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**PAPER ANATOMY II**

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**SUBMITTED TO MAM AROOBA**

**Q1:**

**ANS:**

**cranial Fossa:**

**cranial fossa is formed by the floor of the**[**cranial cavity**](https://en.wikipedia.org/wiki/Cranial_cavity)**.**

**There are three distinct cranial fossae:**

* [**Anterior cranial fossa**](https://en.wikipedia.org/wiki/Anterior_cranial_fossa)**(*fossa cranii anterior*), housing the projecting frontal lobes of the brain**
* [**Middle cranial fossa**](https://en.wikipedia.org/wiki/Middle_cranial_fossa)**(*fossa cranii media*), separated from the posterior fossa by the clivus and the petrous crest**
* [**Posterior cranial fossa**](https://en.wikipedia.org/wiki/Posterior_cranial_fossa)**(*fossa cranii posterior*), between the foramen magnum and tentorium cerebelli, containing the brainstem and cerebellum**

**Intracranial fossae:**

**The anterior cranial fossa is a depression in the floor of the cranial base which houses the projecting**[**frontal lobes**](https://en.wikipedia.org/wiki/Frontal_lobe)**of the brain. It is formed by the orbital plate  of the fronta, the**[**cribriform plate**](https://en.wikipedia.org/wiki/Cribriform_plate)**of the [ethmoid](https://en.wikipedia.org/wiki/Ethmoid" \o "Ethmoid), and the small wings and front part of the body of the**[**sphenoid**](https://en.wikipedia.org/wiki/Sphenoid_bone)**; it is limited behind by the posterior borders of the small wings of the sphenoid and by the anterior margin of the**[**chiasmatic groove**](https://en.wikipedia.org/wiki/Chiasmatic_groove)**. The lesser wings of the sphenoid separate the anterior and**[**middle**](https://en.wikipedia.org/wiki/Middle_cranial_fossa)**fossae.**

**Structure**

**It traversed by the frontoethmoid sphenoethmoida, and [sphenofrontl](https://en.wikipedia.org/wiki/Sphenofrontal" \o "Sphenofrontal) sutures.**

**Its lateral portions roof in the orbital cavities and support the frontal lobes of the**[**cerebrum**](https://en.wikipedia.org/wiki/Cerebrum)**; they are convex and marked by depressions for the brain convolutions, and grooves for branches of the meningeal vessels.**

**The central portion corresponds with the roof of the**[**nasal cavity**](https://en.wikipedia.org/wiki/Nasal_cavity)**, and is markedly depressed on either side of the**[**crista galli**](https://en.wikipedia.org/wiki/Crista_galli)**.**

**It presents, in and near the median line, from before backward, the commencement of the frontal crest for the attachment of the [falx cerebri](https://en.wikipedia.org/wiki/Falx_cerebri" \o "Falx cerebri); the**[**foramen cecum**](https://en.wikipedia.org/wiki/Foramen_cecum_(frontal_bone))**, between the**[**frontal bone**](https://en.wikipedia.org/wiki/Frontal_bone)**and the crista galli of the ethmoid, which usually transmits a small vein from the nasal cavity to the**[**superior sagittal sinus**](https://en.wikipedia.org/wiki/Superior_sagittal_sinus)**; behind the foramen cecum, the crista galli, the free margin of which affords attachment to the [falx cerebri](https://en.wikipedia.org/wiki/Falx_cerebri" \o "Falx cerebri); on either side of the crista galli, the olfactory groove formed by the**[**cribriform plate**](https://en.wikipedia.org/wiki/Cribriform_plate)**, which supports the olfactory bulb and presents foramina for the transmission of the**[**olfactory nerves**](https://en.wikipedia.org/wiki/Olfactory_nerves)**, and in front a slit-like opening for the [nasociliary nerve](https://en.wikipedia.org/wiki/Nasociliary_nerve" \o "Nasociliary nerve).**

**Lateral to either olfactory groove are the internal openings of the anterior and posterior [ethmoidal foramina](https://en.wikipedia.org/wiki/Ethmoidal_foramina_(disambiguation)" \o "Ethmoidal foramina (disambiguation)); the anterior, situated about the middle of the lateral margin of the olfactory groove, transmits the anterior ethmoidal vessels and the nasociliary nerve; the nerve runs in a groove along the lateral edge of the cribriform plate to the slit-like opening above mentioned; the**[**posterior ethmoidal foramen**](https://en.wikipedia.org/wiki/Posterior_ethmoidal_foramen)**opens at the back part of this margin under cover of the projecting lamina of the sphenoid, and transmits the posterior ethmoidal vessels and nerve.**

**Farther back in the middle line is the [ethmoidal spine](https://en.wikipedia.org/wiki/Ethmoidal_spine" \o "Ethmoidal spine), bounded behind by a slight elevation separating two shallow longitudinal grooves which support the**[**olfactory lobes**](https://en.wikipedia.org/wiki/Olfactory_lobes)**.**

**Behind this is the anterior margin of the [chiasmatic groove](https://en.wikipedia.org/wiki/Chiasmatic_groove" \o "Chiasmatic groove), running laterally on either side to the upper margin of the optic foramen.**

