

Head and neck

Skull, cervical vertebrae, and their connections, blood supply, venous and lymphatic drainage, innervation, regional anatomy

Skull

Neurocranium

1/ occipital bone

basilar part – foramen magnum
pharyngeal tubercle, clivus, groove for inferior petrosal sinus
lateral part (paired)
occipital condyle, hypoglossal canal, jugular tubercle,
condylar fossa – condylar canal, jugular process,
jugular notch – intrajugular process
squamous part
external surface – external occipital protuberance, external
occipital crest, supreme, superior and inferior nuchal lines
internal surface – internal occipital protuberance (cruciform
eminence), internal occipital crest (groove for occipital
sinus), groove for superior sagittal sinus, groove for
transverse sinus, groove for sigmoid sinus, cerebral and
cerebellar fossae

2/ temporal bone (paired)

petrous part (pyramid) – apex of petrous part
anterior surface – trigeminal impression, hiatus for greater and
lesser petrosal nn., groove for greater and lesser petrosal nn.,
arcuate eminence, tegmen tympani
superior border – groove for superior petrosal sinus
posterior surface – internal acoustic opening and meatus,
subarcuate fossa, vestibular canaliculus
posterior border – jugular notch, intrajugular process,
groove for inferior petrosal sinus,
groove for sigmoid sinus – mastoid foramen
inferior surface
musculotubal canal – septum of musculotubal canal,
semicanal for tensor tympani m.,
semicanal for auditory tube,
carotid canal – caroticotympanic canaliculi,
jugular fossa – mastoid canaliculus,
external opening of cochlear canaliculus,
fossula petrosa – tympanic canaliculus,
styloid process, mastoid process, stylomastoid foramen,
mastoid notch, groove for occipital a., mastoid foramen
tympanic part
external acoustic opening and meatus, tympanic sulcus
squamous part
mandibular fossa, articular tubercle, zygomatic process,
groove for middle temporal a.
tympanomastoid and tympanosquamous fissure
petrotympanic and petrosquamous fissures

jugular foramen: between jugular notch of temporal and occipital bones

3/ sphenoidal bone (sphenoid)

body of sphenoid

 sella turcica – tuberculum sellae, hypophyseal fossa, dorsum sellae, posterior clinoid process

 prechiasmatic sulcus, carotid sulcus, sphenoidal lingula, sphenoidal rostrum, sphenoidal crest,

 sphenoidal sinus – septum of sphenoidal sinuses, sphenoidal conchae, apertures of sphenoidal sinus

lesser wing (paired)

 jugum sphenoidale (sphenoidal yoke), anterior clinoid process, optic canal superior orbital fissure

greater wing (paired)

 cerebral surface – impressions of cerebral gyri, cerebral yokes, foramen rotundum, foramen ovale, foramen spinosum

 temporal surface – infratemporal crest

 infratemporal surface – foramen ovale, foramen spinosum, spine of sphenoid, sulcus of auditory tube

orbital surface

 maxillary surface – foramen rotundum

pterygoid process (paired)

 lateral plate – pterygospinous process

 pterygoid notch, pterygoid fossa, scaphoid fossa

 medial plate – pterygoid hamulus, pterygoid canal (Vidian)

foramen lacerum: after maceration of skull

4/ ethmoidal bone (ethmoid)

cribriform plate – cribriform foramina

 crista galli – ala of crista galli

perpendicular plate

ethmoidal labyrinth (paired)

 anterior, middle, and posterior ethmoidal cells,

 ethmoidal bulla, orbital plate, supreme nasal concha, superior nasal concha, middle nasal concha – uncinate process

5/ frontal bone

squamous part

external surface

 glabella, superciliary arch, supraorbital margin, supraorbital notch or foramen, frontal notch or foramen, frontal tuber, temporal line, zygomatic process

internal surface

 groove for superior sagittal sinus, frontal crest, foramen cecum

 frontal sinus – septum of frontal sinuses

orbital part (paired)

 fossa for lacrimal gland, trochlear spine, trochlear fovea,

 ethmoidal notch, impressions of cerebral gyri

nasal part – nasal spine

anterior and posterior ethmoidal foramen: between orbital part of frontal bone and orbital plate of ethmoidal labyrinth

superior orbital fissure: between lesser wing of sphenoidal bone and orbital surface of greater wing of sphenoidal bone

inferior orbital fissure: between orbital surface of body of maxilla and orbital surface of greater wing of sphenoidal bone

