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 **Program BS Radiology (6th semester)**

 The topics assigned to me and their descriptions are given below: =

1. **Parts of temporal and palatine bones in the inferior view of cranium:**

**Parts of temporal bone:** The temporal bone contributes to the lower lateral walls of the skull, it contains the middle and inner portions of ear. The lower portion of the bone articulates with mandible forming temporomandibular joint of the jaw.

Temporal bone itself is comprised of five constituent’s parts; the squamous, tympanic, petro mastoid parts make up the majority of bone, with zygomatic and styloid processes projecting outwards.

From inferior view we can see following parts of temporal bone:

Zygomatic process, mandibular fossa, external acoustic meatus, styloid process, carotid canal, petrous temporal bone, jugular fossa, jugular foramen, mastoid foramen.

**Parts of palatine bone:** The palatine bone is a paired L shaped bone that forms parts of the nasal cavity and hard palate, it is located between the maxilla and sphenoid bone and is part of inferior skull surface.

It is composed of perpendicular plate and the pyramidal process. The horizontal forms the posterior portion of hard palate of the oral cavity and is directly inferior to the nasal cavity. From inferior view following structures related to palatine bone can be seen;

Both perpendicular and horizontal plates, transverse palatine suture, posterior nasal spine, median palatine suture, palatine process of maxilla, palatine grooves, incisive foramen, incisive suture.

1. **Circle of Willis**: The circle of Willis is a circulatory anastomosis that supplies blood to the brain and surrounding structures. It is named after Thomas Willis an English physician. It is composed of following arteries.

Anterior cerebral artery both left and right, Anterior communicating artery, internal carotid artery both left and right, posterior cerebral artery left and right , posterior communicating artery both left and right, the middle cerebral arteries ,supplying the brain are not considered part the circle.

**Origin of arteries**: The left and right internal carotid arteries arise from the left and right common carotid arteries. The posterior communicating artery is given off as a branch of internal carotid artery just before it divides into its terminal branches. The anterior and middle cerebral arteries. The anterior cerebral artery forms the anterolateral portion of the circle of Willis, while the middle cerebral artery does not contribute to the circle. The right and left posterior cerebral arteries arise from the basilar artery, which is formed by the left and right vertebral arteries arise from the subclavian arteries.

The anterior communicating artery connects the two anterior cerebral arteries and could be said to arise from either the left or right side.

All arteries involved give off cortical and central branches. The central branches supply the interior of the circle of Willis.

Variation: Considerable anatomic variations exists in the circle of Willis. In about 40% people the classic anatomy of the circle is only seen.

**Function:** The arrangement of the brain’s arteries into the circle of Willis creates redundancy for collateral circulation in the cerebral circulation, if one part of the circle becomes blocked or narrowed (stenosis), blood from the other blood vessels can often preserve the cerebral perfusion well enough to avoid the symptoms of ischemia.

**Clinical significance:** Aneurysm can occur in various arteries of the circle of Willis, subclavian steal syndrome can also occurs in which blood is stolen from the circle of Willis to preserve blood flow to the upper limb, it results from proximal stenosis, i.e. narrowing of the subclavian artery, an artery supplied by aorta, which is also the same blood vessel that eventually feeds the circle of Willis via the vertebral and internal carotid arteries.

1. **Arteries of Neck:** The most common arteries in neck are carotid arteries and vertebral arteries, which supply blood to almost all parts of neck and skull. The two main carotid arteries are right and left common carotid arteries. The first common carotid artery arise from a bifurcation of the brachiocephalic trunk, the right subclavian artery is the other branch.

The left common carotid artery branches directly from the arch of aorta.

The left and right common carotid arteries ascend up the neck, lateral to trachea and esophagus, they do not give off any branches in neck, at the level of thyroid cartilage C4 the carotid artery splits into external and internal carotid arteries, this bifurcation area is slightly dilated here known as carotid sinus and is important for blood pressure detection. External carotid artery supply blood to facial area, while internal carotid artery supply blood to cranial parts like brain and eyes etc.

Other arteries in neck are, inferior thyroid artery, ascending cervical artery, transverse cervical artery, suprascapular artery supplying blood to various parts in neck.

1. **Structures seen in the superior lobe of both lungs by viewing it medially:**

**Medial view of superior lobe for right lung:**  following structures can be viewed

Apex of lung, area of trachea, area for esophagus, groove for azygous vein, oblique fissure, groove for brachiocephalic vein, groove for first rib, groove for superior venacava, area for thymus and mediastinal , right superior lobar branches, right pulmonary artery, right bronchial artery, right superior pulmonary vein, right bronchial artery.

**Medial view of superior lobe for left lung:** Apex, groove for subclavian artery, groove for left brachiocephalic vein, groove for first rib, area for thymus and mediastinal fatty tissues. Oblique fissure, groove for arch of aorta, left pulmonary artery, left superior pulmonary vein.

1. **Cross sectional anatomy:** cross sectional anatomy is two dimensional axial view of gross anatomical structures seen in transverse planes. They are obtained by taking imaginary slices perpendicular to the main axis of organs, vessels, nerves, bones, soft tissues or even the entire human body.

**Importance:**  Cross section provides the perception of depth, creating three dimensional relationships between anatomical structures, they build the entire picture, improve your understanding, consolidate the information and facilitate recall. In addition modern imaging techniques like ultrasound, CT-scene and MRI are based on cross sectional anatomy.

Therefore cross sectional anatomy is important for establishing a precise diagnosis, planning therapy and performing radiologically guided interventions.

Every cross section is viewed from the feet of the patient in a supine position i.e. lying horizontally on his/her back, this means that structures on the right side of the patient’s body will be on the on the left side of the cross sectional image and vice versa, like looking in mirror.

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