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The basics of surgical interventions on the head

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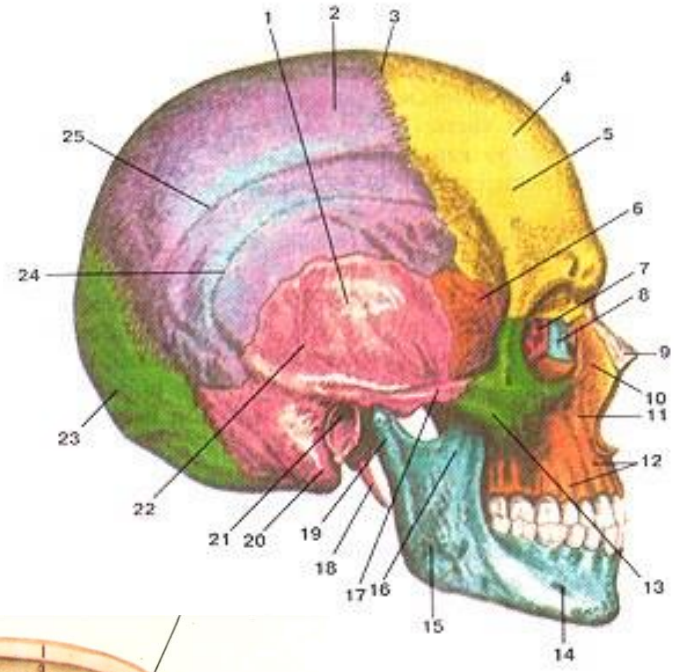
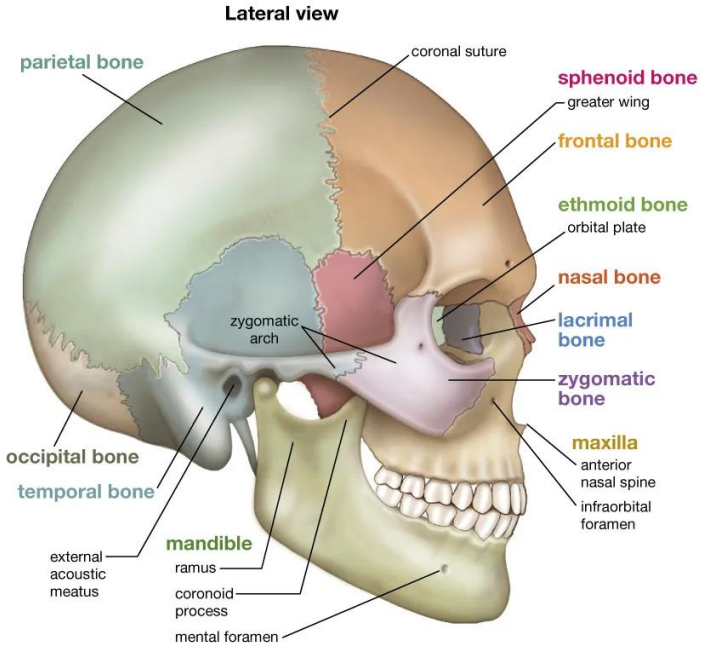
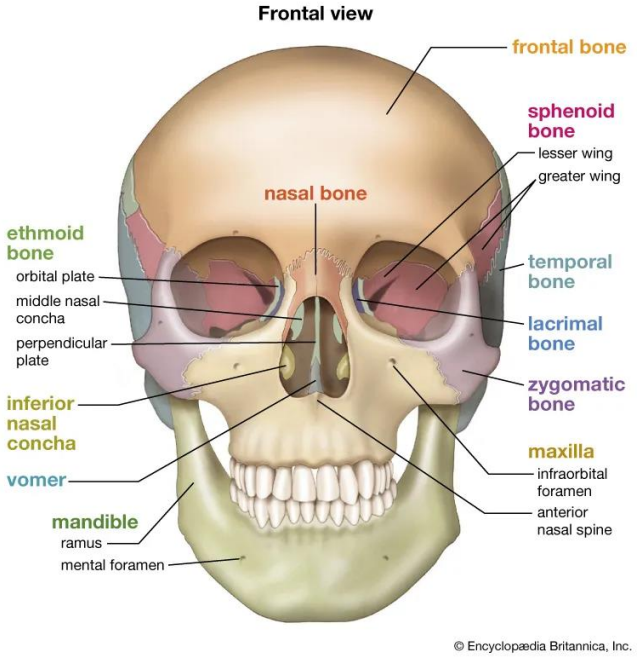
Boundaries and divisions of the head

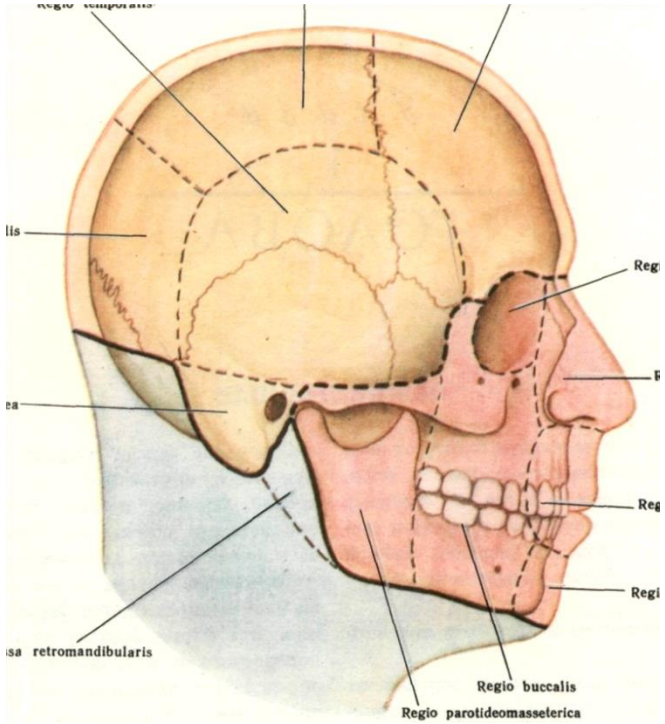


The border between the head and neck: chin protrusion; lower edge, angle and branch of the lower jaw; external auditory canal; apex of the mastoid process; upper frontal line; external occipital protuberance.

Departments: brain and facial







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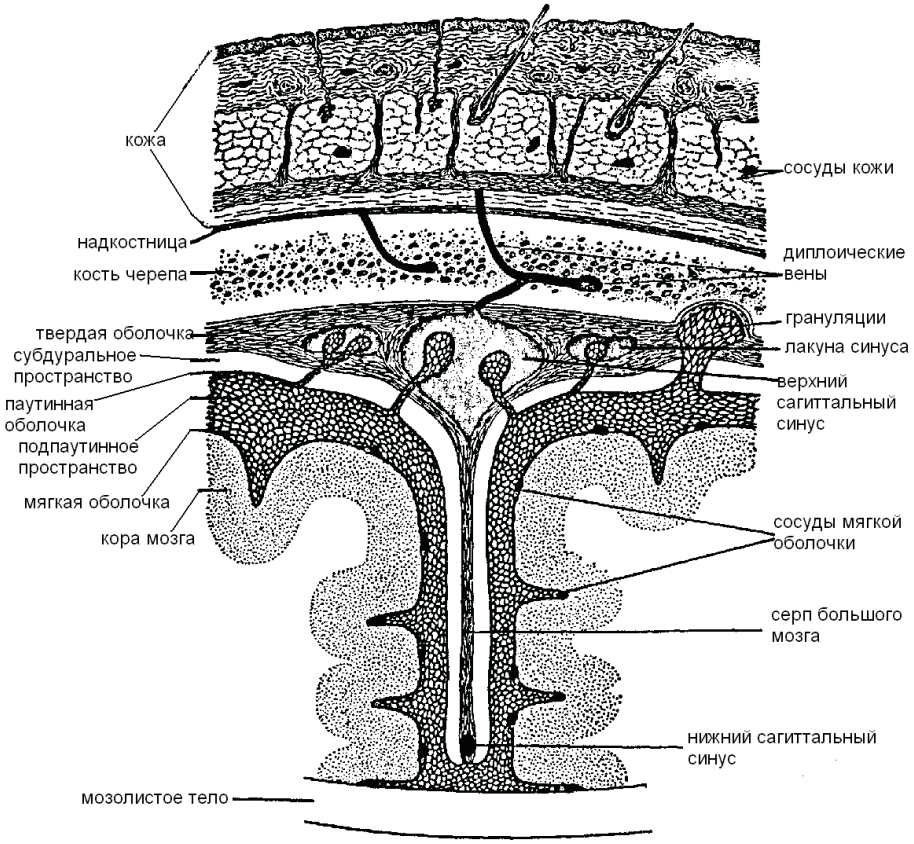
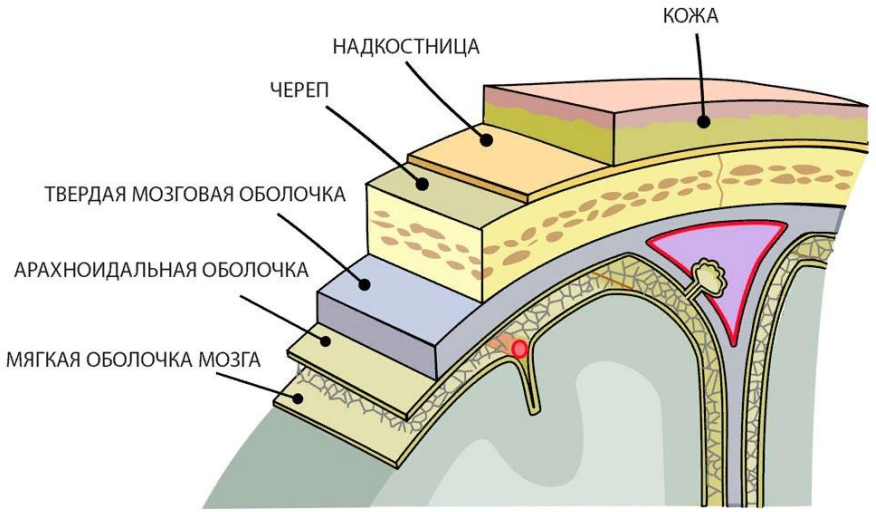
THE CEREBRAL PART OF THE HEAD
FRONTAL-PARIETAL-OCCIPITAL REGION



Layers:

1. The SKIN is thick, sedentary, connected to the aponeurosis by connective tissue bridges.
2. SUBCUTANEOUS ADIPOSE TISSUE – is divided into cells by these connective tissue bridges, there are superficial arteries and veins.
3. TENDON HELMET – consists of muscular and dense tendon parts (aponeurosis).
4. SUBAPONEUROTIC FIBER – is loose, easily peeled off.
5. The PERIOSTEUM – is separated from the bone by a layer of subcostal fiber, fused with the bone at the sutures.



6. SUBCOSTAL TISSUE – limited to the limits of one bone.
7. BONE – it consists of 3 layers:
   - Outer compact plate;
   - Diploetic substance (diploe);
   - Internal compact plate (vitreous)

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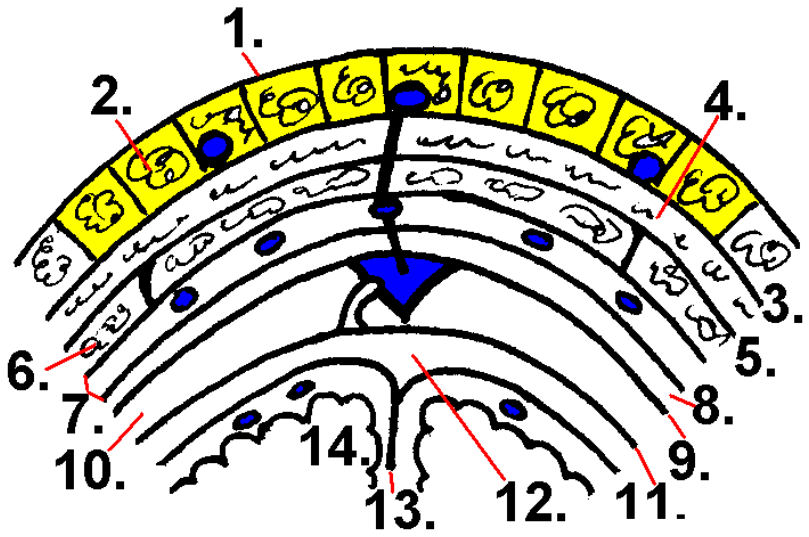
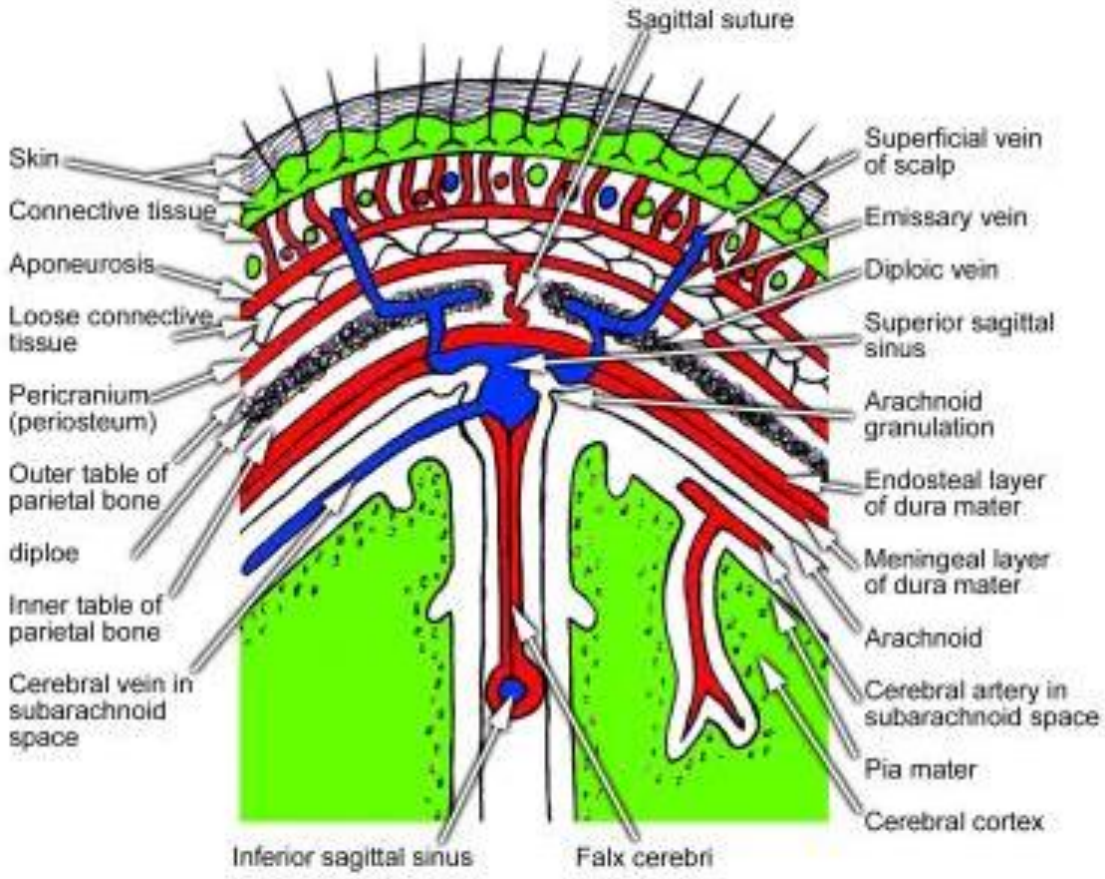
Frontal-parietal-occipital region (cranial meninges)