6/ parietal bone (paired)

frontal, occipital, sphenoid, and mastoid angles
frontal, occipital, sagittal, and squamous borders
external surface – parietal eminence, parietal foramen,
superior and inferior temporal lines
internal surface – groove for superior sagittal sinus,
parietal foramen, groove for middle meningeal

calvaria (cranial vault): parietal bones, partially squamous parts of frontal, temporal, and occipital bones, part of temporal surface of greater wing of sphenoid

Viscerocranium 1/ mandible

(splanchnocranium) body of mandible
 base of mandible
 external surface – mental protuberance, mental tubercle,
 mental foramen, oblique line
 internal surface – mental spine, digastric fossa, sublingual
 and submandibular fossae, mylohyoid line
 alveolar part
 alveolar arch, alveolar juga (alveolar yokes),
 dental alveoli – interradicular septa, interalveolar septa,
 angle of mandible – masseteric and pterygoid tuberosities
 ramus of mandible (paired)
 condylar process – head of mandible, neck of mandible,
 pterygoid fovea
 coronoid process – temporal crest
 mandibular notch
 mandibular foramen – mandibular canal, lingula of mandible,
 mylohyoid groove

2/ maxilla (paired)

body of maxilla
orbital surface – infraorbital groove, infraorbital canal,
infraorbital margin
anterior surface – infraorbital foramen, canine fossa, anterior
nasal spine, nasal notch
infratemporal surface – maxillary tuberosity, alveolar foramina
and alveolar canals
nasal surface – lacrimal groove, lacrimal margin, conchal crest,
greater palatine groove, maxillary hiatus
maxillary sinus – zygomatic, frontal, palatine and alveolar
recesses

piriform aperture: nasal notch and frontal processes of maxillae, nasal bones

frontal process – anterior lacrimal crest, lacrimal groove,
ethmoidal crest
alveolar process – alveolar arch, juga alveolaria
dental alveoli – interradicular septa, interalveolar septa
palatine process – incisive foramen, incisive canal, incisive
suture, median palatine suture, transverse palatine suture,
palatine grooves, palatine spines, nasal crest
zygomatic process

3/ zygomatic bone (paired)

orbital surface – zygomaticoorbital foramen
lateral surface – zygomaticofacial foramen
temporal surface – zygomaticotemporal foramen
temporal, frontal, and maxillaris processes

zygomatic arch: zygomatic process of temporal bone and
temporal process of zygomatic bone

4/ palatine bone (paired)

horizontal plate
nasal surface, palatine surface,
nasal crest, palatine crest,
posterior nasal spine
perpendicular plate
nasal surface – conchal crest, ethmoidal crest,
greater palatine groove
maxillary surface
greater palatine foramen
pyramidal process – lesser palatine foramen
sphenoidal process
sphenopalatine notch
orbital process

sphenopalatine foramen: between sphenopalatine notch of palatine bone
and body of sphenoidal bone

greater palatine canal: between
greater palatine groove of nasal surface of body of maxilla and
greater palatine groove of perpendicular plate of palatine bone

5/ nasal bone (paired) – ethmoidal groove, nasal foramen

6/ lacrimal bone (paired)

posterior lacrimal crest, lacrimal groove, fossa for lacrimal sac

7/ inferior nasal concha (paired)

lacrimal, ethmoidal, and maxillary processes

nasolacrimal canal – between lacrimal bone, maxilla and inferior nasal concha

8/ vomer – ala of vomer

9/ auditory ossicles (paired) – malleus, incus, stapes in the middle ear

10/ hyoid bone – body, greater and lesser horns
in the anterior region of the neck

Skull spaces

Internal cranial base:

anterior cranial fossa	frontal bone: orbital part, sulcus for superior sagittal sinus, frontal crest, foramen caecum; ethmoidal bone: cribriform plate, crista galli, sphenoidal bone: lesser wing, anterior clinoid process, optic canal, sphenoidal jugum, praechiasmatic sulcus
middle cranial fossa	sphenoidal bone: sella turcica (tuberculum sellae, hypophyseal fossa, dorsum sellae, posterior clinoid process), superior orbital fissure, carotid sulcus, sphenoidal lingula, foramen rotundum, foramen ovale, foramen spinosum; temporal bone: trigeminal impression, hiatus for greater and lesser petrosal nn., groove for greater and lesser petrosal nn., arcuate eminence, tegmen tympani, groove for superior petrosal sinus, groove for middle meningeal a.
posterior cranial fossa	temporal bone: internal acoustic opening and meatus, subarcuate fossa vestibular canaliculus; occipital bone: clivus, groove for superior petrosal sinus, jugular foramen, hypoglossal canal, foramen magnum, internal occipital protuberance, internal occipital crest, groove for transverse sinus, groove for sigmoid sinus, mastoid foramen, cerebellar fossae