**Q2:**

**ANS:**

**Cranial Nerve:**

**Cranial nerves are the**[**nerves**](https://en.wikipedia.org/wiki/Nerve)**that emerge directly from the**[**brain**](https://en.wikipedia.org/wiki/Brain)**(including the**[**brainstem**](https://en.wikipedia.org/wiki/Brainstem)**), of which there are conventionally considered twelve pairs. Cranial nerves relay information between the brain and parts of the body, primarily to and from regions of the**[**head and neck**](https://en.wikipedia.org/wiki/Head_and_neck)**, including the**[**special senses**](https://en.wikipedia.org/wiki/Special_senses)**of**[**vision**](https://en.wikipedia.org/wiki/Visual_perception)**,**[**taste**](https://en.wikipedia.org/wiki/Taste)**,**[**smell**](https://en.wikipedia.org/wiki/Olfaction)**, and**[**hearing**](https://en.wikipedia.org/wiki/Hearing)**.**

**The cranial nerves emerge from the**[**central nervous system**](https://en.wikipedia.org/wiki/Central_nervous_system)**above the level of the first vertebrae of the**[**vertebral column**](https://en.wikipedia.org/wiki/Vertebral_column) **Each cranial nerve is paired and is present on both sides. There are conventionally twelve pairs of cranial nerves, which are described with**[**Roman numerals**](https://en.wikipedia.org/wiki/Roman_numerals)**I–XII. Some considered there to be thirteen pairs of cranial nerves, including**[**cranial nerve zero**](https://en.wikipedia.org/wiki/Cranial_nerve_zero)**. The numbering of the cranial nerves is based on the order in which they emerge from the brain and brainstem, from front to back**

**The**[**terminal nerves**](https://en.wikipedia.org/wiki/Terminal_nerve)**(0),**[**olfactory nerves**](https://en.wikipedia.org/wiki/Olfactory_nerve)**(I) and**[**optic nerves**](https://en.wikipedia.org/wiki/Optic_nerve)**(II) emerge from the**[**cerebrum**](https://en.wikipedia.org/wiki/Cerebrum)**, and the remaining ten pairs arise from the**[**brainstem**](https://en.wikipedia.org/wiki/Brainstem)**, which is the lower part of the brain**

**The cranial nerves are considered components of the**[**peripheral nervous system**](https://en.wikipedia.org/wiki/Peripheral_nervous_system)**(PNS), although on a structural level the olfactory (I), optic (II), and trigeminal (V) nerves are more accurately considered part of the central nervous system (CNS).**

**Most typically, humans are considered to have twelve pairs of cranial nerves (I–XII), with the**[**terminal nerve**](https://en.wikipedia.org/wiki/Terminal_nerve)**(0) more recently canonized. The nerves are: the**[**olfactory nerve**](https://en.wikipedia.org/wiki/Olfactory_nerve)**(I), the**[**optic nerve**](https://en.wikipedia.org/wiki/Optic_nerve)**(II), [oculomotor nerve](https://en.wikipedia.org/wiki/Oculomotor_nerve" \o "Oculomotor nerve) (III),**[**trochlear nerve**](https://en.wikipedia.org/wiki/Trochlear_nerve)**(IV),**[**trigeminal nerve**](https://en.wikipedia.org/wiki/Trigeminal_nerve)**(V), [abducens nerve](https://en.wikipedia.org/wiki/Abducens_nerve" \o "Abducens nerve) (VI),**[**facial nerve**](https://en.wikipedia.org/wiki/Facial_nerve)**(VII),[vestibulocochlear nerve](https://en.wikipedia.org/wiki/Vestibulocochlear_nerve" \o "Vestibulocochlear nerve) (VIII),**[**glossopharyngeal nerve**](https://en.wikipedia.org/wiki/Glossopharyngeal_nerve)**(IX), [vagus nerve](https://en.wikipedia.org/wiki/Vagus_nerve" \o "Vagus nerve) (X),**[**accessory nerve**](https://en.wikipedia.org/wiki/Accessory_nerve)**(XI), and the**[**hypoglossal nerve**](https://en.wikipedia.org/wiki/Hypoglossal_nerve)**(XII).**

## Function

**The cranial nerves provide motor and sensory supply mainly to the structures within the head and neck. The sensory supply includes both "general" sensation such as temperature and touch, and "special" senses such as**[**taste**](https://en.wikipedia.org/wiki/Taste)**,**[**vision**](https://en.wikipedia.org/wiki/Visual_perception)**,**[**smell**](https://en.wikipedia.org/wiki/Olfaction)**, balance and**[**hearing**](https://en.wikipedia.org/wiki/Hearing)**. The vagus nerve (X) provides sensory and autonomic (parasympathetic) supply to structures in the neck and also to most of the organs in the chest and abdomen.**

### Terminal nerve

**The**[**terminal nerve**](https://en.wikipedia.org/wiki/Terminal_nerve)**(0) may not have a role in humans although it has been implicated in hormonal responses to smell, sexual response and mate selection.**

### Smell (I)

**The**[**olfactory nerve**](https://en.wikipedia.org/wiki/Olfactory_nerve)**(I) conveys information giving rise to the sense of smell.**

**Damage to the olfactory nerve (I) can cause an inability to smell (**[**anosmia**](https://en.wikipedia.org/wiki/Anosmia)**), a distortion in the sense of smell ([parosmia](https://en.wikipedia.org/wiki/Parosmia" \o "Parosmia)), or a distortion or lack of taste.**