8. EPIDURAL SPACE
9. DURA MATER – forms venous sinuses.
10. SUBDURAL SPACE
11. The ARACHNOID MENINGES – are vascular-free and form Pachyonic granulations.
12. The SUBARACHNOID SPACE – is filled with cerebrospinal fluid.
13. THE SOFT MENINGES (VASCULAR) – covers the substance of the brain, enters the gyrus.
14. BRAIN MATTER





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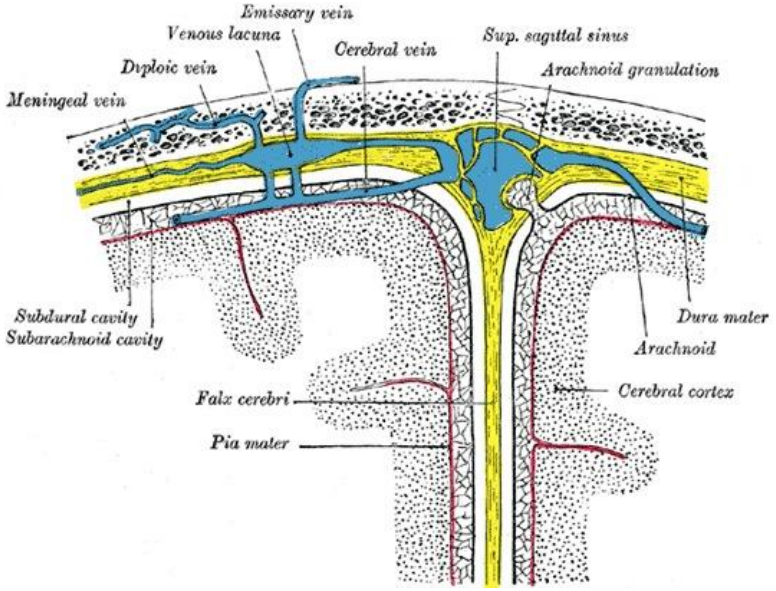
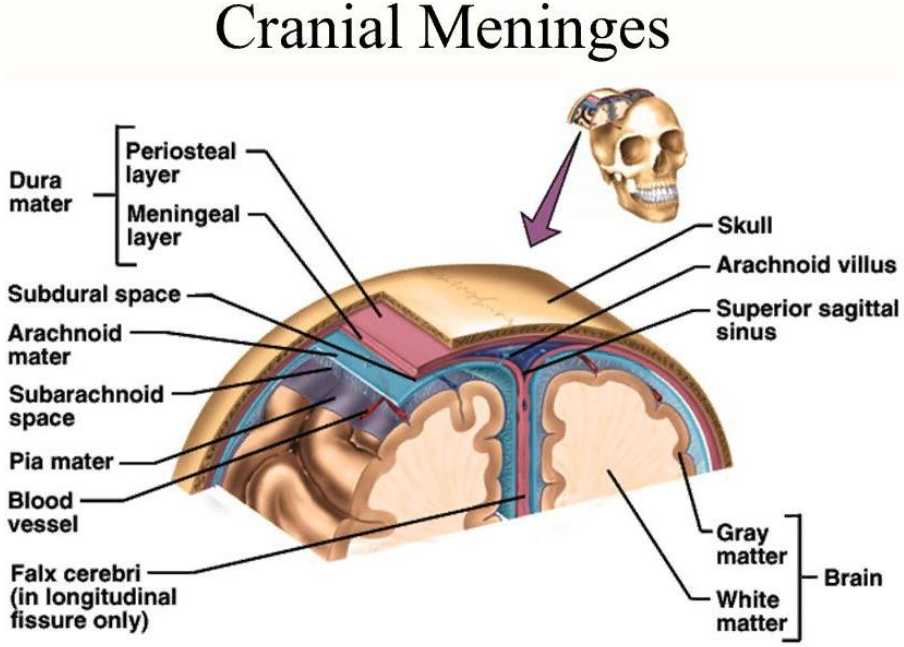
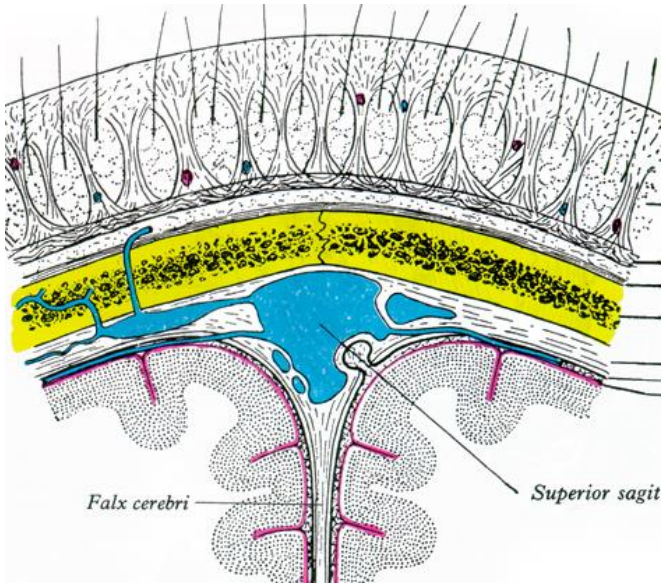
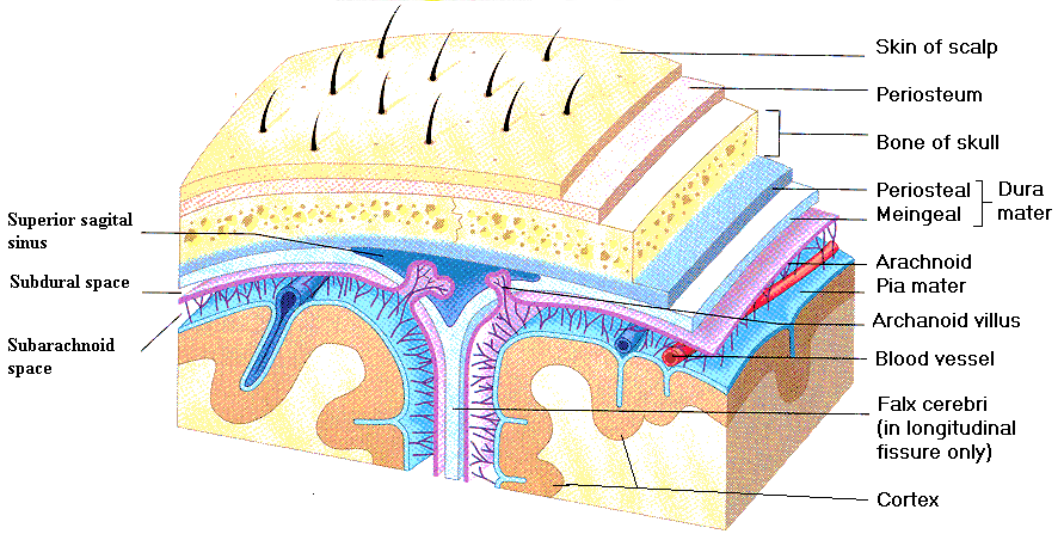
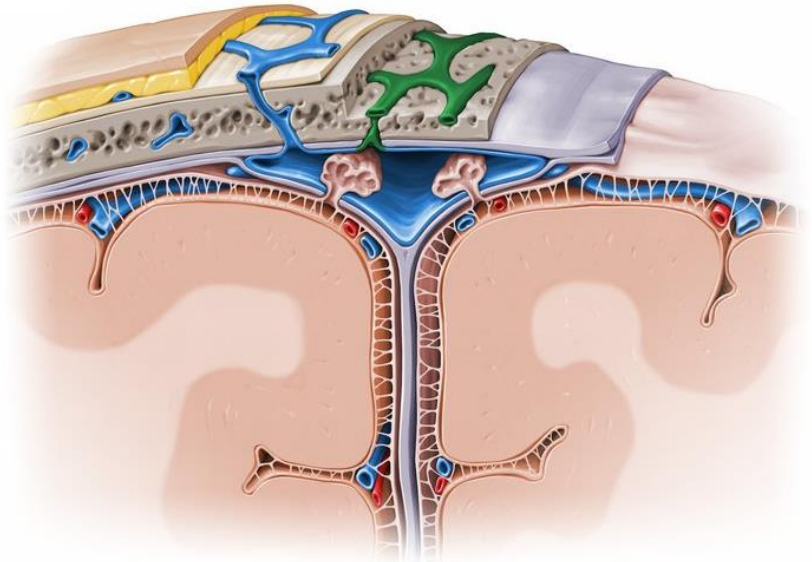
Structural features of the soft tissues of the cranial vault











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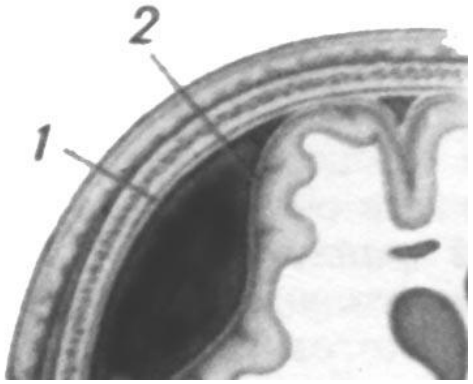
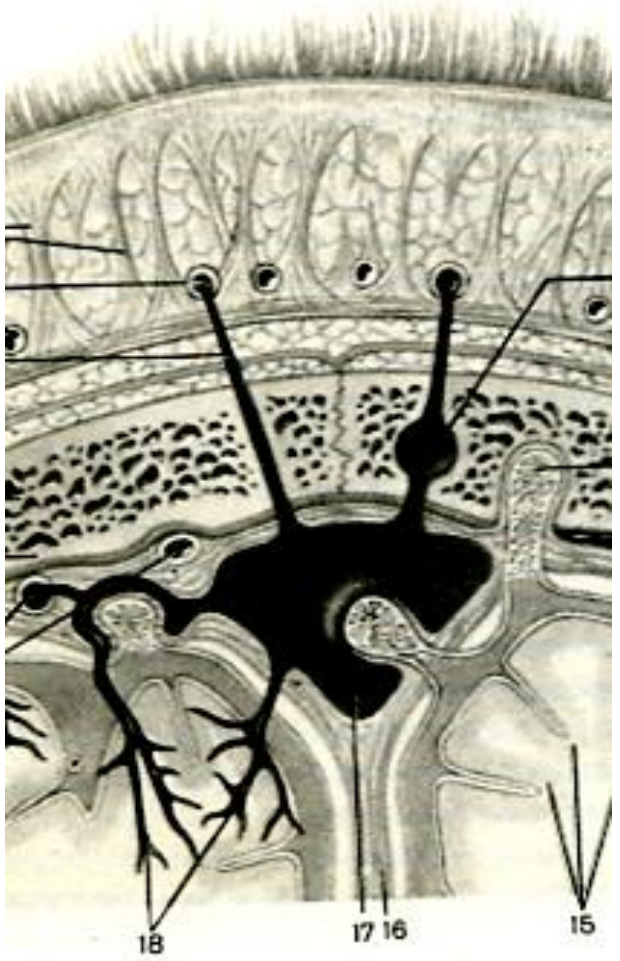
Topographic and anatomical features of the head are the basis of the general principles of performing operations.

1. The covering of the arch of the head has three layers of fiber: subcutaneous, subaponeurotic and subcostal.
   - Subcutaneous adipose tissue has a cellular structure, due to the presence of vertical and oblique fibrous bundles connecting the skin with the muscular-aponeurotic layer.
   - Ulcers and hematomas may be located in each layer of fiber, which differ in the shape of the swelling and the limits of spread.
2. In head trauma, so-called scalped wounds are observed, in which the integumentary tissues (skin, subcutaneous tissue, muscle-aponeurotic layer) peel off from the periosteum. Sometimes, with damage, all soft tissues, including the periosteum, peel off from the bones of the skull, which become exposed. The possibility of such wounds is explained by the fact that cranial aponeurosis binds firmly to the skin (the skin does not shift) with fibrous bundles and loosely with the periosteum.





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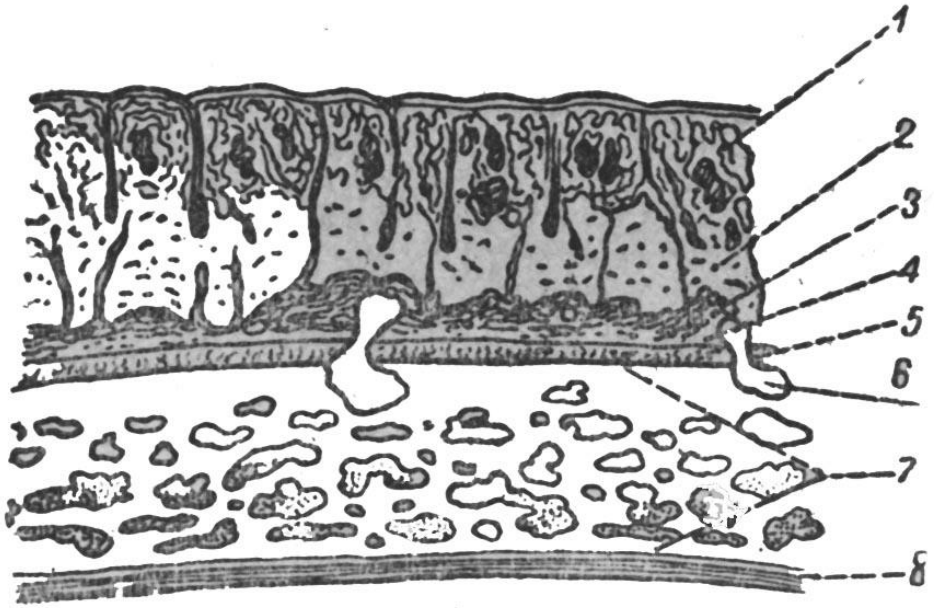
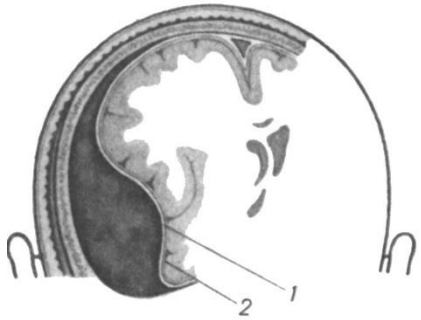
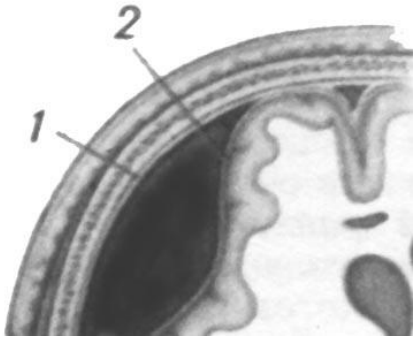
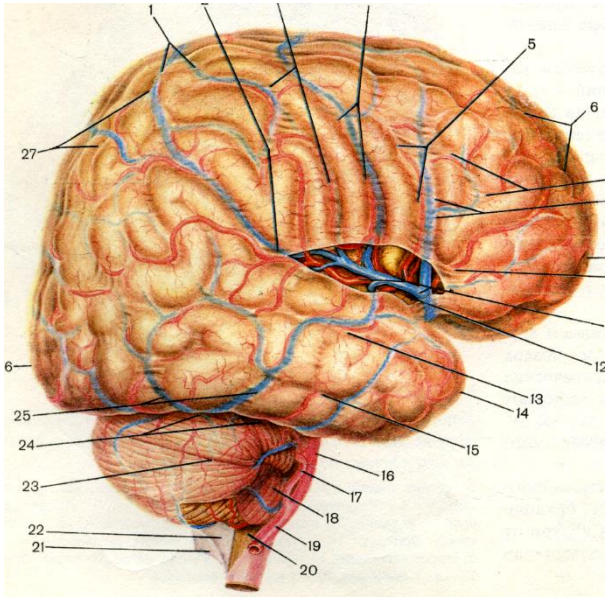
Topographic and anatomical features of the head are the basis of the general principles of performing operations.