External cranial base:

anterior part	maxilla: alveolar and palatine processes, horizontal plate of palatine bone; choanae, posterior nasal spine, vomer
middle part	sphenoidal bone: inferior orbital fissure, pterygoid process, pterygoid canal foramen ovale, foramen spinosum, sulcus of auditory tube, spine of sphenoid, infratemporal crest; temporal bone: zygomatic process, articular tubercle, mandibular fossa, external acoustic opening and meatus, carotic canal, jugular fossa, mastoid canaliculus, fossula petrosa, external opening of cochlear canaliculus, jugular notch, fissures (tympanosquamous, petrotympanic, petrosquamous, tympanomastoid), musculotubal canal, foramen lacerum; occipital bone: styloid process, stylomastoid foramen
posterior part	occipital bone: jugular notch (jugular foramen), jugular process, mastoid process, mastoid foramen, mastoid notch, groove for occipital a., occipital condyle, hypoglossal canal, condylar fossa and canal, foramen magnum, pharyngeal tubercle, external occipital crest, external occipital protuberance, superior and inferior nuchal lines, nuchal plane
Orbit borders	entry – orbital opening roof – orbital part of frontal bone, fossa for lacrimal gl., lesser wing of sphenoidal bone floor – orbital surface of body of maxilla, orbital surface of zygomatic bone, orbital surface of palatine bone medial wall – frontal process of maxilla, lacrimal bone, orbital plate of ethmoidal bone, lesser wing of sphenoidal bone, fossa of lacrimal sac lateral wall – parts of zygomatic bone, greater wing of sphenoidal bone
Bony nasal cavity borders	entry – piriform aperture, exit – choanae roof – nasal bones, orbital part of frontal bone, cribriform plate of ethmoidal bone, body of sphenoidal bone floor – palatine process of maxilla, horizontal plate of palatine bone medial wall (nasal septum) – perpendicular plate of ethmoidal bone, vomer

	<p>lateral wall – frontal process and nasal surface of maxilla, lacrimale bone, ethmoidal cells, nasal conchae, perpendicular plate of palatine bone, medial plate of pterygoid process</p>
Temporal fossa borders	<p>from the front – zygomatic process of frontal bone, part of zygomatic bone laterally – zygomatic arch inferior border – infratemporal crest medially – part of parietal bone, superior and inferior temporal line, squamous part of temporal bone, squamous part of frontal bone, temporal surface of greater wing of sphenoidal bone</p>
Infratemporal fossa borders	<p>from the front – maxillary tuberosity, laterally – ramus of mandible medially – lateral plate of pterygoid process, pterygomaxillary fissure from behind – styloid and mastoid processes of temporal bone roof – infratemporal surface of greater wing of sphenoidal bone floor – horizontal plane through angle of mandible</p>
Pterygopalatine-fossa borders	<p>roof – maxillary surface of greater wing of sphenoidal bone from the front – infratemporal surface of body of maxilla from behind – anterior border of pterygoid process of sphenoidal bone medially – perpendicular plate of palatine bone laterally – pterygomaxillary fissure, floor – greater palatine canal</p>

Cervical vertebrae (C1 – C7)

Atlas (C1)	<p>anterior arch – anterior tubercle, dental fovea (joins dens of axis) posterior arch – posterior tubercle, groove for vertebral a. lateral mass (paired) – superior and inferior articular surfaces transverse process (paired) – transverse foramen vertebral foramen</p>
Axis (C2)	<p>vertebral body dens of axis – apex of dens, anterior and posterior articular surfaces vertebral arch pedicle – superior and inferior vertebral notches lamina superior and inferior articular processes transverse process – transverse foramen, anterior and posterior tubercles, groove for spinal n. spinous process vertebral foramen</p>
Cervical vertebrae C3 – C7	<p>vertebral body – uncal process vertebral arch pedicle – superior and inferior vertebral notches lamina superior and inferior articular processes transverse process – transverse foramen anterior tubercle (C6 – carotid tubercle) posterior tubercle, groove for spinal n. spinous process (bifurcated, except of C7 – vertebra prominens) vertebral foramen</p>

