it is involved in
  1. Forced inspiration (accessory muscle)
  2. Fracture clavicle (pull the medial segment upward)

Trapezius muscle

- It is the most superficial muscle on the back of the neck
- It takes origin from ______________________ to be inserted to ______________________

  **Task 4:** Note the anterior free border of the muscle, its attachment sites, then feel the muscle on you or a colleague

- Its motor innervation is similar to that of sternocleidomastoid muscle
- Refer to lecture for parts and actions
Triangles of the neck
- For descriptive purposes the neck is divided into two triangles, anterior and posterior.
- **Task 4**: Review the boundaries of the anterior and posterior triangles

Regions of the head
- For descriptive purposes the head is divided into the following regions: Frontal, parietal, occipital, temporal, auricular, parotid, orbital, nasal, zygomatic, buccal, oral, and mental
- **Task 5**: Use your lab time to be familiar with the above regions

Compartments and fascia of the neck
- The structures within the neck are grouped into four major compartments, (vertebral, visceral, and 2 vascular) these compartments are separated by deep fascia of the neck
- Clinical importance
  1. Allows movement between adjacent structures
  2. Determine how infection and cancer spread in the neck.
  3. Facilitates the surgical approach to specific areas.
- **Task 6**: View a cross section of neck to identify these compartments. Answer these questions
  - What are the structures seen within the each compartment?
  - How many fascial layers can you count? Name these layers
  - Name the fascial layer encircling the neck. List the structures invested by this fascia.

Cervical vertebra
- **Task 7**: Review the structure of typical vertebra then answer the following questions
  - What distinguishes cervical vertebra from all other vertebra?
  - How to differentiate typical from atypical cervical vertebra?
  - Which parts of the vertebra surrounds the vertebral canal? List the content of the canal

Skull
- It is divided into two main parts: Neurocranium (for brain) / Viscerocranium (facial skeleton)
- It has numerous foramina for cranial nerves and vessels passing into and out of the cranium,
- It contains cavities of the upper gastrointestinal and respiratory tracts (oral and nasal cavities).
- **Review question 1**: Below is an image of a child with abnormal position of the head.
  A. Which anatomical structure is damaged to produce this position? Describe its action
  B. Can this abnormality be seen in adults? Why?

**Review question 2:** below is a radiograph of a fractured clavicle.

A. Where is the weakest point of the clavicle?
B. The proximal segment is displaced upward, why?


---

**Lab check list**

**A- Head**

1. **Skull**
   - Neurocranium
     - Cranial vault
     - Cranial cavity / Brain
     - Base/ Cranial foramina/ Cranial nerves
   - Viscerocranium (facial skeleton)
     - Face: Orbital cavity, Nasal cavity, Oral cavity
     - Mandible
   - Useful bony markings
     - External occipital protuberance
     - Superior nuchal line
     - Mastoid process
     - Lower border of mandible

2. **Special sense organs:**
   - Eyes
   - Ears
   - Nose
   - Tongue
B- Neck

1. Bones:
   - Cervical spine / 7 cervical vertebrae / vertebral canal and spinal cord
   - Typical cervical vertebra / Atlas / axis / prominence
2. Cartilages
   - Thyroid cartilage
3. Muscles: Sternodeidomastoid / Trapezius
4. Blood vessels
   - Carotid arteries
   - Internal jugular vein
5. Cranial and spinal nerves
6. Anterior and posterior triangles
7. Endocrine and exocrine glands
   - Thyroid gland
   - Parotid salivary gland
   - Submandibular salivary glands
8. Useful Surface markings
   - Anterior Aspect
     - Symphysis menti
     - Body of the hyoid bone
     - Upper border of the thyroid cartilage
     - Cricoid cartilage
     - Trachea
     - Suprasternal notch
   - Posterior Aspect
     - Vertebra prominens
   - Lateral Aspect
     - Clavicles