3. A feature of the structure of the bones of the cranial vault is that they consist of outer, inner plates and a spongy substance located between them. It has been observed that in case of head injury, the inner plate of the skull bone is damaged earlier and to a greater extent than the outer one. This is due to the fact that the bone resists compression more than stretching. The inner plate undergoes stretching during fractures of the bones of the skull and therefore breaks rather than the outer one, which is experiencing compression at the same time.
4. As a feature of the structure of the head tissues, it is also necessary to indicate the presence of subcellular spaces of the brain, in which epi- and subdural hematomas may form and require surgical treatment during injury.









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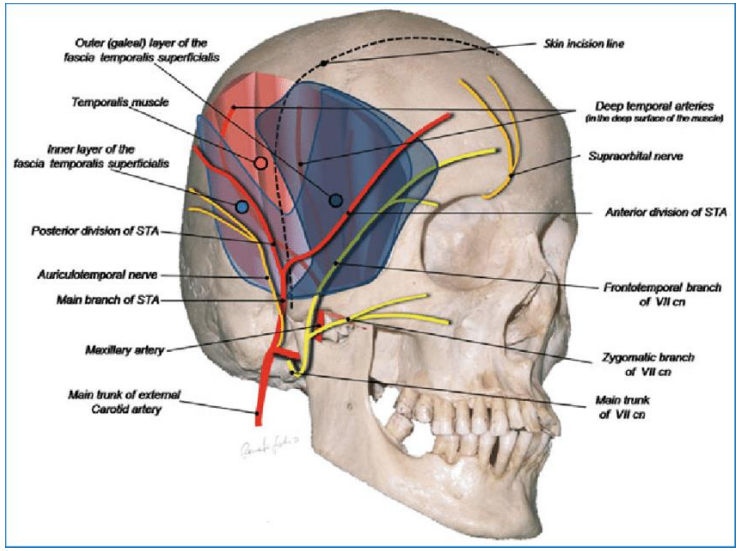
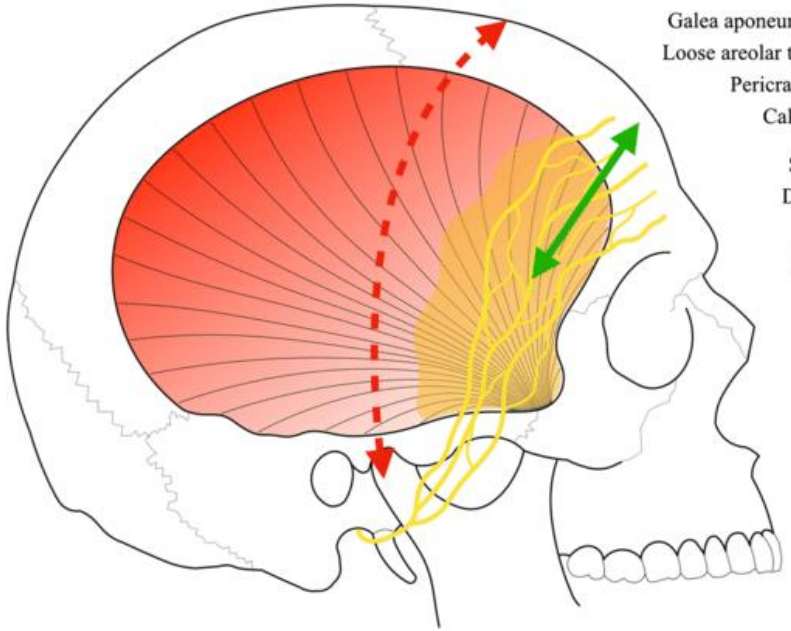
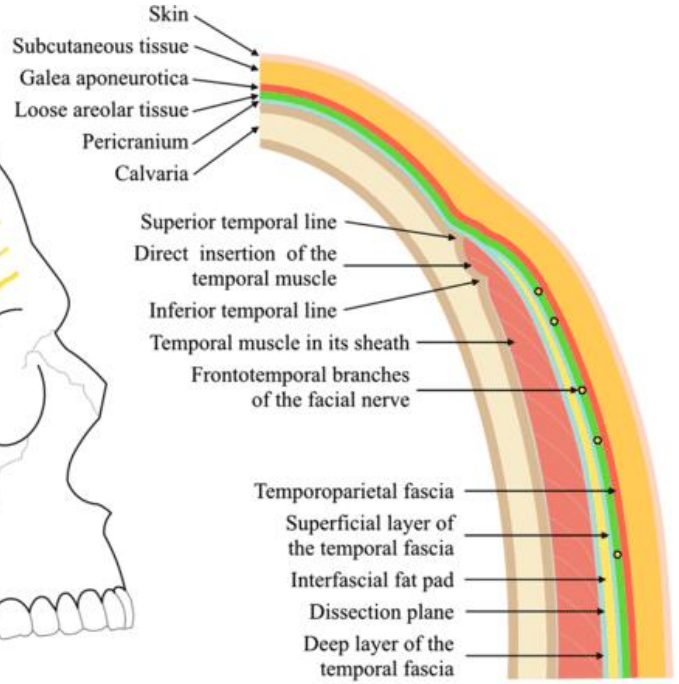
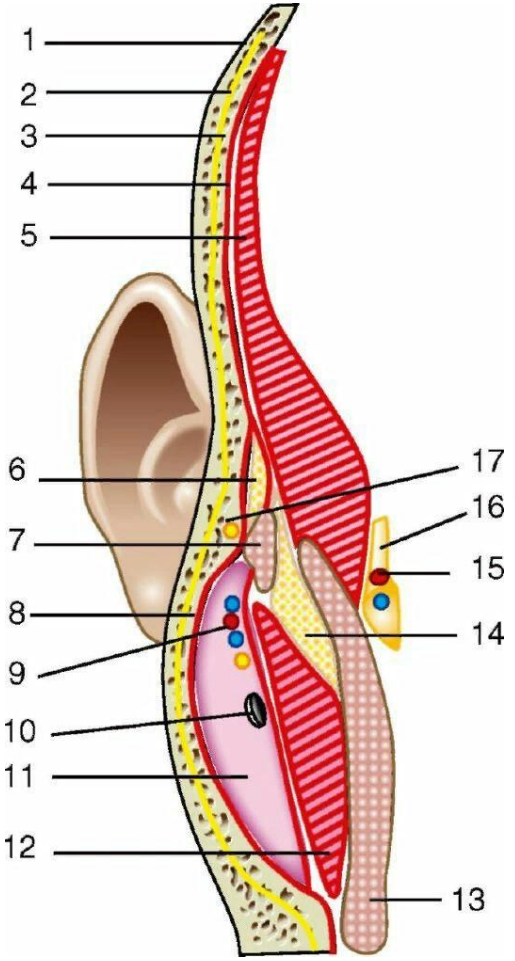
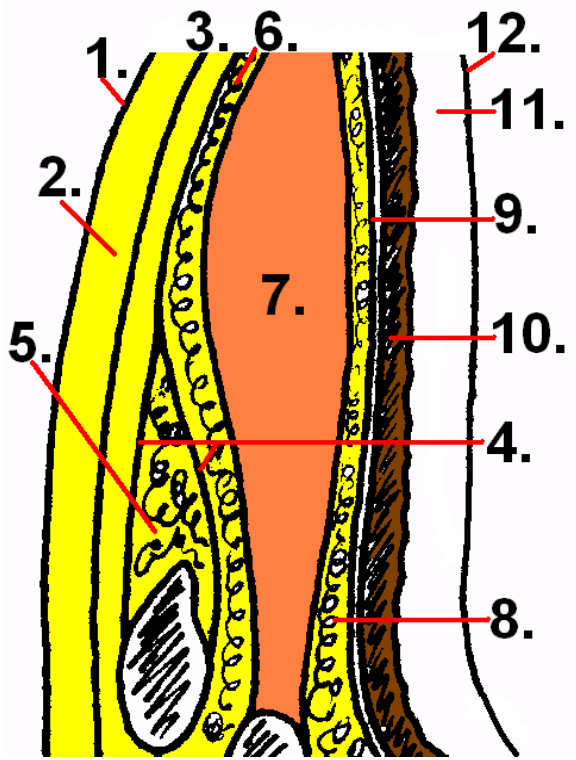
TEMPORAL REGION

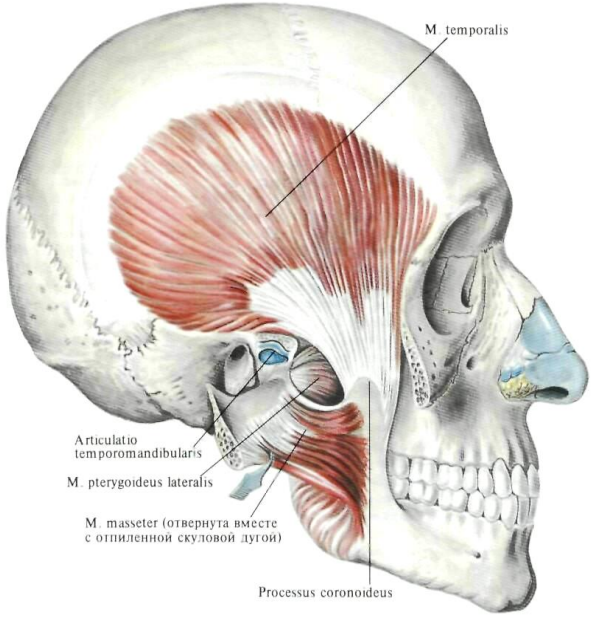












MASTOID REGION

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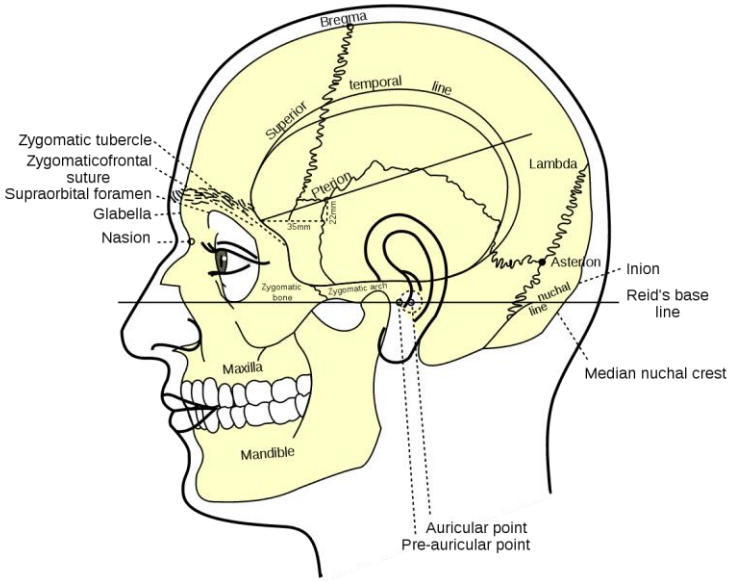
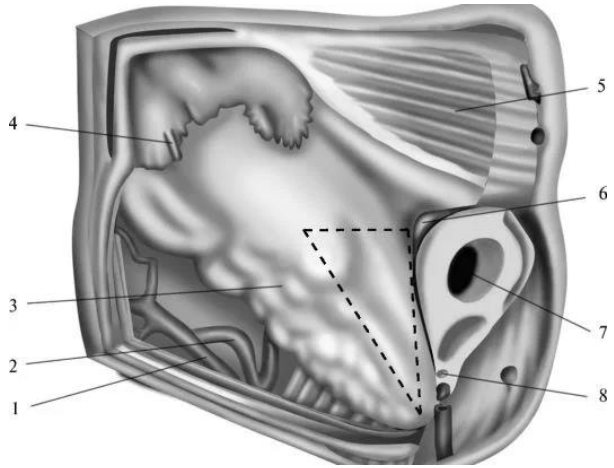
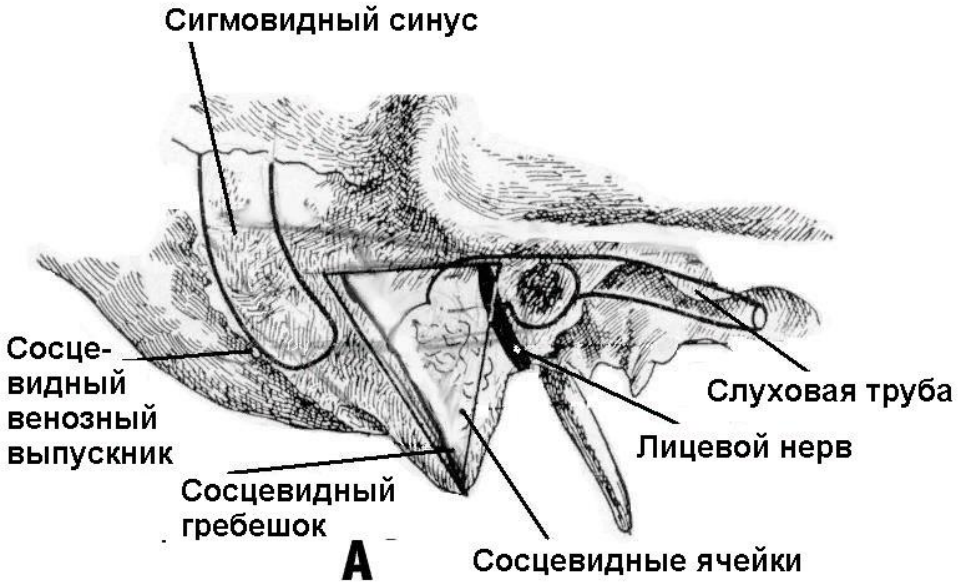
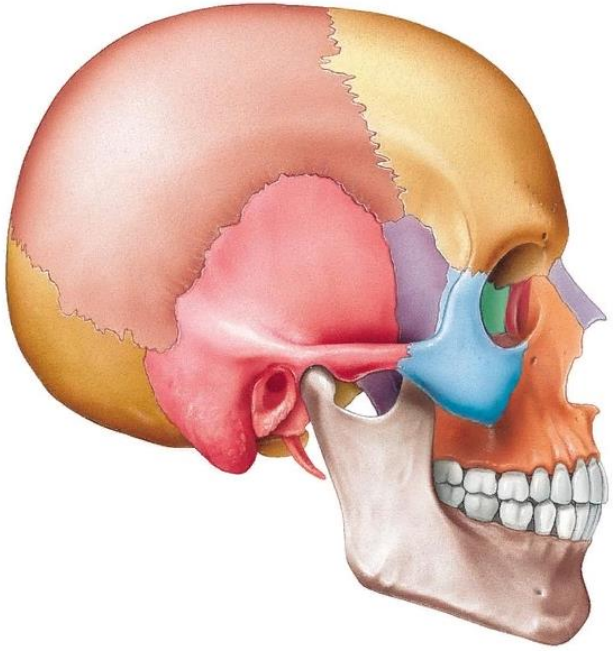
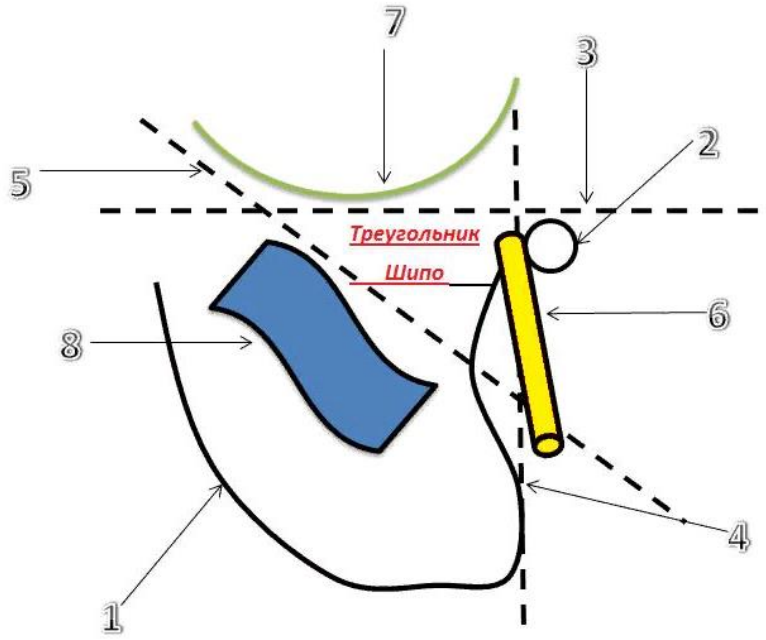