intervertebral foramen: between inferior and superior vertebral notches

Joints of skull and cervical vertebrae

immovable joints

- 1/ cranial syndesmoses (fibrous joints of skull)
sutures – coronal, sagittal, lambdoid, squamous sutures
median and transverse palatine sutures
fontanelles (fonticles) – anterior, posterior, sphenoidal and mastoid
gomphosis (dentoalveolar syndesmosis)
- 2/ cranial synchondroses (cartilaginous joints of skull)
sphenooccipital synchondrosis – disappears in the 18th year of life
sphenopetrosal and petrooccipital synchondroses (permanent,
foramen lacerum – after maceration of skull)
- 3/ cranial synostoses (osseous joints of skull)
after ossification of sutures

movable joints

- 1/ **temporomandibular joint** (synovial joint)
articular disc – discomandibular and discotemporal joints
direct ligaments – lateral and medial ligg.
indirect ligaments – stylomandibular lig. (angular tract – separates
parotid and submandibular glands)
sphenomandibular lig. – protects maxillary a.
pterygomandibular lig. (buccopharyngeal raphe)
pterygospinous lig. – protects mandibular n.

2/ craniocervical joints

- atlantooccipital joints
anterior atlantooccipital membrane (from anterior longitudinal lig.)
tectorial membrane (from posterior longitudinal lig.)
posterior atlantooccipital membrane (from ligg. flava)
- atlantoaxial joints:
median atlantoaxial joint – cruciform lig. of atlas, alar ligg.,
apical lig. of dens
lateral atlantoaxial joints

Muscles of head and neck

muscles of facial expression (mimetic mm.)

i.: facial n.

- 1/ epicranius m. – epicranial aponeurosis
occipitofrontal m. – frontal and occipital bellies
temporoparietal m.
- 2/ muscles of auricle – superior, anterior, and posterior auricular mm.
- 3/ muscles of eye slit
orbicularis oculi m. – orbital, palpebral ,and lacrimal parts
depressor supercilii m., corrugator supercilii m., procerus m.
- 4/ muscles of nose
nasalis m. – transverse and alar parts, depressor septi nasi m.
- 5/ muscles of oral slit
orbicularis oris m. – marginal and labial parts
levator labii superioris m., levator labii superioris alaeque nasi m.,
levator anguli oris m., zygomatic major et minor mm., risorius m.,
depressor anguli oris m., depressor labii inferioris m., mentalis m.,
transversus menti m.
buccinator m. – the only deep muscle of head and the only mimetic
muscle covered by fascia, it is pierced by parotid duct

modiolus anguli oris: common insertion of levator anguli oris m., zygomatic major m., buccinator m., risorius m., platysma, depressor anguli oris m., orbicularis oris m.

masticatory muscles (chewing mm.)
i.: mandibular n.

- 1/ masseter m. – superficial and deep parts
- 2/ temporalis m.
- 3/ medial pterygoid m. – superficial and deep parts
- 4/ lateral pterygoid m. – superior and inferior heads (it opens mouth)

muscles of neck

- 1/ platysma m. – only mimetic muscle of neck
- 2/ sternocleidomastoid m. – sternal and clavicular parts
- 3/ suprathyroid mm.
 - geniohyoid m., mylohyoid m. – mylohyoid raphe,
 - digastric m. – anterior and posterior bellies, stylohyoid m.
- 4/ infrathyroid mm. – sternohyoid m., sternothyroid m., thyrohyoid m., omohyoid m. – superior and inferior bellies
- 5/ scalene mm. – m. scalenus anterior, medius et posterior
 - scalene fissure*: between anterior and middle scalene mm.
- 6/ prevertebral mm. (deep cervical mm.)
 - rectus capitis anterior m., rectus capitis lateralis m.
 - longus capitis m., longus colli m.

Arterial supply of head and neck

Common carotid a.

in carotid sheath with internal jugular v. and vagus n.
right: starts from brachiocephalic trunk, left from aortic arch
carotid bifurcation – level of upper border of thyroid cartilage
carotid body – chemoreceptor for O₂ and CO₂,
has terminal branches only – external and internal carotid aa.

Region of supply: neck, thyroid gland, larynx, head and brain, teeth, salivary glands, sensory organs

External carotid a.