### Vision (II)

**The**[**optic nerve**](https://en.wikipedia.org/wiki/Optic_nerve)**(II) transmits visual information.**

**Damage to the optic nerve (II) affects specific aspects of vision that depend on the location of the damage. A person may not be able to see objects on their left or right sides (**[**homonymous hemianopsia**](https://en.wikipedia.org/wiki/Homonymous_hemianopsia)**), or may have difficulty seeing objects from their outer visual fields ([bitemporal hemianopsia](https://en.wikipedia.org/wiki/Bitemporal_hemianopsia" \o "Bitemporal hemianopsia)) if the**[**optic chiasm**](https://en.wikipedia.org/wiki/Optic_chiasm)**is involved. Inflammation (**[**optic neuritis**](https://en.wikipedia.org/wiki/Optic_neuritis)**) may impact the sharpness of vision or colour detection**

### Eye movement (III, IV, VI)

**The oculomotor (III), troclear (IV) and abducens (VI) nerves supply the muscle of the eye. Damage will affect the movement of the eye in various ways, shown here.**

**The [oculomotor nerve](https://en.wikipedia.org/wiki/Oculomotor_nerve" \o "Oculomotor nerve) (III),**[**trochlear nerve**](https://en.wikipedia.org/wiki/Trochlear_nerve)**(IV) and [abducens nerve](https://en.wikipedia.org/wiki/Abducens_nerve" \o "Abducens nerve) (VI) coordinate**[**eye movement**](https://en.wikipedia.org/wiki/Eye_movement)**. The oculomotor nerve controls all muscles of the eye except for the**[**superior oblique muscle**](https://en.wikipedia.org/wiki/Superior_oblique_muscle)**controlled by the trochlear nerve (IV), and the**[**lateral rectus muscle**](https://en.wikipedia.org/wiki/Lateral_rectus_muscle)**controlled by the abducens nerve (VI). This means the ability of the eye to look down and inwards is controlled by the trochlear nerve (IV), the ability to look outwards is controlled by the abducens nerve (VI), and all other movements are controlled by the oculomotor nerve (III)**

**Damage to these nerves may affect the movement of the eye. Damage may result in double vision (**[**diplopia**](https://en.wikipedia.org/wiki/Diplopia)**) because the movements of the eyes are not synchronized. Abnormalities of visual movement may also be seen on examination, such as jittering ([nystagmus](https://en.wikipedia.org/wiki/Nystagmus" \o "Nystagmus))**

**Damage to the oculomotor nerve (III) can cause double vision and inability to coordinate the movements of both eyes (**[**strabismus**](https://en.wikipedia.org/wiki/Strabismus)**), also eyelid drooping (**[**ptosis**](https://en.wikipedia.org/wiki/Ptosis_(eyelid))**) and pupil dilation ([mydriasis](https://en.wikipedia.org/wiki/Mydriasis" \o "Mydriasis)). Lesions may also lead to inability to open the eye due to paralysis of the [levator palpebrae](https://en.wikipedia.org/wiki/Levator_palpebrae" \o "Levator palpebrae) muscle. Individuals suffering from a lesion to the oculomotor nerve may compensate by tilting their heads to alleviate symptoms due to paralysis of one or more of the eye muscles it controls.**

**Damage to the trochlear nerve (IV) can also cause double vision with the eye adducted and elevated The result will be an eye which can not move downwards properly (especially downwards when in an inward position). This is due to impairment in the superior oblique muscle.**

**Damage to the abducens nerve (VI) can also result in double vision. This is due to impairment in the lateral rectus muscle, supplied by the abducens nerve.**

### Trigeminal nerve (V)

**The**[**trigeminal nerve**](https://en.wikipedia.org/wiki/Trigeminal_nerve)**(V) and its three main branches the ophthalmic (V1), maxillary (V2), and mandibular (V3) provide sensation to the skin of the face and also controls the muscles of**[**chewing**](https://en.wikipedia.org/wiki/Mastication)**.**

**Damage to the trigeminal nerve leads to loss of sensation in an affected area. Other conditions affecting the trigeminal nerve (V) include**[**trigeminal neuralgia**](https://en.wikipedia.org/wiki/Trigeminal_neuralgia)**, herpes zoster, sinusitis pain, presence of a**[**dental abscess**](https://en.wikipedia.org/wiki/Dental_abscess)**, and**[**cluster headaches**](https://en.wikipedia.org/wiki/Cluster_headache)**.**

**The facial nerve (VII) supplies the muscles of facial expression. Damage to the nerve causes a lack of muscle tone on the affected side, as can be seen on the right side of the face here.**

### Facial expression (VII

**The facial nerve (VII) controls most muscles of facial expression, supplies the sensation of taste from the front two-thirds of the tongue, and controls the [stapedius muscle](https://en.wikipedia.org/wiki/Stapedius_muscle" \o "Stapedius muscle). Most muscles are supplied by the cortex on the opposite side of the brain; the exception is the [frontalis muscle](https://en.wikipedia.org/wiki/Frontalis_muscle" \o "Frontalis muscle) of the forehead, in which the left and the right side of the muscle both receive inputs from both sides of the brain**

**Damage to the**[**facial nerve**](https://en.wikipedia.org/wiki/Facial_nerve)**(VII) may cause**[**facial palsy**](https://en.wikipedia.org/wiki/Facial_palsy)**. This is where a person is unable to move the muscles on one or both sides of their face. The most common cause of this is**[**Bell's palsy**](https://en.wikipedia.org/wiki/Bell%27s_palsy)**, the ultimate cause of which is unknown. Patients with Bell's palsy often have a drooping mouth on the affected side and often have trouble chewing because the [buccinator muscle](https://en.wikipedia.org/wiki/Buccinator_muscle" \o "Buccinator muscle) is affected. The facial nerve is also the most commonly affected cranial nerve in**[**blunt trauma**](https://en.wikipedia.org/wiki/Blunt_trauma)**.**