The Shipo Triangle





the borders:

1.with a middle cranial fossa (top);
2. with a sigmoid sinus (rear);
3.with a facial nerve channel (front)

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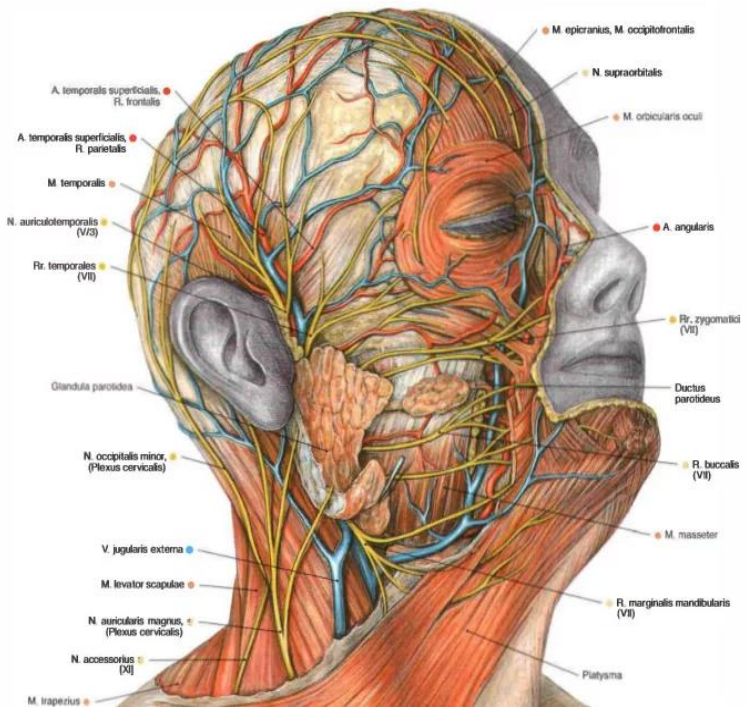
The main neurovascular bundles

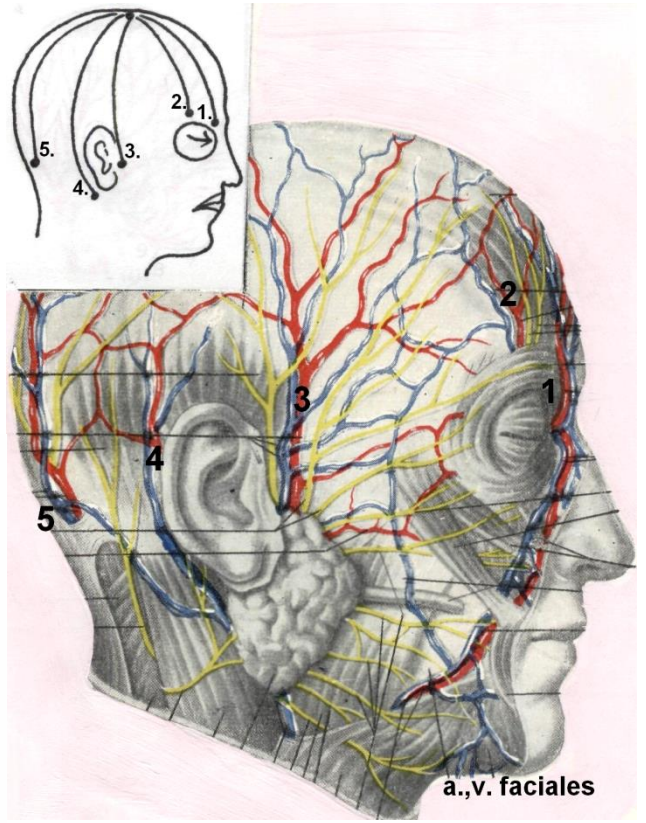
The main neurovascular bundles:

1. a. et n. supratrochleares
2. a. et n. supraorbitales
3. a. temporalis superficialis et n. auriculotemporalis
4. a. occipitalis et nn. occipitales minor et major
5. a. et n. auriculares posteriora

FEATURES OF VESSELS:

1. the radial direction relative to the upper point of the head (crown);
2. location in the subcutaneous tissue, fixation of the walls to the connective tissue bridges (if damaged, a gaping lumen and profuse bleeding);
3. a rich network of arterial anastomoses (good wound healing).).





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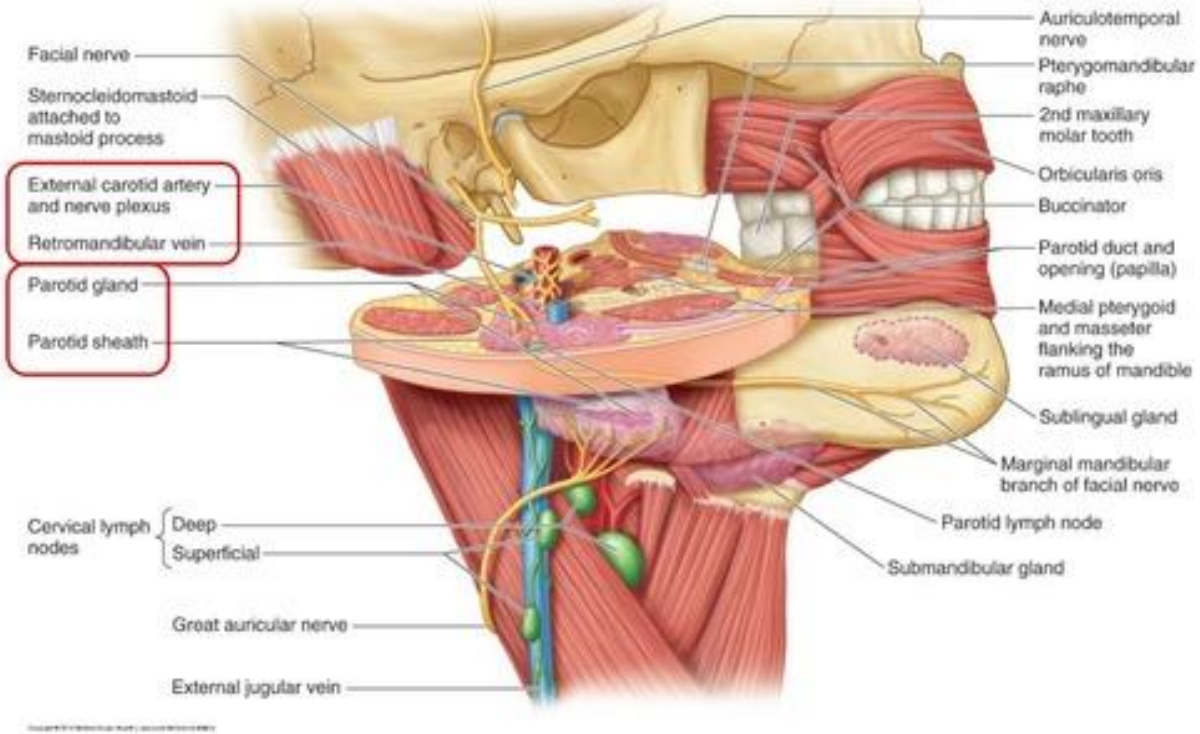
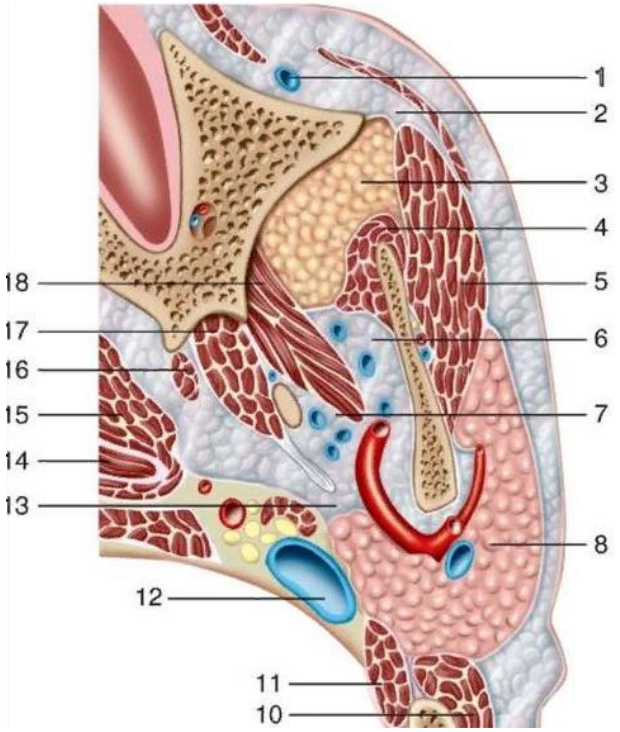
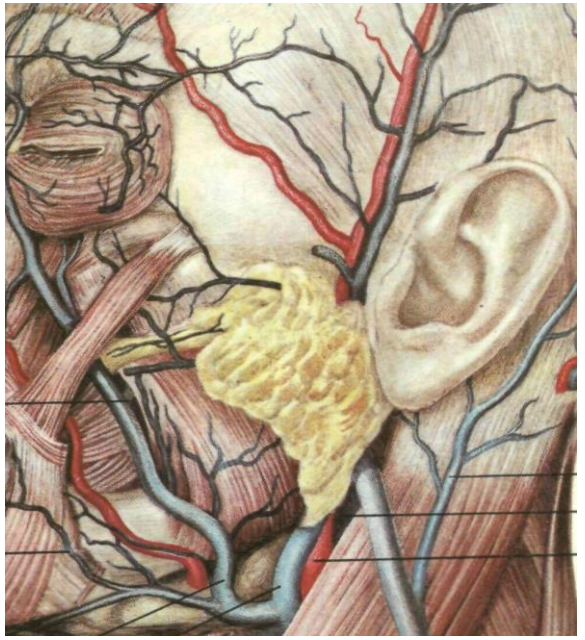
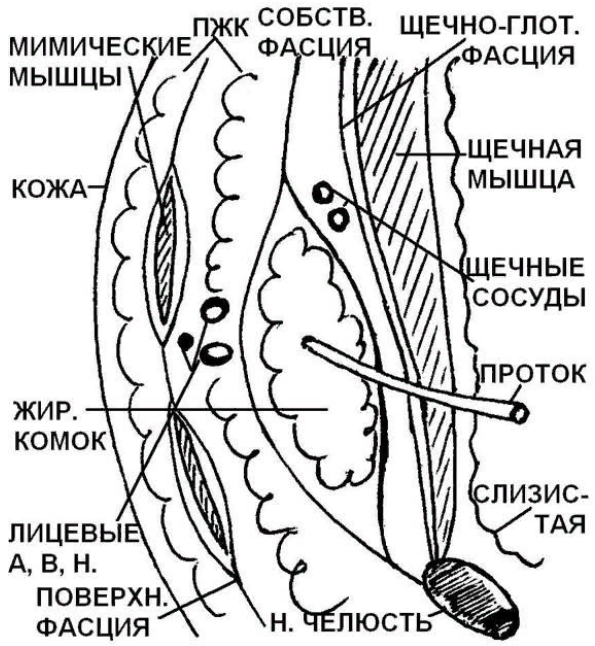
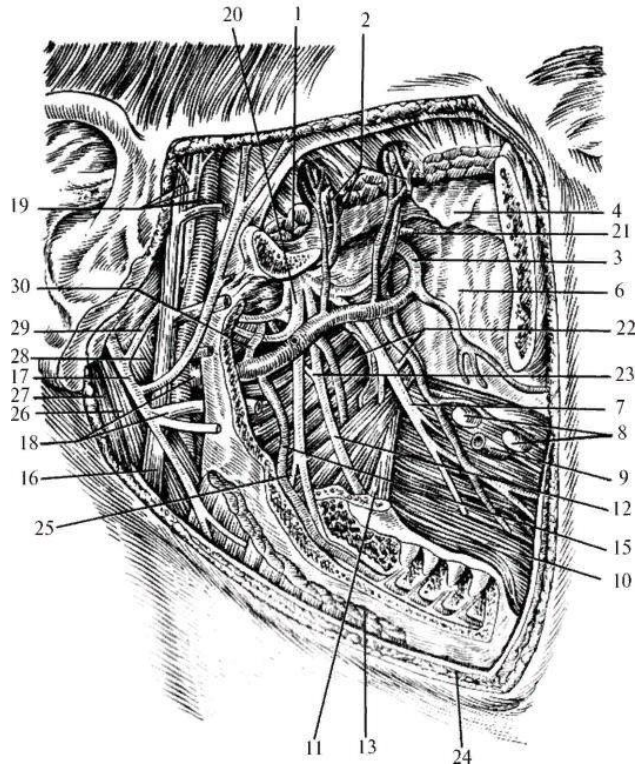
THE FACIAL PART OF THE HEAD
Parotid-chewing area