- anterior branches:
- 1/ superior thyroid a. – below hyoid bone
 - infrahyoid br.,
 - superior laryngeal a. – pierces thyrohyoid membrane,
 - sternocleidomastoid br., cricothyroid br.,
 - glandular brr. – anterior, posterior, and lateral brr.
 - 2/ lingual a. – runs medially below hyoglossal m.
 - suprathyroid br., dorsal lingual brr., sublingual a., deep lingual a.
 - 3/ facial a. – runs medially to stylohyoid m. and posterior belly of digastric m.
 - ascending palatine a., submental a., glandular brr., inferior labial a.,
 - superior labial a. – septal nasal br., lateral nasal br.,
 - angular a. – anastomoses with dorsal nasal a. (from ophthalmic a.)

medial branch:

- 1/ ascending pharyngeal a.
 - pharyngeal brr., inferior tympanic a.,
 - posterior meningeal a. – to jugular foramen

posterior branches:

1/ occipital a. – in groove of occipital a.

sternocleidomastoid brr.,

mastoid br. – mastoid foramen for dura mater,

auricular br., occipital br.,

descending br. – for muscles of nape,

meningeal br. – variable

2/ posterior auricular a.

stylomastoid a., posterior tympanic a., parotid br., auricular br.
occipital br.

terminal branches:

1/ temporal superficial a. – in front of auricle

transverse facial a. – runs below zygomatic arch

zygomaticoorbital a. – runs above zygomatic arch

middle temporal a., parotid brr., anterior auricular brr.,

frontal and parietal brr. – terminal branches

2/ maxillary a. – 3 parts:

mandibular part: between mandible and sphenomandibular lig.

deep auricular a., anterior tympanic a.,

middle meningeal a. – through foramen spinosum,

accessory br., superior tympanic a., petrosal br., orbital br.,
frontal and parietal brr.

inferior alveolar a. – mylohyoid br., dental and peridental brr.,
mental br.

pterygoid part: branches for muscles

deep temporal aa., masseteric a., pterygoid brr., buccal a.

pterygopalatine part: in pterygopalatine fossa

superior posterior alveolar a. – dental and peridental brr.

infraorbital a.

superior anterior alveolar a. – dental and peridental brr.

pterygoid canal a. – pharyngeal br.

descending palatine a. – greater and lesser palatine aa.

sphenopalatine a.

lateral posterior nasal aa.

posterior septal brr. – nasopalatine a.

Internal

carotid a.

carotid sinus – mechanoreceptors for blood pressure

terminal branches: anterior and middle cerebral aa.

ophthalmic a. – accompanies optic n. into optic canal

central retinal a.

lacrimal a. – lateral palpebral aa.

zygomaticotemporal and zygomaticofacial aa. – terminal brr.

medial palpebral aa.

long and short posterior ciliary aa.

muscular aa. – anterior ciliary aa.

anterior ethmoidal aa. – anterior meningeal br.

anterior septal brr., lateral anterior nasal brr.

posterior ethmoidal a.

terminal brr.: supraorbital a., supratrochlear a. – dorsal nasal a.