### Hearing and balance (VIII)

**The [vestibulocochlear nerve](https://en.wikipedia.org/wiki/Vestibulocochlear_nerve" \o "Vestibulocochlear nerve) (VIII) supplies information relating to balance and hearing via its two branches, the**[**vestibular**](https://en.wikipedia.org/wiki/Vestibular_nerve)**and**[**cochlear nerves**](https://en.wikipedia.org/wiki/Cochlear_nerve)**. The vestibular part is responsible for supplying sensation from the**[**vestibules**](https://en.wikipedia.org/wiki/Vestibules_(inner_ear))**and**[**semicircular canal**](https://en.wikipedia.org/wiki/Semicircular_canal)**of the**[**inner ear**](https://en.wikipedia.org/wiki/Inner_ear)**, including information about**[**balance**](https://en.wikipedia.org/wiki/Balance_(ability))**, and is an important component of the [vestibuloocular reflex](https://en.wikipedia.org/wiki/Vestibuloocular_reflex" \o "Vestibuloocular reflex), which keeps the head stable and allows the eyes to track moving objects. The**[**cochlear nerve**](https://en.wikipedia.org/wiki/Cochlear_nerve)**transmits information from the**[**cochlea**](https://en.wikipedia.org/wiki/Cochlea)**, allowing sound to be heard.**

**When damaged, the vestibular nerve may give rise to the sensation of spinning and dizziness (**[**vertigo**](https://en.wikipedia.org/wiki/Vertigo)**). Function of the vestibular nerve may be tested by putting cold and warm water in the ears and watching eye movements**[**caloric stimulation**](https://en.wikipedia.org/wiki/Caloric_stimulation)**. Damage to the vestibulocochlear nerve can also present as repetitive and involuntary eye movements ([nystagmus](https://en.wikipedia.org/wiki/Nystagmus" \o "Nystagmus)), particularly when the eye is moving horizontally. Damage to the cochlear nerve will cause partial or complete**[**deafness**](https://en.wikipedia.org/wiki/Deafness)**in the affected ear.**

### Oral sensation, taste, and salivation (IX)

**A damaged glossopharyngeal nerve (IX) may cause the uvula to deviate to the affected side.**

**The**[**glossopharyngeal nerve**](https://en.wikipedia.org/wiki/Glossopharyngeal_nerve)**(IX) supplies the [stylopharyngeus muscle](https://en.wikipedia.org/wiki/Stylopharyngeus_muscle" \o "Stylopharyngeus muscle) and provides sensation to the**[**oropharynx**](https://en.wikipedia.org/wiki/Oropharynx)**and back of the tongue.  The glossopharyngeal nerve also provides parasympathetic input to the**[**parotid gland**](https://en.wikipedia.org/wiki/Parotid_gland)

**Damage to the nerve may cause failure of the**[**gag reflex**](https://en.wikipedia.org/wiki/Gag_reflex)**; a failure may also be seen in damage to the vagus nerve (X).**

### Vagus nerve (X

**The [vagus nerve](https://en.wikipedia.org/wiki/Vagus_nerve" \o "Vagus nerve) (X) provides sensory and parasympathetic supply to structures in the neck and also to most of the organs in the chest and abdomen**

**Loss of function of the vagus nerve (X) will lead to a loss of parasympathetic supply to a very large number of structures. Major effects of damage to the vagus nerve may include a rise in blood pressure and heart rate. Isolated dysfunction of only the vagus nerve is rare, but - if the lesion is located above the point at which the vagus first branches off - can be indicated by a hoarse voice, due to dysfunction of one of its branches, the**[**recurrent laryngeal nerve**](https://en.wikipedia.org/wiki/Recurrent_laryngeal_nerve)**.**

**Damage to this nerve may result in difficulties swallowing.**

### Shoulder elevation and head-turning (XI)

**The accessory nerve (XI) supplies the sternocleidomastoid and trapezius muscles. Damage to the nerve may cause a**[**winged scapula**](https://en.wikipedia.org/wiki/Winged_scapula)**, shown here.**

**The hypoglossal nerve (XII) supplies the muscles of the tongue. A damaged hypoglossal nerve will result in an inability to stick the tongue out straight; here seen in an injury resulting from [branchial cyst](https://en.wikipedia.org/wiki/Branchial_cyst" \o "Branchial cyst)surgery.**

**The**[**accessory nerve**](https://en.wikipedia.org/wiki/Accessory_nerve)**(XI) supplies the**[**sternocleidomastoid**](https://en.wikipedia.org/wiki/Sternocleidomastoid_muscle)**and**[**trapezius muscles**](https://en.wikipedia.org/wiki/Trapezius_muscle)

**Damage to the accessory nerve (XI) will lead to weakness in the trapezius muscle on the same side as the damage. The trapezius lifts the shoulder when**[**shrugging**](https://en.wikipedia.org/wiki/Shrug)**, so the affected shoulder will not be able to shrug and the shoulder blade (**[**scapula**](https://en.wikipedia.org/wiki/Scapula)**) will protrude into a**[**winged**](https://en.wikipedia.org/wiki/Winged_scapula)**position. Depending on the location of the lesion there may also be weakness present in the**[**sternocleidomastoid**](https://en.wikipedia.org/wiki/Sternocleidomastoid)**muscle, which acts to turn the head so that the face points to the opposite side.**