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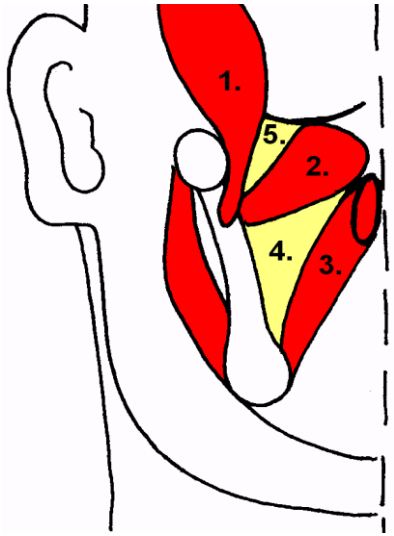
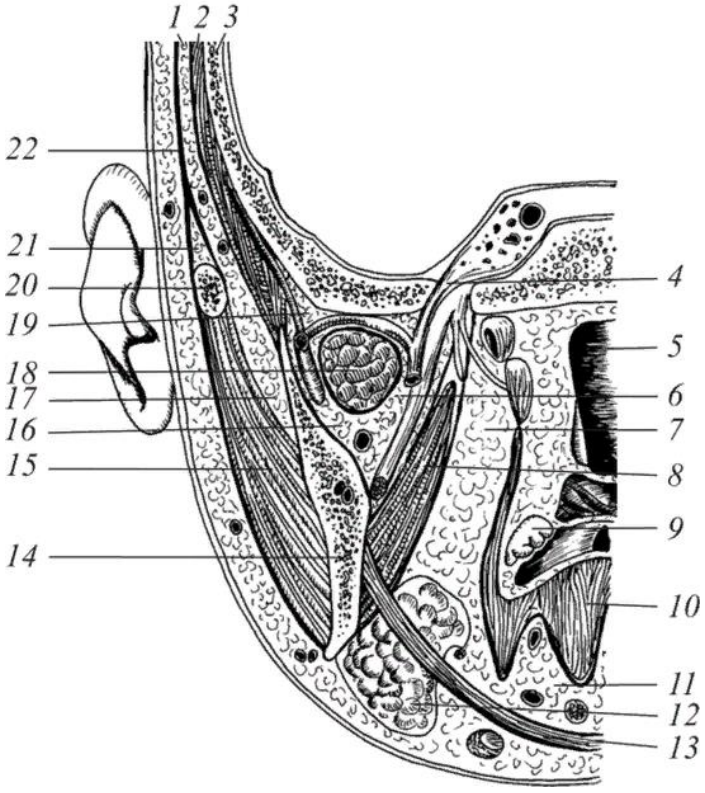
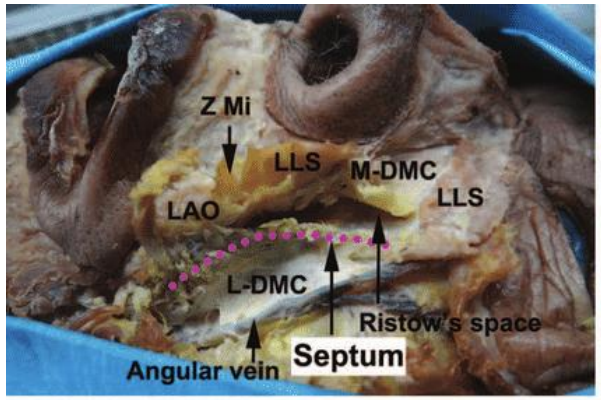
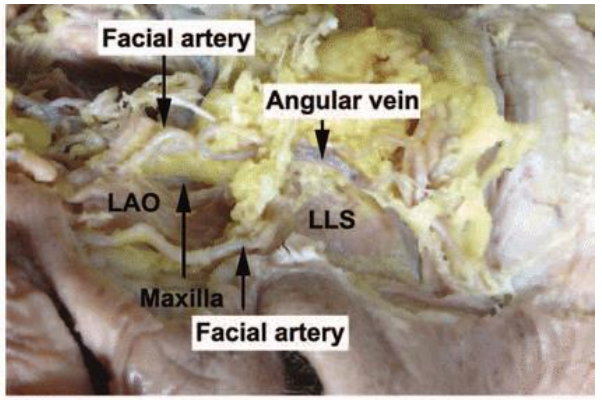
The deep area of the face

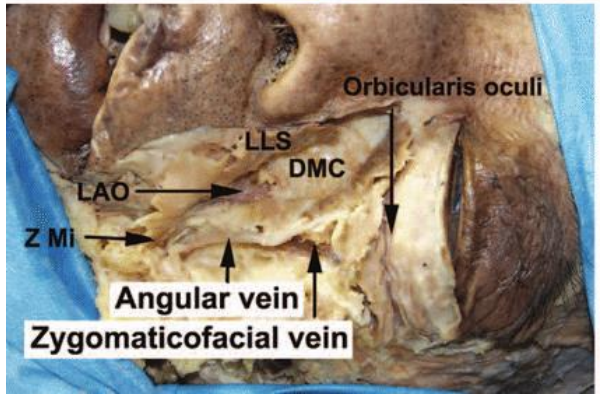
(located between the upper and lower jaws)

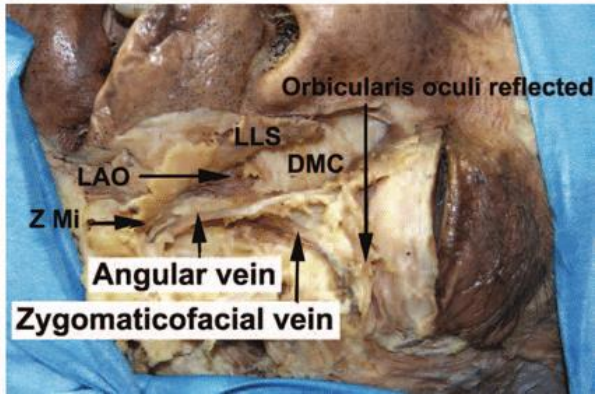


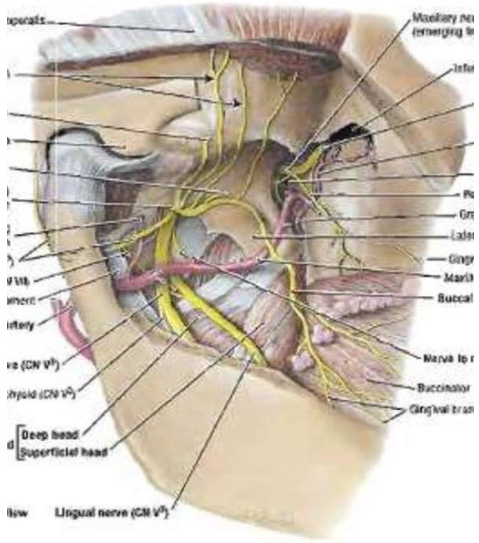












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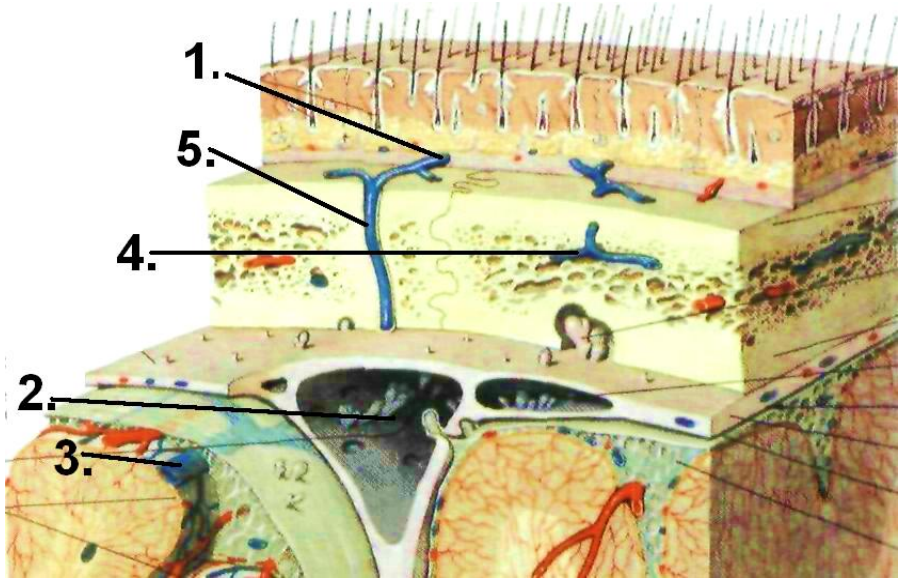
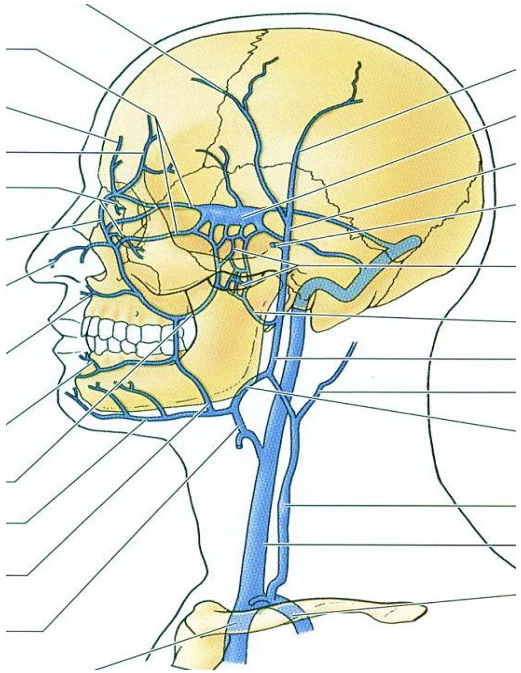
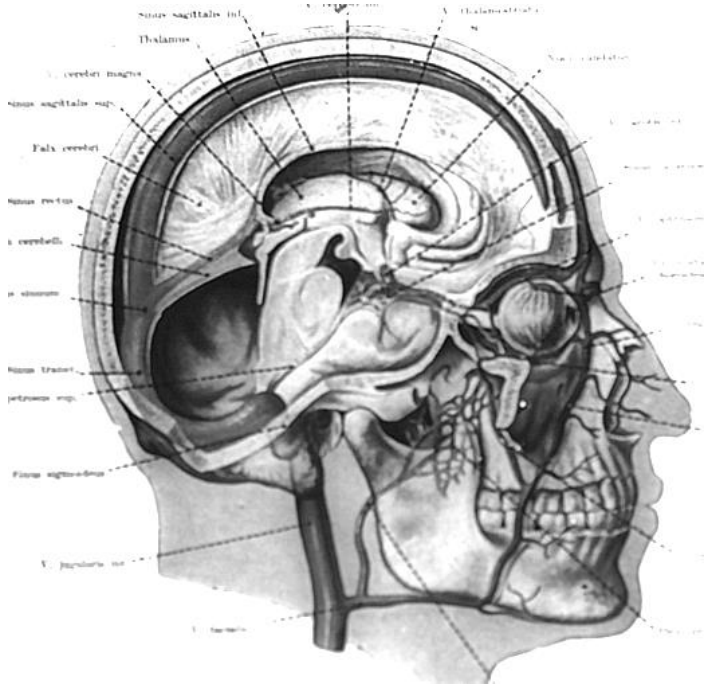
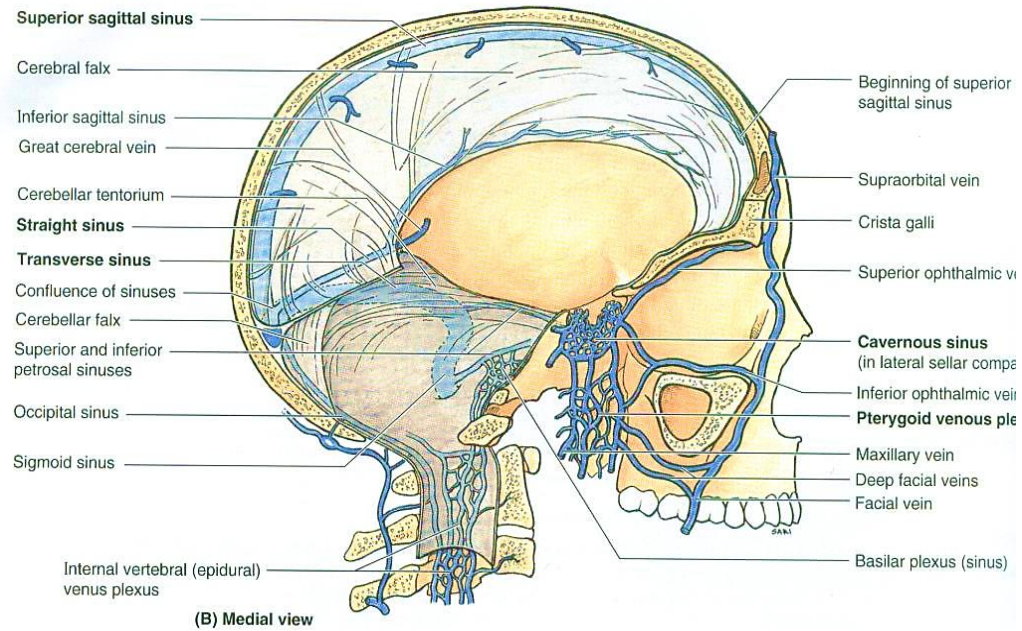
Features of venous outflow from the head









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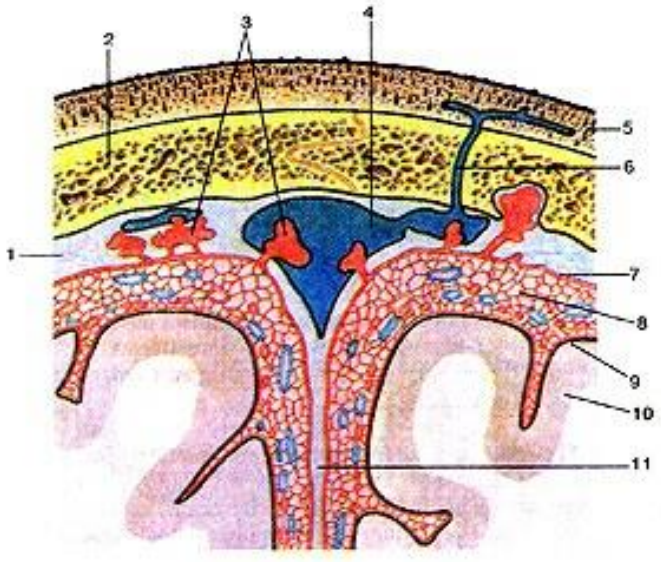
FEATURES OF VENOUS OUTFLOW FROM THE HEAD