Subclavian a.	passes through scalene gap with trunks of brachial plexus right: from brachiocephalic trunk, left: from aortic arch Region of supply: <i>UL, part of thorax, back, abdominal wall, pericardium, diaphragm, neck, thyroid gland, larynx, brain, spinal cord</i>
	intrascalenic part 1/ vertebral a. – transverse foramen C6 – C1 to foramen magnum anterior and posterior spinal aa., basilar a. – posterior cerebral aa. 2/ internal thoracic a. – into thoracic cavity 3/ thyrocervical trunk – inferior thyroid a., ascending cervical a., suprascapular a., transverse cervical a. resp. superficial cervical a.
	interscalenic part costocervical trunk: supreme intercostal a., deep cervical a. – spinal brr. extrascalenic part: transverse cervical a. resp. dorsal scapular a. <i>transverse cervical a.:</i> superficial and deep brr. in 25 % arises as transverse cervical a. and dorsal scapular a.
	Venous drainage of head and neck
Superficial veins	external jugular v. – from occipital v. and posterior auricular v. or from posterior auricular v. and posterior br. of retromandibular v. receives: anterior jugular v., suprascapular v., transverse cervical v. anterior jugular v. – from submental vv. form: jugular venous arch or v. mediana coli
Deep veins Internal jugular v.	from sigmoid sinus, through jugular foramen, superior and inferior bulbs runs ventrolaterally to common carotid a. in carotid sheath retromandibular v. – from superficial temporal v. and maxillary vv. superficial temporal v. – frontal and parietal brr., parotid brr., anterior auricular v., articular brr., transverse facial v., zygomaticoorbital v., middle temporal v. anterior br. joins facial v. – to internal jugular v. posterior br. joins posterior auricular v. – to external jugular v. maxillary vv. – from pterygoid plexus: inferior ophthalmic v., superior and inferior alveolar vv., internal nasal vv., parotid vv., articular vv., tympanic vv., stylomastoid v. facial v. – angular v.: from supraorbital and supratrochlear vv. deep facial v. – connection with pterygoid plexus superior and inferior labial vv., submental v., external palatine v. lingual v. – deep lingual v. (for rapid absorption of medicaments) sublingual v., committant v. of hypoglossal n. superior thyroid v. – superior laryngeal v., cricothyroid v. <i>thyrolinguofacial, thyrolingual, thyrofacial, linguofacial trunks</i> middle thyroid v., external jugular v., variable occipital v.
Subclavian v.	passes in front of scalene fissure and opens in venous angle receives: external jugular v., variable: transverse cervical v., suprascapular v., vertebral v. – anterior vertebral v. <i>venous angle: connection of internal jugular v. and subclavian v.</i>
Brachiocephalic v.	from venous angle, receives: vertebral v., deep cervical v., inferior laryngeal v., inferior thyroid v. – plexus thyroideus impar

Lymphatic drainage of head and neck

head	occipital lnn., mastoid (retroauricular) lnn., parotid lnn. submental lnn., facial (buccal) lnn., submandibular lnn. – main lymphatic nodes of head
neck	superficial cervical lnn. lateral cervical lnn. anterior cervical lnn. – paratracheal, pretracheal, prelaryngeal lnn. deep cervical lnn. along internal jugular v.: jugulodigastric and juguloomohyoid lnn. retropharyngeal lnn., lingual lnn. along transverse cervical vessels: Virchow's ln. along accessory n. to left and right jugular trunks

Innervation of head and neck

Cranial nn.: (CN I – XII)	12 pairs – sensory, motor, mixed nerves somatic fibers: afferent (sensory) and efferent (motor) autonomic fibers: parasympathetic
olfactory n. (CN I)	through cribriform plate of ethmoidal bone, <u>sensory</u> from olfactory region of nasal cavity, olfactory tract to brain cortex
optic n. (CN II)	through optic canal accompanied by ophthalmic a., <u>sensory</u> from retina, optic tract to brain cortex
oculomotor n. (CN III)	through superior orbital fissure, <u>motor</u> i.: rectus superior m., rectus inferior m., rectus medialis m., obliquus inferior m., levator palpebrae superior m.
trochlear n. (CN IV)	through superior orbital fissure, <u>motor</u> i.: obliquus superior m.
trigeminal n. (CN V)	<u>mixed</u> – sensory root: trigeminal (semilunar) ggl. in trigeminal impression; motor root: for masticatory mm.; sensory: for dura mater – tentorial br. (CN V/1), meningeal brr. (CN V/2 and CN V/3) 1/ ophthalmic n. (CN V/1) – through superior orbital fissure, <u>sensory</u> lacrimal n. frontal n. – supraorbital n.: lateral and medial brr., supratrochlear n. nasociliary n.: communicating br. to ciliary ggl. – short ciliary nn. long ciliary nn., anterior ethmoidal n. – medial and lateral internal nasal brr., external nasal brr., posterior ethmoidal n., terminal branch: infratrochlear a. 2/ maxillary n. (CN V/2) – through foramen rotundum, <u>sensory</u> zygomatic n. – communicating br. to lacrimal n. zygomaticofacial br., zygomaticotemporal br. infraorbital n. – posterior, middle, and anterior superior alveolar nn. to superior dental plexus, pes anserinus minor – inferior palpebral brr., external and internal nasal brr., superior labial brr. pterygopalatine nn. (ganglionar brr.) – to pterygopalatine ggl.