### Tongue movement (XII)

**The**[**hypoglossal nerve**](https://en.wikipedia.org/wiki/Hypoglossal_nerve)**(XII) supplies the intrinsic muscles of the tongue, controlling tongue movement. The hypoglossal nerve (XII) is unique in that it is supplied by the**[**motor cortices**](https://en.wikipedia.org/wiki/Motor_cortex)**of both hemispheres of the brain.**

**Damage to the nerve may lead to fasciculations or wasting (**[**atrophy**](https://en.wikipedia.org/wiki/Atrophy)**) of the muscles of the tongue. This will lead to weakness of tongue movement on that side. When damaged and extended, the tongue will move towards the weaker or damaged side, as shown in the image. The fasciculations of the tongue are sometimes said to look like a "bag of worms". Damage to the nerve tract or nucleus will not lead to atrophy or fasciculations, but only weakness of the muscles on the same side as the damage.**

**Q3:**

**Ans:**

**Norma Frontalis**

**When viewed from the front the skull exhibits a somewhat oval outline, limited *above* by the frontal bone,*below* by the body of the mandible, and *laterally* by the zygomatic bones and the mandibular rami. The upper part, formed by the frontal squama, is smooth and convex. The lower part, made up of the bones of the face, is irregular; it is excavated laterally by the orbital cavities, and presents in the middle line the anterior nasal aperture leading to the nasal cavities, and below this the transverse slit between the upper and lower dental arcades. *Above,* the frontal eminences stand out more or less prominently, and beneath these are the superciliary arches, joined to one another in the middle by the glabella. On and above the glabella a trace of the frontal suture sometimes persists; beneath it is the frontonasal suture, the mid-point of which is termed thenasion. Behind and below the frontonasal suture the frontal articulates with the frontal process of the maxilla and with the lacrimal. Arching transversely below the superciliary arches is the upper part of the margin of the orbit, thin and prominent in its lateral two-thirds, rounded in its medial third, and presenting, at the junction of these two portions, the supraorbital notch or foramen for the supraorbital nerve and vessels. The supraorbital margin ends laterally in the zygomatic process which articulates with the zygomatic bone, and from it the temporal line extends upward and backward. Below the frontonasal suture is the bridge of the nose, convex from side to side, concavo-convex from above downward, and formed by the two nasal bones supported in the middle line by the perpendicular plate of the ethmoid, and laterally by the frontal processes of the maxillæ which are prolonged upward between the nasal and lacrimal bones and form the lower and medial part of the circumference of each orbit. Below the nasal bones and between the maxillæ is the anterior aperture of the nose, pyriform in shape, with the narrow end directed upward. Laterally this opening is bounded by sharp margins, to which the lateral and alar cartilages of the nose are attached; *below,* the margins are thicker and curve medialward and forward to end in the anterior nasal spine. On looking into the nasal cavity, the bony septum which separates the nasal cavities presents, in front, a large triangular deficiency; this, in the fresh state, is filled up by the cartilage of the nasal septum; on the lateral wall of each nasal cavity the anterior part of the inferior nasal concha is visible. Below and lateral to the anterior nasal aperture are the anterior surfaces of the maxillæ, each perforated, near the lower margin of the orbit, by the infraorbital foramen for the passage of the infraorbital nerve and vessels. Below and medial to this foramen is the canine eminence separating the incisive from the canine fossa. Beneath these fossæ are the alveolar processes of the maxillæ containing the upper teeth, which overlap the teeth of the mandible in front. The zygomatic bone on either side forms the prominence of the cheek, the lower and lateral portion of the orbital cavity, and the anterior part of the zygomatic arch. It articulates medially with the maxilla, behind with the zygomatic process of the temporal, and above with the great wing of the sphenoid and the zygomatic process of the frontal; it is perforated by thezygomaticofacial foramen for the passage of the zygomaticofacial nerve. On the body of the mandible is a median ridge, indicating the position of the symphysis; this ridge divides below to enclose the mental protuberance, the lateral angles of which constitute the mental tubercles. Below the incisor teeth is the incisive fossa, and beneath the second premolar tooth the mental foramen which transmits the mental nerve and vessels. The oblique line runs upward from the mental tubercle and is continuous behind with the anterior border of the ramus. The posterior border of the ramus runs downward and forward from the condyle to the angle, which is frequently more or less everted.**