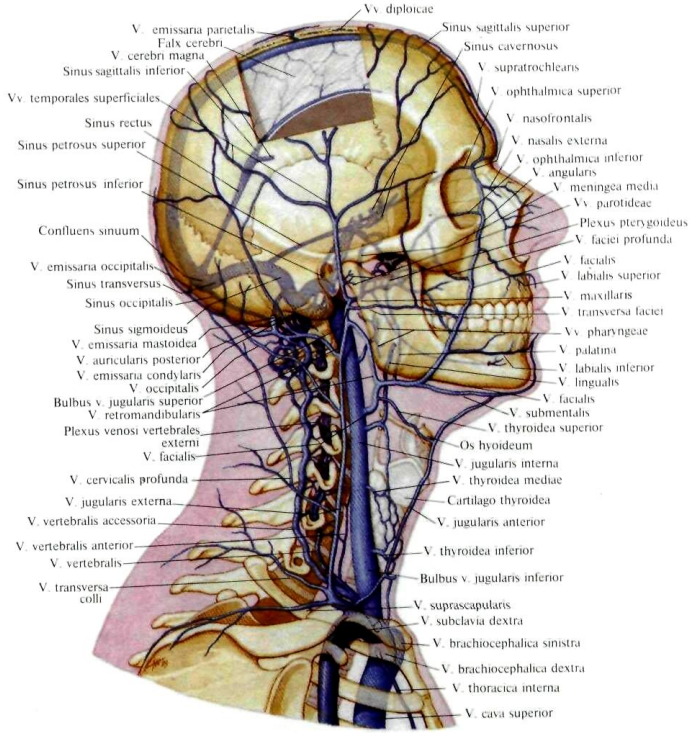
Types of venous anastomoses

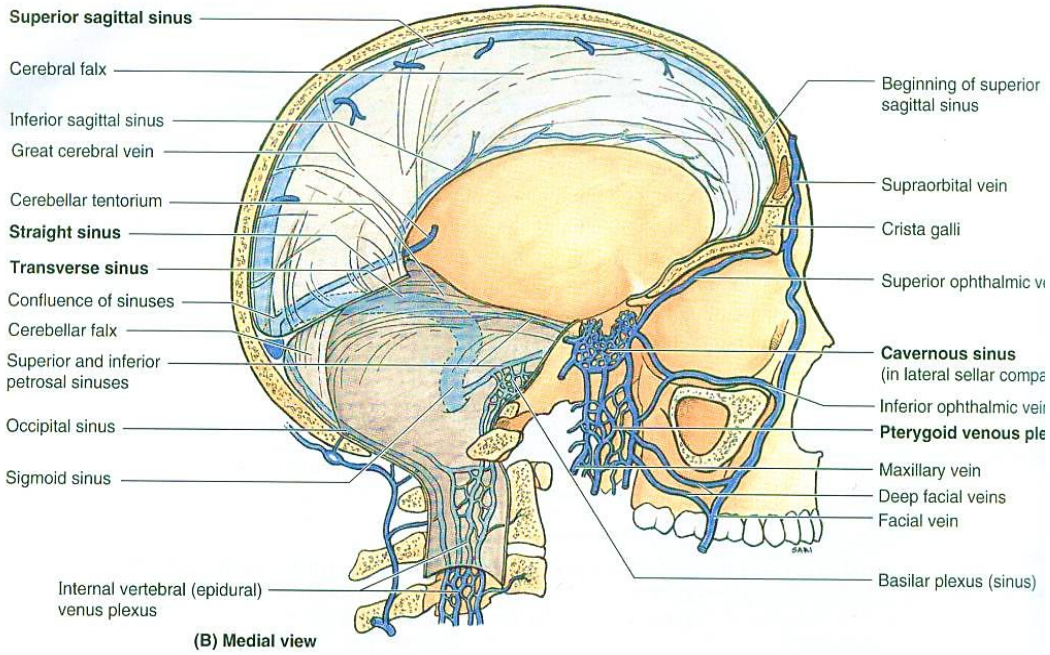
а) v. facialis → v. angularis ↔ v. nasofrontalis ↔ v. ophtalmica superior ↔ sinus cavernosus

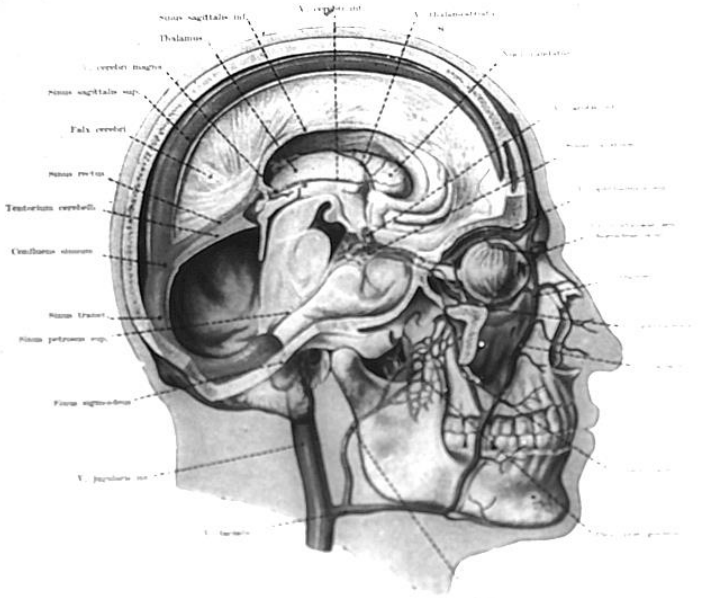
б) v. facialis ↔ plexus venosus pterygoideus ↔ v. ophtalmica inferior sinus cavernosus

в) v. facialis → plexus venosus pterygoideus ↔ rete foraminis ovalis → sinus cavernosus









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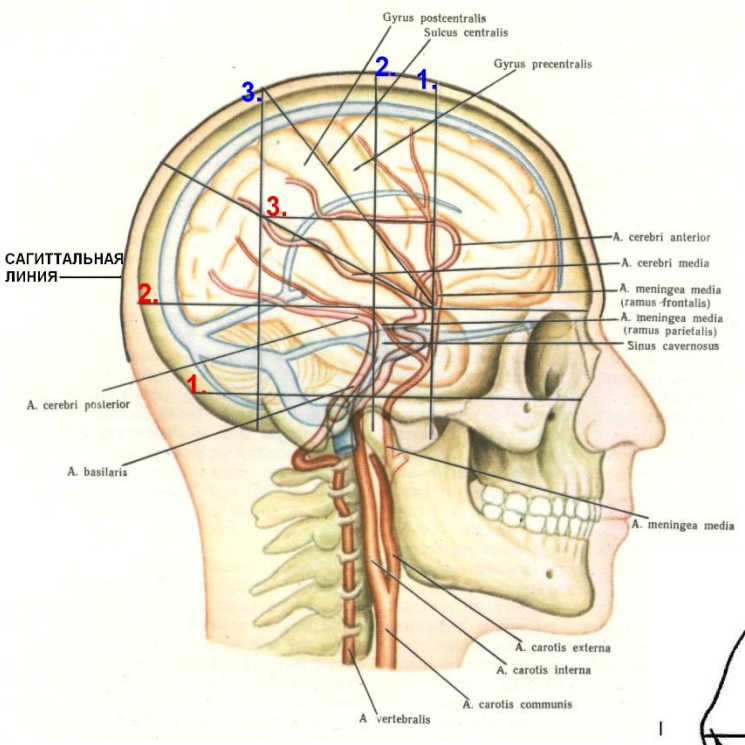
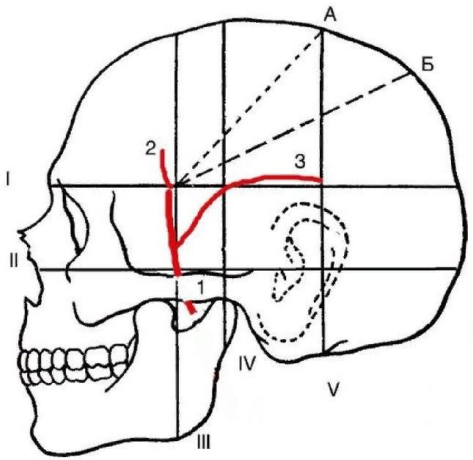
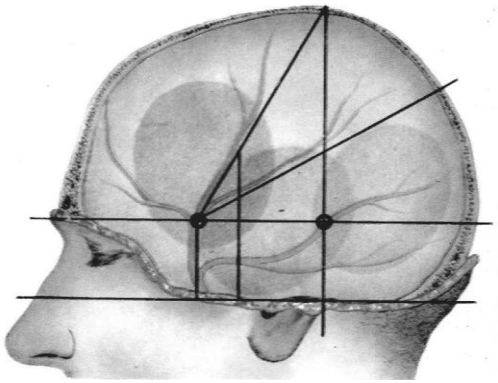
Cranio-cerebral topography

The Krenlein-Bryusova scheme

1. The main lower horizontal
2. The average horizontal
3. The third horizontal (according to Bryusova)
1. Front vertical
2. The average vertical
3. Rear vertical







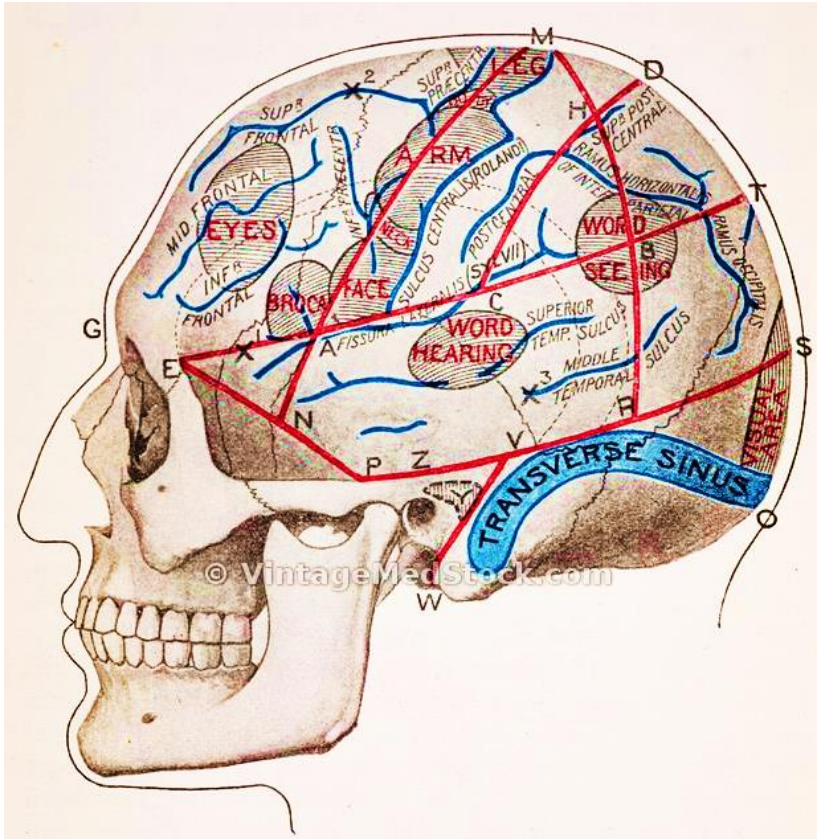


FIG. 70.—Cranio-Cerebral Topography. The figure shows the positions of the motor and sensory areas and their relations to Chiene's lines.

G. Glabella.
O. External occipital protuberance.
M. Mid-point between G and O.
T. Mid-point between M and O.
S. Mid-point between T and O.
E. Zygomatic process of frontal.
P. Pre-auricular point.
N. Mid-point of EP.
R. Mid-point of PS.
C. Mid-point of AB.
CD is drawn parallel to AM.
Z. Post-auricular point.
VW. Guide to anterior limit of transverse sinus.
Y. Tympanic antrum.
X^1. Site at which sub-arachnoid space may be opened.
X^2. Site for draining lateral ventricle (Kocher).
X^3. Site for draining lateral ventricle (Keen).

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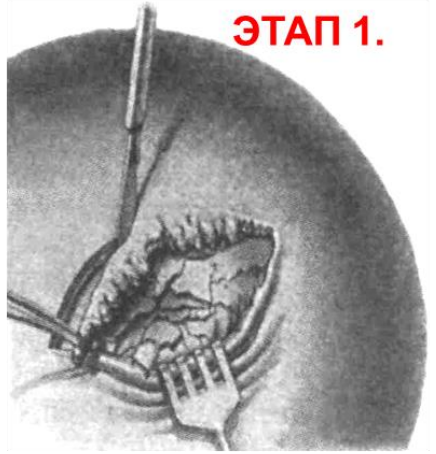
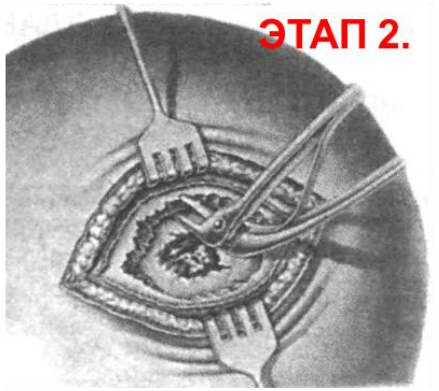
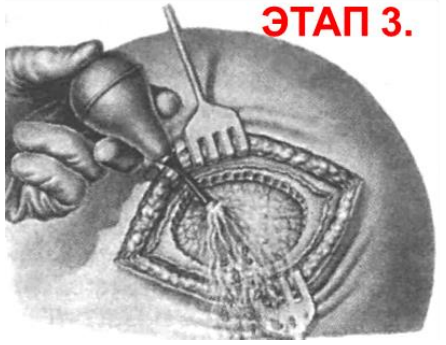
Primary surgical treatment of wounds of the cerebral part of the head







- Head injuries: closed and open (with skin damage)
- Skull injuries: non-penetrating and penetrating (with damage to the dura mater)

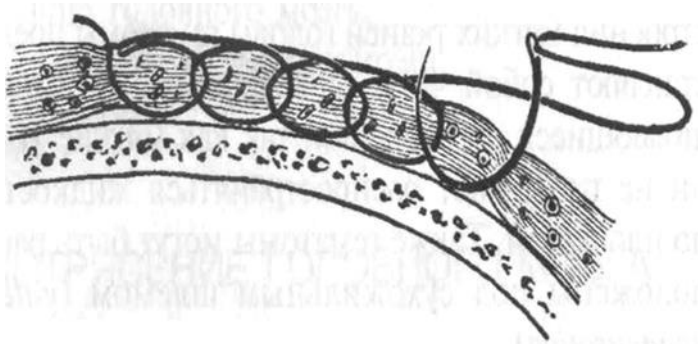
Stages of primary surgical treatment of penetrating head wounds:

1. economical excision of soft tissues, taking into account the topographic and anatomical features of the region;
2. Bone fragments unrelated to the periosteum are removed. With the help of Luer pliers, the bone wound is expanded, its edges are aligned;
3. treat (economically excise) the wound of the dura mater, sanitize the wound canal, wash out cerebral detritus and small foreign bodies with a stream of warm saline solution.