from pterygopalatine ggl. – pterygoid canal n. (greater and deep petrosal nn.), lateral and medial superior posterior nasal brr.
 – nasopalatine n., inferior posterior nasal brr.,
 greater and lesser palatine nn. – tonsillar brr., pharyngeal br.
 3/ mandibular n. (CN V/3) – through foramen ovale, mixed
 motor branches – masseteric n., deep temporal nn.,
 lateral and medial pterygoid nn., n. to tensor tympani m.,
 n. to tensor veli palatini m.
 sensory branches – buccal n.
 auriculotemporal n. – communicating br. to facial n.,
 external acoustic meatus n., tympanic membrane brr.,
 parotid brr., anterior auricular br., articular brr.,
 superficial temporal brr.
 lingual n. – communicating br. to chorda tympani,
 brr. to isthmus of fauces, communicating br. to
 hypoglossal n., ganglionar brr. to submandibular ggl.,
 lingual brr., sublingual n.
 mixed branch – inferior alveolar n.
 motor – mylohyoid n.
 sensory – inferior dental plexus, mental n.

abducent n. (CN VI)	through superior orbital fissure, <u>motor</u> i.: rectus lateralis m.
facial n. (CN VII)	enters internal acoustic pore, leaves stylomastoid foramen, <u>mixed</u> motor root – for mimetic mm., for stylohyoid m., for posterior belly of digastric m. and stapedius m. intermediate n. – parasympathetic for glands, sensory for taste intracranial branches in petrosal part of temporal bone greater petrosal n. – parasympathetic, taste from palate stapedius n. – motor for stapedius m. chorda tympani – parasympathetic, taste from anterior 2/3 of tongue extracranial branches posterior auricular n., digastric and stylohyoid brr. pes anserinus major (intraparotid plexus) for mimetic mm. temporal brr., zygomatic brr., buccal brr., marginal mandibular br. cervical br.
vestibulocochlear n. (CN VIII)	into internal acoustic pore, <u>sensory</u> for balance and hearing from vestibular and cochlear organs to cortex of brain
glossopharyngeal n. (CN IX)	through jugular foramen, superior and inferior gll., <u>mixed</u> sensory – for pharynx, palatine tonsil, posterior 1/3 of tongue, tympanic cavity, auditory tube, carotic body, carotic sinus sensory – taste from posterior 1/3 of tongue motor – for muscles of palate, pharynx, larynx parasympathetic – for parotid gland tympanic n. – lesser petrosal n. (Jacobson's anastomosis) carotid sinus n. – from carotid body and sinus pharyngeal brr. – to pharyngeal plexus, tonsillar brr., lingual brr.

vagus n. (CN X)	through jugular foramen, superior and inferior gll., <u>mixed</u> in carotid sheath between common carotid a. and internal jugular v. sensory – for dura mater, auricle, pharynx, larynx; taste from epiglottis motor – muscles of palate, pharynx, larynx, palatoglossal and palatopharyngeal mm. parasympathetic – PS ganglia in walls of organs of neck, thorax, abdomen branches in neck, thorax, and abdomen neck: meningeal br., auricular br., pharyngeal br. (to pharyngeal plexus) carotid body n. superior laryngeal n., mixed – sensory: internal br. (laryngeal fold), motor: external br. – for cricothyroid m. and inferior pharyngeal constrictor m. recurrent laryngeal n., mixed inferior laryngeal n.: sensory to vocal folds (from below) motor: larynx except of cricothyroid m. superior and inferior cervical cardiac brr. (to cardiac plexus)
accessory n. (CN XI)	spinal root from spinal cord (via foramen magnum to skull), cranial root from medulla oblongata; from skull through jugular foramen, <u>motor</u> internal br. – joins vagus n., to pharyngeal plexus external br. – i.: sternocleidomastoid and trapezius mm.
hypoglossal n. (CN XII)	through hypoglossal canal, <u>motor</u> for all muscles of tongue except of palatoglossal m.
Spinal nn.:	anterior rami of spinal nn. C1 – Th: cervical and brachial plexuses posterior rami of spinal nn. C1 – C3: do not create nerve plexus
cervical plexus	anterior rami of spinal nn. C1 – C4 motor – ansa cervicalis for infrahyoid muscles superior (anterior) root: C1 runs together with hypoglossal n. inferior (posterior) root: C2 – C3 phrenic n. – in front of anterior scalene m., innervates diaphragm muscular brr. – for prevertebral muscles sensory – from punctum nervorum: transverse cervical n. – superior brr. (connect cervical br. of facial n.), inferior brr., lesser occipital n., greater auricular n. – accompanies external jugular v., supraclavicular nn. – medial, intermediate, and lateral nn.
brachial plexus	anterior rami of spinal nn. C5 – Th1 trunks: superior, middle, inferior – through scalene fissure supraclavicular part: dorsal scapular n., suprascapular n., long thoracic n., subclavian n.
posterior rami of spinal nerves	for paravertebral muscles, skin of spine, joints of vertebral column suboccipital n. – C1, greater occipital n. – C2, third occipital n. – C3
Autonomic nn.:	for smooth muscles of inner organs, glands, and myocardium
sympathetic fibers (S)	run along vessels, ganglia of neck: superior cervical ggl. – C2-3, middle cervical ggl. – C6, inferior cervical ggl. (cervicothoracic, stellate) – C7
parasympathetic fibers (PS)	run inside cranial nerves; ganglia of head: ciliary ggl. (CN III), pterygopalatine ggl. (CN VII), otic ggl. (CN IX), ganglion of neck: submandibular ggl. (CN VII)