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| **Norma Occipitalis**  **When viewed from behind the cranium presents a more or less circular outline. In the middle line is the posterior part of the sagittal suture connecting the parietal bones; extending downward and lateralward from the hinder end of the sagittal suture is the deeply serrated lambdoidal suture joining the parietals to the occipital and continuous below with the parietomastoid and occipitomastoid sutures; it frequently contains one or more sutural bones. Near the middle of the occipital squama is the external occipital protuberanceor inion, and extending lateralward from it on either side is the superior nuchal line, and above this the faintly marked highest nuchal line. The part of the squama above the inion and highest lines is named theplanum occipitale, and is covered by the Occipitalis muscle; the part below is termed the planum nuchale, and is divided by the median nuchal line which runs downward and forward from the inion to the foramen magnum; this ridge gives attachment to the ligamentum nuchæ. The muscles attached to the planum nuchale are enumerated on p. 130. Below and in front are the mastoid processes, convex laterally and grooved medially by the mastoid notches. In or near the occipitomastoid suture is the mastoid foramen for the passage of the mastoid emissary vein.**  **Q4:**  **ANS:** Muscles [***Muscles of the hip***](https://en.wikipedia.org/wiki/Muscles_of_the_hip)***:***  **The hip muscles act on three mutually perpendicular main axes, all of which pass through the center of the**[**femoral head**](https://en.wikipedia.org/wiki/Femur_head)**, resulting in three**[**degrees of freedom**](https://en.wikipedia.org/wiki/Degrees_of_freedom_(mechanics))**and three pair of principal directions:**[**Flexion**](https://en.wikipedia.org/wiki/Flexion)**and**[**extension**](https://en.wikipedia.org/wiki/Extension_(kinesiology))**around a transverse axis (left-right);**[**lateral rotation**](https://en.wikipedia.org/wiki/Lateral_rotation)**and**[**medial rotation**](https://en.wikipedia.org/wiki/Medial_rotation)**around a longitudinal axis (along the thigh); and**[**abduction**](https://en.wikipedia.org/wiki/Abduction_(kinesiology))**and [adduction](https://en.wikipedia.org/wiki/Adduction" \o "Adduction)around a sagittal axis (forward-backward); and a combination of these movements (i.e.**[**circumduction**](https://en.wikipedia.org/wiki/Anatomical_terms_of_motion#Other_special_motions)**, a compound movement in which the leg describes the surface of an irregular cone). Some of the hip muscles also act on either the vertebral joints or the knee joint, that with their extensive areas of origin and/or insertion, different part of individual muscles participate in very different movements, and that the range of movement varies with the position of the hip joint. Additionally, the**[**inferior**](https://en.wikipedia.org/wiki/Inferior_gemellus_muscle)**and**[**superior gemelli**](https://en.wikipedia.org/wiki/Superior_gemellus_muscle)**may be termed *triceps coxae* together with the [obturator internus](https://en.wikipedia.org/wiki/Obturator_internus_muscle" \o "Obturator internus muscle), and their function simply is to assist the latter muscle.**  **The muscles of the hip consist of four main groups** Gluteal group ***Main article:***[***Gluteal muscles***](https://en.wikipedia.org/wiki/Gluteal_muscles)  **The gluteal muscles include the**[**gluteus maximus**](https://en.wikipedia.org/wiki/Gluteus_maximus)**,**[**gluteus medius**](https://en.wikipedia.org/wiki/Gluteus_medius)**,**[**gluteus minimus**](https://en.wikipedia.org/wiki/Gluteus_minimus)**, and**[**tensor fasciae latae**](https://en.wikipedia.org/wiki/Tensor_fasciae_latae)**. They cover the lateral surface of the**[**ilium**](https://en.wikipedia.org/wiki/Ilium_(bone))**. The gluteus maximus, which forms most of the muscle of the**[**buttocks**](https://en.wikipedia.org/wiki/Buttocks)**, originates primarily on the ilium and**[**sacrum**](https://en.wikipedia.org/wiki/Sacrum)**and inserts on the**[**gluteal tuberosity**](https://en.wikipedia.org/wiki/Gluteal_tuberosity)**of the**[**femur**](https://en.wikipedia.org/wiki/Femur)**as well as the [iliotibial tract](https://en.wikipedia.org/wiki/Iliotibial_tract" \o "Iliotibial tract), a tract of strong**[**fibrous tissue**](https://en.wikipedia.org/wiki/Fibrous_tissue)**that runs along the lateral**[**thigh**](https://en.wikipedia.org/wiki/Thigh)**to the**[**tibia**](https://en.wikipedia.org/wiki/Tibia)**and**[**fibula**](https://en.wikipedia.org/wiki/Fibula)**. The gluteus medius and gluteus minimus originate anterior to the gluteus maximus on the ilium and both insert on the**[**greater trochanter**](https://en.wikipedia.org/wiki/Greater_trochanter)**of the femur. The tensor fasciae latae shares its origin with the gluteus maximus at the ilium and also shares the insertion at the iliotibial tract.** Adductor group ***Main article:***[***Adductor muscles of the hip***](https://en.wikipedia.org/wiki/Adductor_muscles_of_the_hip)  **The**[**adductor brevis**](https://en.wikipedia.org/wiki/Adductor_brevis)**,**[**adductor longus**](https://en.wikipedia.org/wiki/Adductor_longus)**,**[**adductor magnus**](https://en.wikipedia.org/wiki/Adductor_magnus)**, [pectineus](https://en.wikipedia.org/wiki/Pectineus" \o "Pectineus), and [gracilis](https://en.wikipedia.org/wiki/Gracilis_muscle" \o "Gracilis muscle) make up the adductor group. The adductors all originate on the**[**pubis**](https://en.wikipedia.org/wiki/Pubis_(bone))**and insert on the medial, posterior surface of the femur, with the exception of the gracilis which inserts just below the**[**medial condyle**](https://en.wikipedia.org/wiki/Medial_condyle_of_tibia)**of the tibia.