Stopping the bleeding

- To stop bleeding from the vessels of soft tissues, use:

1) finger pressing of soft tissues to the bones of the cranial vault
2) sequential stitching of soft tissues around the wound with thick silk along with vessels passing through the subcutaneous tissue (Heydenhain method)
3) application of hemostatic clamps followed by vascular ligation
4) electrocoagulation



- To stop bleeding from diploetic veins, use:

1) rubbing wax paste
2) with Luer pliers, the bone is crushed, pressing the outer and inner plates to each other

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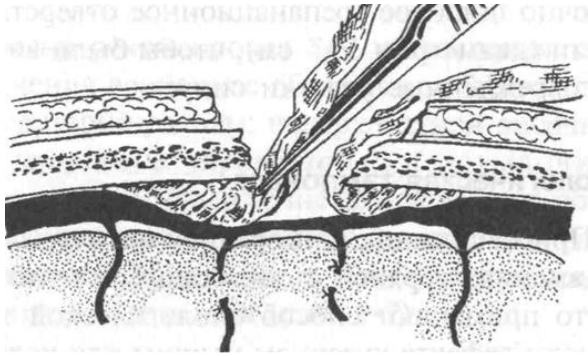
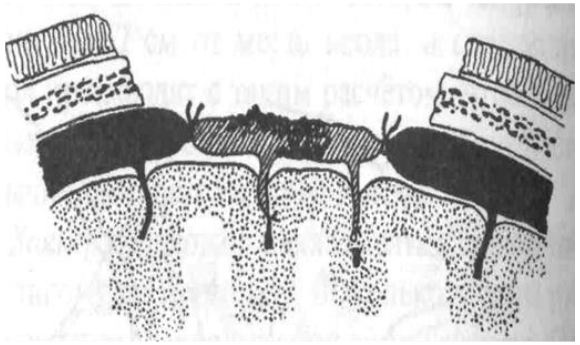
Stopping the bleeding



In case of damage to the sinuses of the dura mater, the following are used:

1) suturing linear wounds of small size;
2) plasty of the sinus wall defect with a flap from the outer sheet of the dura mater or wide fascia of the thigh, a piece of muscle;
3) in case of complete rupture, sinus tamponade is used with gauze rounds, which are inserted between the bone and the dura mater (up to 6 days);
4) ligation of the sinus.

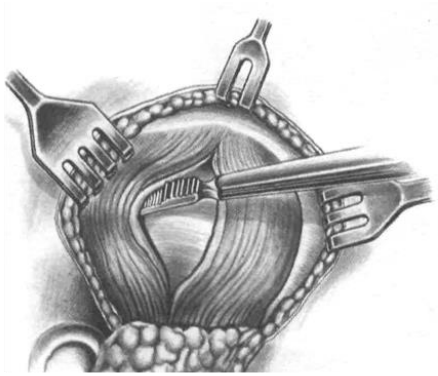


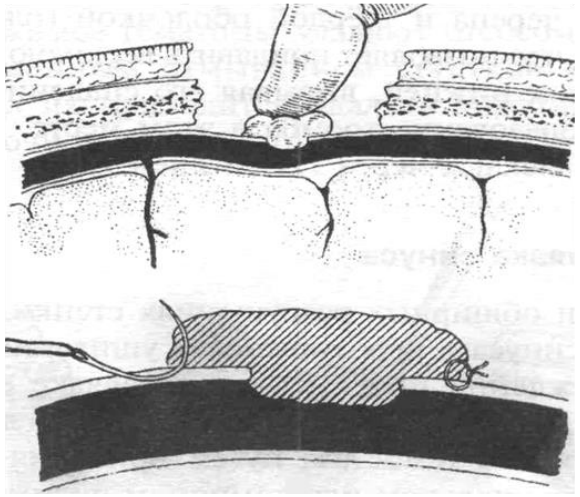
From the cerebral vessels:

1) electrocoagulation;
2) filling the wound canal of the brain with a mixture of fibrinogen and thrombin.

Decompressive trepanation by Cushing

- Decompressive (decompressive, resection) trepanation is a palliative surgery that is most often performed in inoperable brain tumors in order to eliminate or reduce the pain symptom by reducing intracranial pressure.
- The principle of the operation is the formation of a bone defect (5x6 cm) in the area of the cranial vault.





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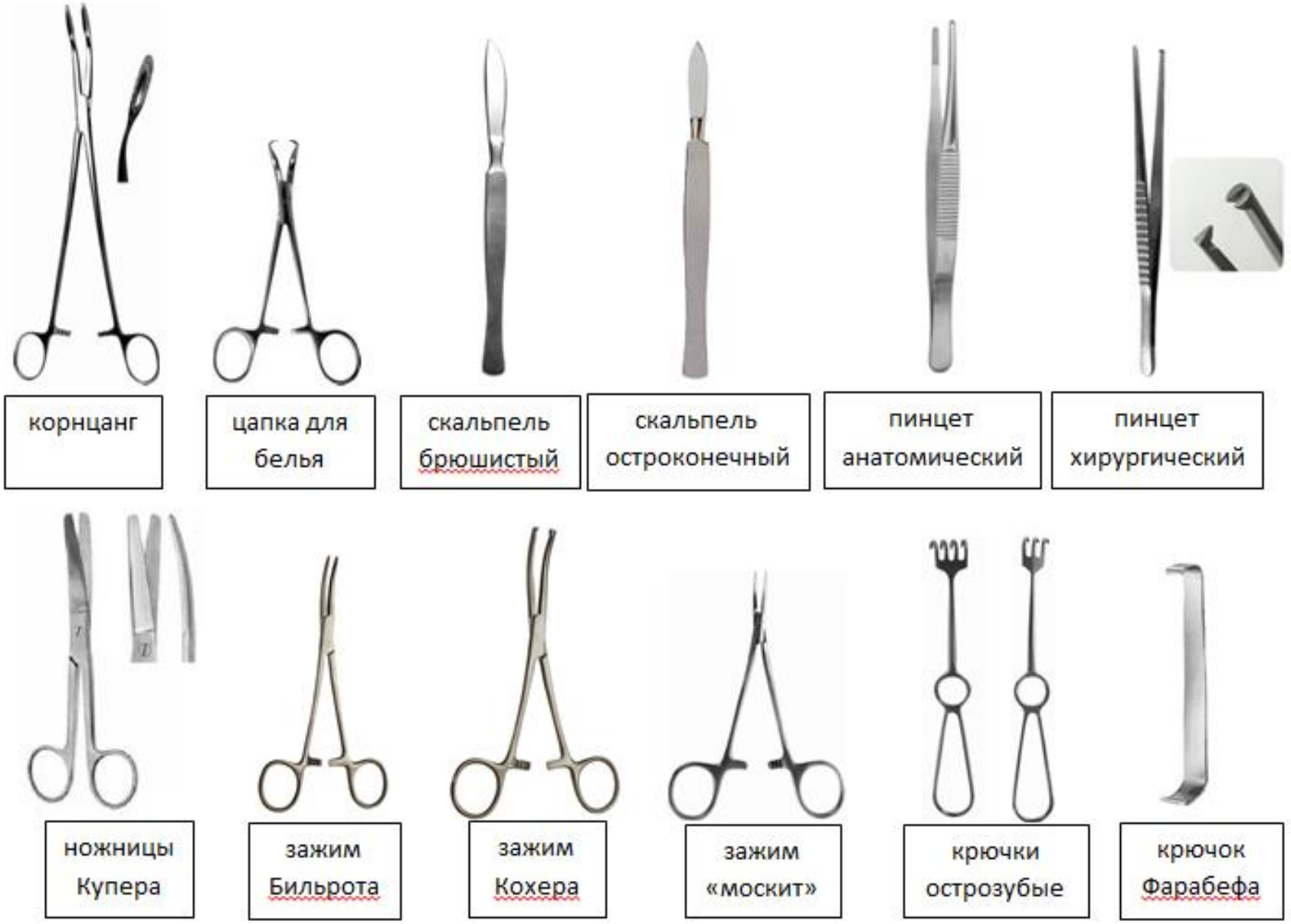
A set of tools for skull trepanation



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A set of tools for skull trepanation (continuation)

иглодержатель

игла режущая

игла колющая

зонд пуговчатый

ранорасширитель Янсена

распатор Фарабефа прямой

коловорот с фрезами

пила Джильи

кусачки Дальгрена

ножницы мозговые

мозговой шпатель

пинцет для коагуляции

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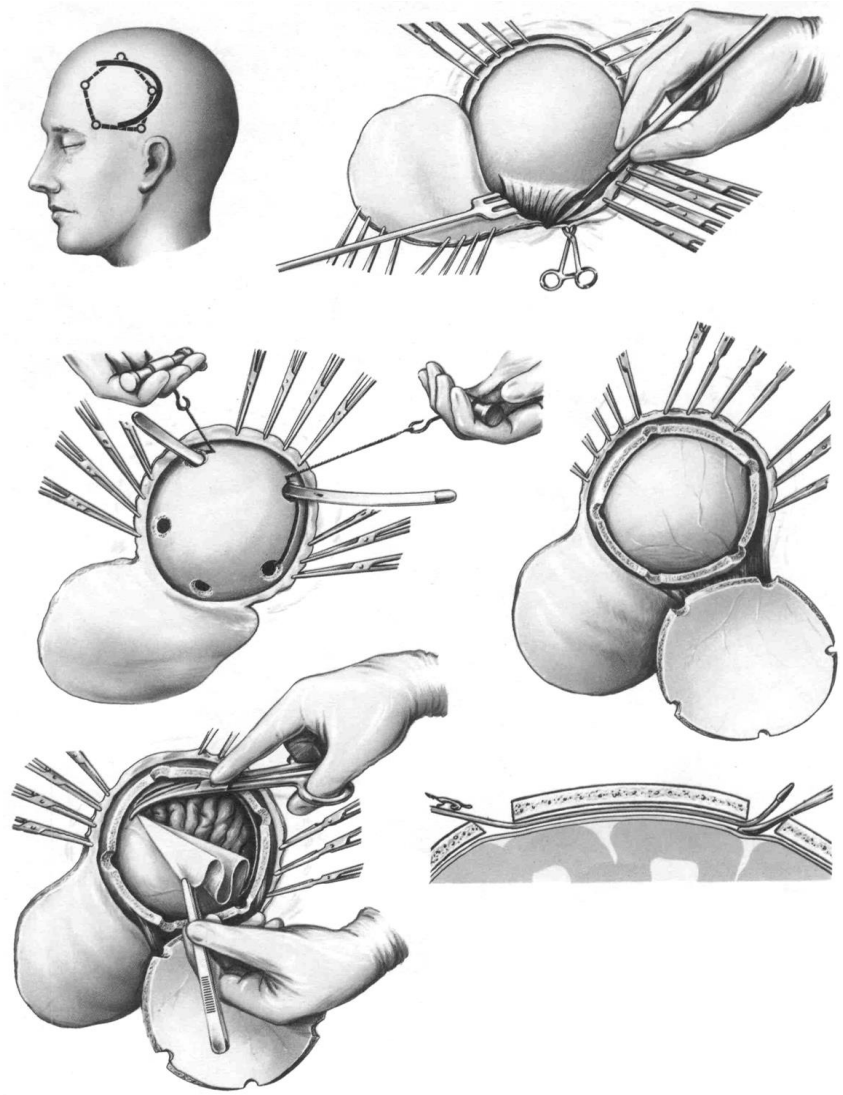
Bone and plastic trepanation



Methods of bone plastic trepanation:

- one-piece by Wagner-Wolf;
- two-piece according to Olivecron.

Stages of double-flap bone plastic trepanation:

- formation of a skin-aponeurotic flap;
- treatment of the periosteum;
- drilling of milling holes:
- sawing the bone bridges between them;
- folding of the bone-periosteal flap with or without preservation of the feeding leg;
- dissection of the dura mater;
- manipulation of the brain;
- suturing of the dura mater;
- closure of the skull defect.

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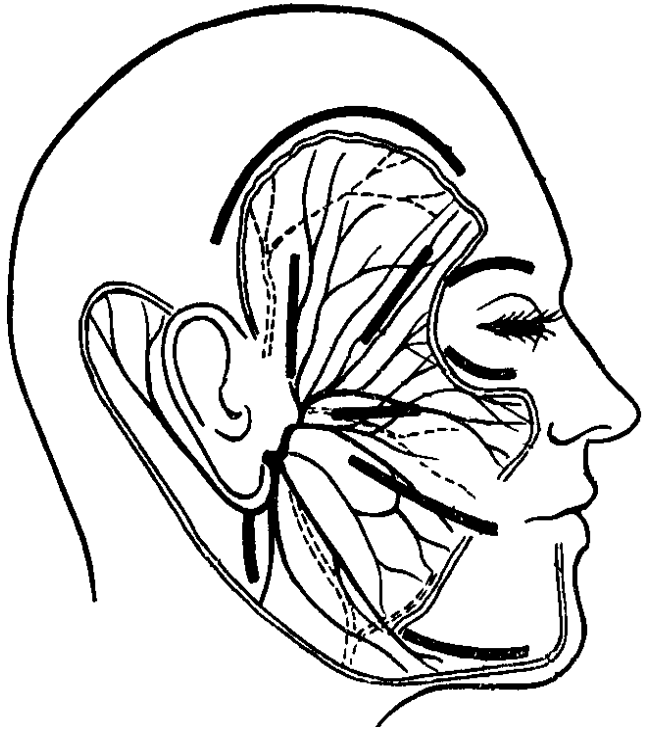
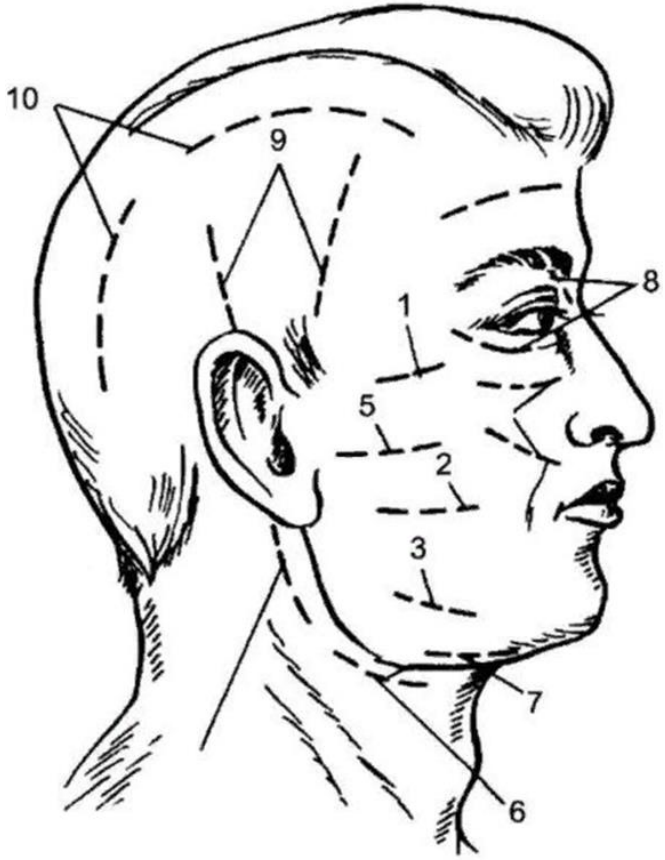
Surgical interventions on the face



INCISIONS ON THE FACE

- Incisions on the face are carried out along the course of natural folds and wrinkles, taking into account the direction of the branches of the facial nerve
- Fabrics are excised sparingly
- Thorough hemostasis
- Sutures are better intradermal continuous with synthetic thread or percutaneous with separate suturing of subcutaneous fat and skin