Regional anatomy of head

temporal fossa	temporalis m., deep temporal nn. from CN V/3, deep temporal aa. and vv., middle temporal a. and v., superficial temporal a. and v., zygomaticotemporal n., auriculotemporal n., buccal fat pad
infratemporal fossa	medial and lateral pterygoid mm., part of temporalis m., buccal fat pad, maxillary a. and its branches, pterygoid plexus, mandibular n. and its branches, chorda tympani, lesser petrosal n., otic ggl.
pterygopalatine fossa	content: pterygopalatine part of maxillary a., maxillary n.. and its branches, n. of pterygoid canal, pterygopalatine ggl., veins to pterygoid plexus

Regional anatomy of neck

1/ Anterior cervical region: between mandible and sternocleidomastoid m.

submental triangle	borders: anterior belly of digastric m., mentum, hyoid bone, mylohyoid m.; content: submental vessels, mylohyoid n., anterior jugular v., lymphnodes
submandibular triangle	borders: mandible, anterior and posterior bellies of digastric m., hyoglossal and mylohyoid mm.; content: submandibular gl., submental and facial vessels, lingual a. and n., submandibular ggl., CN XII and IX, mylohyoid n.
omotracheal triangle	borders: hyoid bone, superior belly of omohyoid m., jugular notch, sternocleidomastoid m.; content: trachea, larynx, pharynx, esophagus, thyroid gl., parathyroid gll., superior and inferior thyroid vessels, middle thyroid v., anterior jugular v. (jugular venous arch), superior laryngeal vessels and n., recurrent laryngeal n., infrathyroid mm.
carotic triangle	borders: posterior belly of digastric m., superior belly of omohyoid m., sternocleidomastoid m.; content: carotic sheath, ansa cervicalis, CN XI, CN XII, commitant v. of hypoglossal n., superior thyroid a., lingual a., facial a., superior laryngeal vessels and n., sympathetic trunk, superior cervical ggl. deep cervical lnn., part of thyroid gland

2/ Sternocleidomastoid region: around sternocleidomastoid m.; content: external jugular v., sternocleidomastoid vessels, CN XI, transverse cervical n.;
minor supraclavicular fossa: between origins of sternocleidomastoid m.; content: cupula of pleura

3/ Lateral cervical region: between clavicle, sternocleidomastoid m., and trapezius m.

omoclavicular triangle	<u>major supraclavicular fossa</u> (superficial) – borders: inferior belly of omohyoid m., sternocleidomastoid m., clavicle; content: subclavian vessels thyrocervical trunk and its branches, venous angle, external jugular v., suprascapular vessels and n., anterior vertebral v., trunks of brachial plexus, phrenic n., supraclavicular nn., supraclavicular lnn.; <u>scalenovertebral triangle</u> (deep) – borders: sternocleidomastoid m., anterior scalene m., longus colli m., trachea, esophagus, thyroid gland, cupula of pleura; content: subclavian vessels and n., trunks of brachial plexus, phrenic n., vagus n., sympathetic trunk, middle and inferior cervical gll., ansa subclavia
omotrapezium triangle	borders: sternocleidomastoid m., trapezius m., inferior belly of omohyoid m.; content: external jugular v. and its veins, deep cervical vessels, transverse cervical a. resp. dorsal scapular a., ascending cervical a., anterior vertebral v., phrenic n., nerves from punctum nervorum, CN XI, trunks of brachial plexus, superficial and deep cervical lnn.