** Iliopsoas group ***Main article: [Iliopsoas](https://en.wikipedia.org/wiki/Iliopsoas" \o "Iliopsoas)***  **The [iliacus](https://en.wikipedia.org/wiki/Iliacus" \o "Iliacus) and**[**psoas major**](https://en.wikipedia.org/wiki/Psoas_major)**comprise the iliopsoas group. The psoas major is a large muscle that runs from the bodies and disc of the L1 to L5**[**vertebrae**](https://en.wikipedia.org/wiki/Vertebra)**, joins with the iliacus via its**[**tendon**](https://en.wikipedia.org/wiki/Tendon)**, and connects to the**[**lesser trochanter**](https://en.wikipedia.org/wiki/Lesser_trochanter)**of the femur. The iliacus originates on the**[**iliac fossa**](https://en.wikipedia.org/wiki/Iliac_fossa)**of the ilium. Together these muscles are commonly referred to as the "iliopsoas".** Lateral rotator group ***Main article:***[***Lateral rotator group***](https://en.wikipedia.org/wiki/Lateral_rotator_group)  **This group consists of the [externus](https://en.wikipedia.org/wiki/Externus_obturator" \o "Externus obturator) and [internus obturators](https://en.wikipedia.org/wiki/Internus_obturator" \o "Internus obturator), the [piriformis](https://en.wikipedia.org/wiki/Piriformis" \o "Piriformis), the**[**superior**](https://en.wikipedia.org/wiki/Superior_gemellus)**and**[**inferior gemelli**](https://en.wikipedia.org/wiki/Inferior_gemellus)**, and the**[**quadratus femoris**](https://en.wikipedia.org/wiki/Quadratus_femoris)**. These six originate at or below the**[**acetabulum**](https://en.wikipedia.org/wiki/Acetabulum)**of the ilium and insert on or near the greater trochanter of the femur.** Other hip muscles **Additional muscles, such as the**[**rectus femoris**](https://en.wikipedia.org/wiki/Rectus_femoris)**and the [sartorius](https://en.wikipedia.org/wiki/Sartorius_muscle" \o "Sartorius muscle), can cause some movement in the hip joint. However these muscles primarily move the**[**knee**](https://en.wikipedia.org/wiki/Knee)**, and not generally classified as muscles of the hip.**  **The**[**hamstring**](https://en.wikipedia.org/wiki/Hamstring)**muscles, which originate mostly from the [ischial tuberosity](https://en.wikipedia.org/wiki/Ischial_tuberosity" \o "Ischial tuberosity) inserting on the tibia/fibula, have a large [moment](https://en.wikipedia.org/wiki/Moment_(physics)" \o "Moment (physics))assisting with hip extension.**  **Muscles of knee:**  **There are many important tendons and ligaments in the knee as it is the largest joint in the body that is under weight-bearing strain and regular use.**  **The functions of the large exterior muscles that affect the knee are easier to understand when viewed in their collective groups.**  **The hamstring muscles are three muscles at the back of the thigh that affect hip and knee movement. They begin under the gluteus maximus behind the hip bone and attach to the tibia at the knee. They are:**   * **Biceps femoris: This long muscle flexes the knee. It begins in the thigh area and extends to the head of the fibula in the knee.** * **Semimembranosus: This long muscle extends from the pelvis to the tibia. It extends the thigh, flexes the knee, and helps rotate the tibia.** * **Semitendinosus: This muscle also extends the thigh and flexes the knee, but the tendons connecting it to the bone are much narrower than those of the semimembranosus.**   **The quadriceps comprise a four-muscle group at the front of the thigh that performs the majority of the work to extend the knee. These muscles are the strongest and leanest in the entire body. They are:**   * **Rectus femoris: This muscle attaches to the kneecap. It has the least effect on flexing the knee.** * **Vastus medialis: This teardrop-shaped muscle of the inner thigh attaches along the femur and down to the inner border of the kneecap. It aids in knee extension.** * **Vastus intermedius: Between the vastus medialis and the vastus lateralis at the front of the femur, it is the deepest of the four quadriceps muscles.** * **Vastus lateralis: On the outside of the thigh, this is the largest of the four quadriceps muscles. It extends from the top of the femur at the hip and to the kneecap.**   **Q5:** ANS:Femoral triangle **The femoral triangle is bounded:**   * [**superiorly**](https://en.wikipedia.org/wiki/Anatomical_terms_of_location)**(also known as the base) by the**[**inguinal ligament**](https://en.wikipedia.org/wiki/Inguinal_ligament)**.** * [**medially**](https://en.wikipedia.org/wiki/Anatomical_terms_of_location)**by the medial border of the**[**adductor longus**](https://en.wikipedia.org/wiki/Adductor_longus)**muscle. (Some people consider the femoral triangle to be smaller hence the medial border being at the lateral border of the adductor longus muscle.)** * [**laterally**](https://en.wikipedia.org/wiki/Anatomical_terms_of_location)**by the medial border of the [sartorius muscle](https://en.wikipedia.org/wiki/Sartorius_muscle" \o "Sartorius muscle).**   **The apex of the triangle is continuous with the**[**adductor canal**](https://en.wikipedia.org/wiki/Adductor_canal)**. The roof is formed by the skin, superficial fascia, and deep fascia (**[**fascia lata**](https://en.wikipedia.org/wiki/Fascia_lata)**). The superficial fascia contains the superficial inguinal lymph nodes, femoral branch of the genitofemoral nerve, branches of the ilioinguinal nerve, superficial branches of the femoral artery with accompanying veins, and upper part of the great saphenous vein. The deep fascia has a saphenous opening and the opening is covered by the cribiform fascia.**  **Its floor is formed by the [pectineus](https://en.wikipedia.org/wiki/Pectineus" \o "Pectineus) and adductor longus muscles medially and**[**iliopsoas**](https://en.wikipedia.org/wiki/Iliopsoas)**muscle laterally**  **The femoral triangle is a wedge-shaped area formed by a depression between the**[**muscles of the thigh**](https://www.kenhub.com/en/library/anatomy/hip-and-thigh-muscles)**. It is located on the medial aspectof the proximal thigh.**  **It is the region of the passage of the main blood vessels between the**[**pelvis**](https://www.kenhub.com/en/library/anatomy/the-pelvis)**and the**[**lower limb**](https://www.kenhub.com/en/library/anatomy/regions-of-the-lower-limb)**, as well as a large nerve supplying**[**the thigh**](https://www.kenhub.com/en/library/anatomy/hip-and-thigh-anatomy)**.**  **This article will outline the borders and contents of the femoral triangle, as well as the fascial compartments and relevant clinical anatomy.**  **Borders**  **The borders of the femoral triangle can be remembered using the word SAIL, as demonstrated in the table above. As well as these boundaries, the femoral triangle also has a floor and a roof.**  **The floor is comprised of four muscles that can be easily remembered by using the mnemonicAPPI (**[**adductor longus**](https://www.kenhub.com/en/library/anatomy/adductor-longus-muscle)**, [pectineus](https://www.kenhub.com/en/library/anatomy/pectineus-muscle),**[**psoas major**](https://www.kenhub.com/en/library/anatomy/psoas-major-muscle)**and illiacus muscles). The roof is formed by the**[**fascia lata**](https://www.kenhub.com/en/library/anatomy/fascia-lata)**, superficial fascia, and the**[**skin.**](https://www.kenhub.com/en/library/anatomy/histology-of-the-skin)**The apex of the triangle is pointed downwards towards the adductor canal**  **The femoral nerve is the most lateral of the contents in the femoral triangle. It supplies the sartorius, rectus femoris, vastus lateralis, vastus intermedius and vastus medialis muscles in the anterior compartment of the thigh, and the pectineus muscle in the medial compartment. It originates from the union of the L2, L3, L4**[**spinal cord**](https://www.kenhub.com/en/library/anatomy/the-spinal-cord)**segments in the**[**lumbar plexus**](https://www.kenhub.com/en/library/anatomy/lumbar-plexus)**on the**[**posterior abdominal wall**](https://www.kenhub.com/en/library/anatomy/anterior-abdominal-wall)**. It enters the thigh by passing deep to the**[**inguinal ligament**](https://www.kenhub.com/en/library/anatomy/inguinal-ligament)**.**  **The nerve divides into anterior and posterior branches immediately after it enters the thigh, giving both motor branches to muscles and sensory branches to the skin and the**[**knee joint**](https://www.kenhub.com/en/library/anatomy/the-knee-joint)**. All of the branches of the femoral nerve terminate in the thigh, apart from one cutaneous branch, the**[**saphenous nerve**](https://www.kenhub.com/en/library/anatomy/saphenous-nerve)**, which accompanies the femoral artery through the adductor canal. It pierces through the deep and superficial fascia of the thigh to accompany the**[**great saphenous vein**](https://www.kenhub.com/en/library/anatomy/great-saphenous-vein)**along the medial aspect of the**[**leg**](https://www.kenhub.com/en/library/anatomy/lower-leg-and-knee-anatomy)**.**  **The femoral artery is the continuation of the**[**external iliac artery**](https://www.kenhub.com/en/library/anatomy/external-iliac-artery)**in the thigh becoming the femoral artery as it passes under the inguinal ligament. The femoral artery is located betweenthe femoral nerve and the**[**femoral vein**](https://www.kenhub.com/en/library/anatomy/femoral-vein)**. It is the main blood vessel supplying the entire**[**lower limb**](https://www.kenhub.com/en/library/anatomy/regions-of-the-lower-limb)**. It gives off a large branch in the proximal thigh, the profunda femoris artery, which passes into the posterior compartment of the thigh. The femoral artery passes distally towards the apex of the femoral triangle and through the adductor canal, where it passes through an opening in the**[**adductor magnus muscle**](https://www.kenhub.com/en/library/anatomy/adductor-magnus)**, the adductor hiatus. Through here it enters the**[**popliteal fossa**](https://www.kenhub.com/en/library/anatomy/popliteal-fossa)**posterior to the knee joint, becoming the popliteal artery.**  **The femoral vein in the proximal continuation of the popliteal vein. It enters the thigh from the popliteal fossa through the adductor canal, passing superiorly in the thigh towards the femoral triangle. In the femoral triangle, the femoral vein is located medial to the femoral artery. A large superficial**[**vein of the lower limb**](https://www.kenhub.com/en/library/anatomy/lower-extremities-arteries-and-nerves)**, thegreat saphenous vein, pierces the fascia lata through the saphenous ring to drain into the femoral vein in the femoral triangle. The femoral vein continues superiorly to become the**[**external iliac vein**](https://www.kenhub.com/en/library/anatomy/external-iliac-vein)**in the pelvis, having passed deep to the inguinal ligament.**  **Femoral sheath**  **In the femoral triangle, the contents (excluding the femoral nerve) are enclosed in a wrapping of fascia called the femoral sheath. The sheath is funnel-shaped, and best described as a sleeve of fascia extending towards the apex of the femoral triangle, where it fuses with the adventitia of the vessels. It is continuous superiorly with the transversalis fascia and iliac fascia of the**[**abdomen**](https://www.kenhub.com/en/library/anatomy/regions-of-the-abdomen)**.**  **Femoral trigone (anterior view)**  **Each of the structures located in the femoral sheath is individually enclosed in its own compartment. The most medial compartment is the femoral canal, which contains the lymphatic vessels. The proximal opening of the femoral canal is thefemoral ring. The femoral ring is bound by the inguinal ligament anteriorly, the pectineal part of the lacunar ligament posteriorly, the base of the lacunar ligament medially, and a fibrous septum on the medial side of the femoral vein laterally.** |
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