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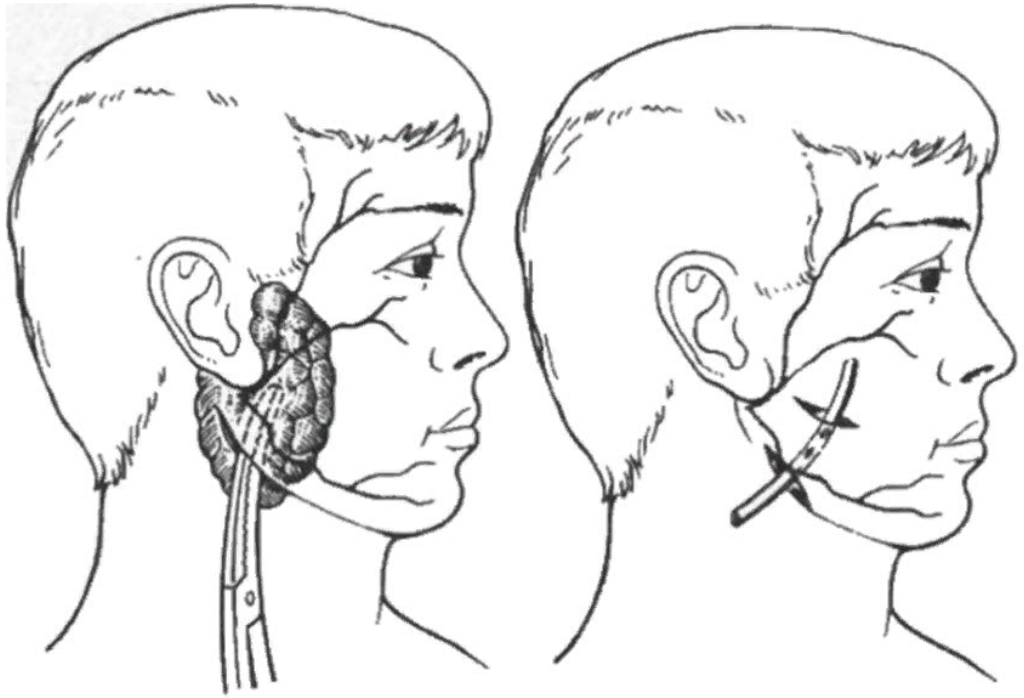
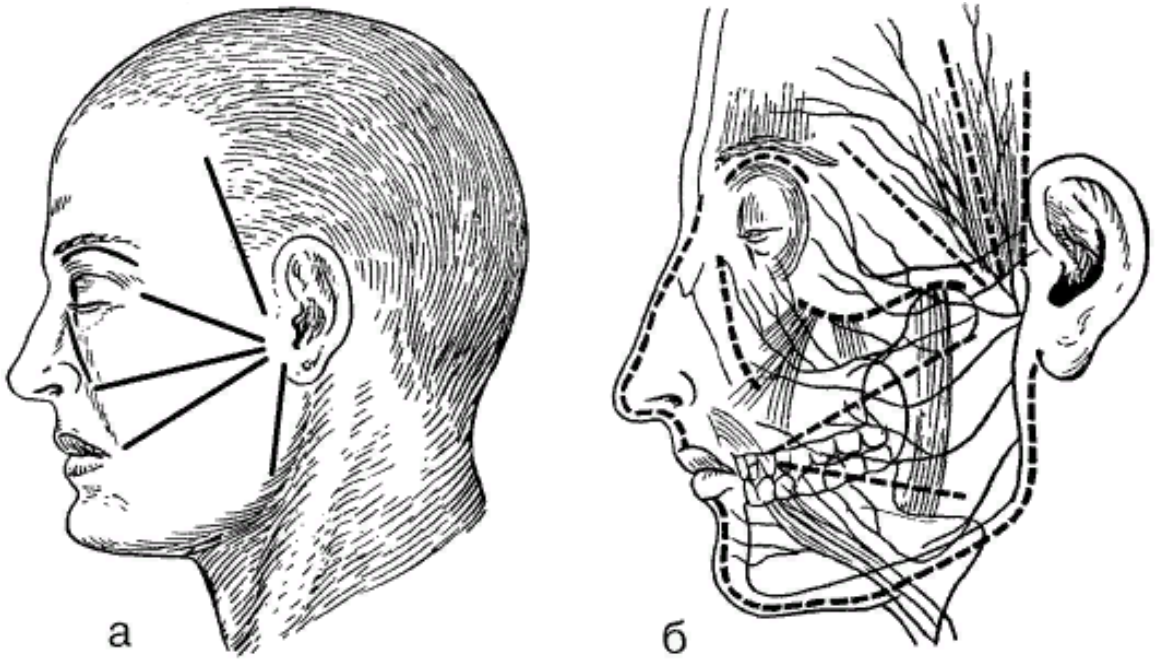
Operations for purulent mumps



- Purulent mumps is a purulent inflammation of the parotid salivary gland
- Incisions in purulent mumps are made taking into account the course of the branches of the facial nerve (an incision around the angle of the lower jaw is more often used)
- Acutely dissect the skin, subcutaneous tissue and capsule of the parotid gland
- Next, the tissues are separated in a blunt way so as not to damage the neurovascular formations



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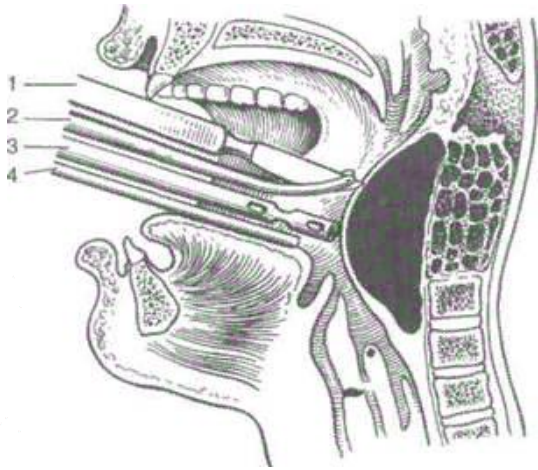
Opening a retropharyngeal abscess

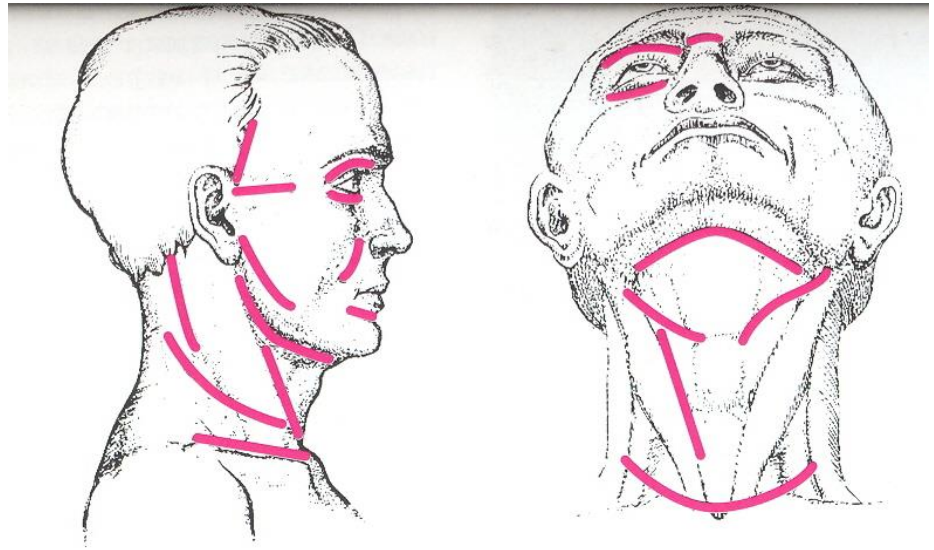


A retropharyngeal abscess is located in the tissue between the pharynx and the prevertebral fascia.

Most often one-sided, because the retropharyngeal space is divided by a septum. It communicates with the retrovisceral space of the neck and further with the posterior mediastinum.

Incisions for facial phlegmon

Radial sections coming from the external auditory canal, taking into account the course of the main branches of the n.facialis in the direction
- to the temporal bone
- along the zygomatic arch
- to the wing of the nose
- to the corner of the mouth
- to the angle of the lower jaw
- along the edge of the lower jaw.



Purulent parotitis: an incision near the angle of the lower jaw of the skin and fascia, then deeper in a blunt way
Phlegmon of the chewing-jaw space: transverse section from the lower edge of the earlobe to the corner of the mouth (between the branches of the facial nerve)

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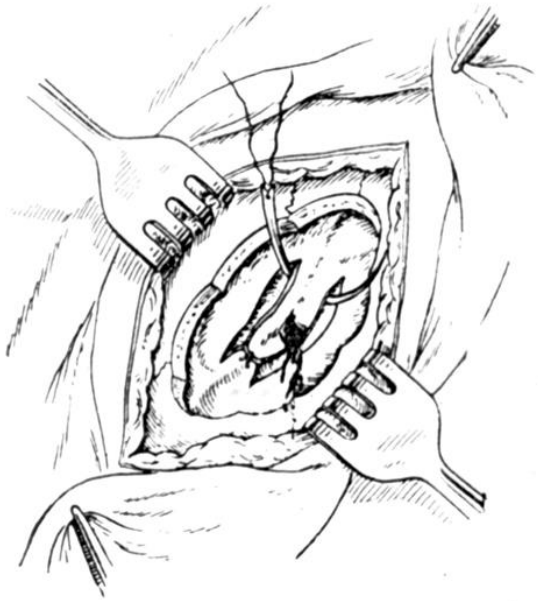
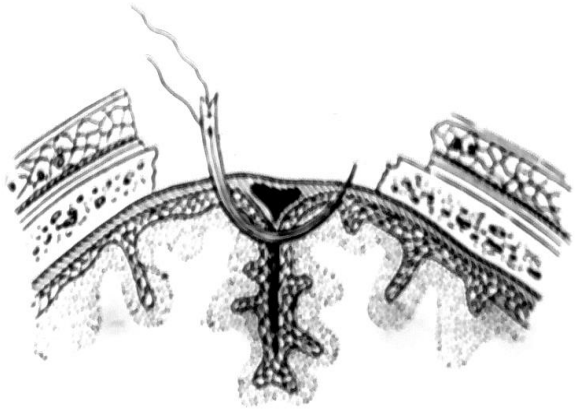
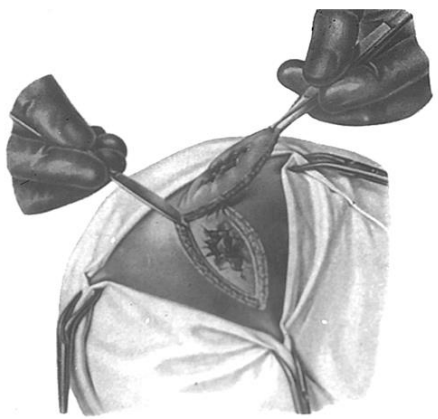
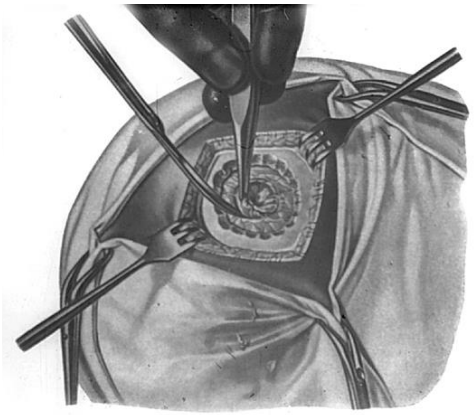
Ways to stop bleeding in various layers of the cranial vault

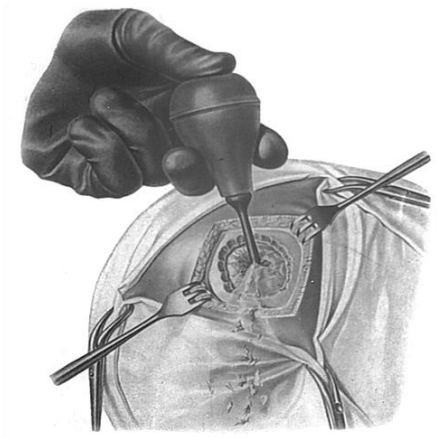




Stages of primary surgical treatment of cranial arch wounds in penetrating wounds







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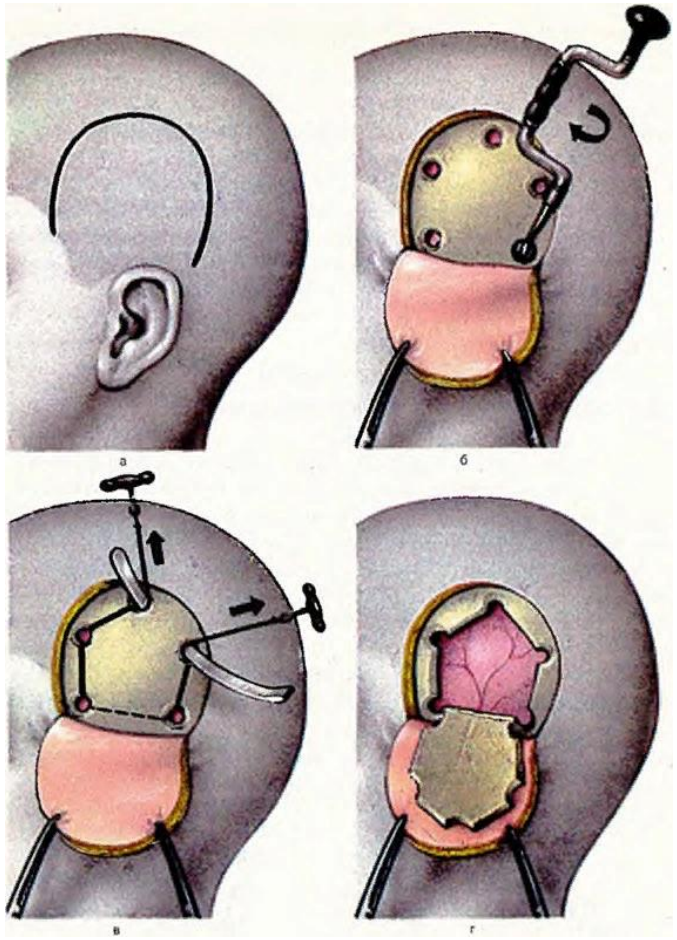
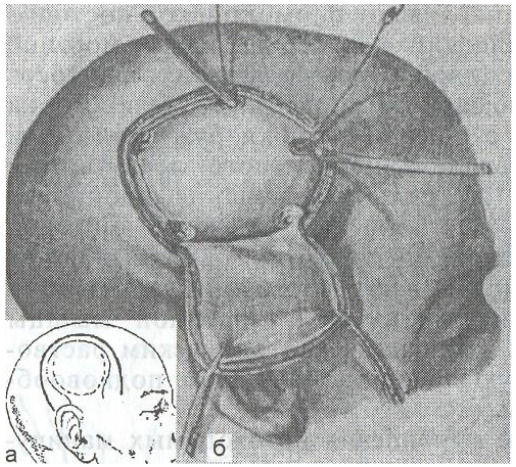
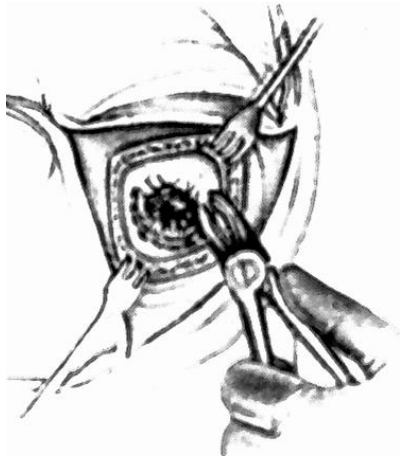
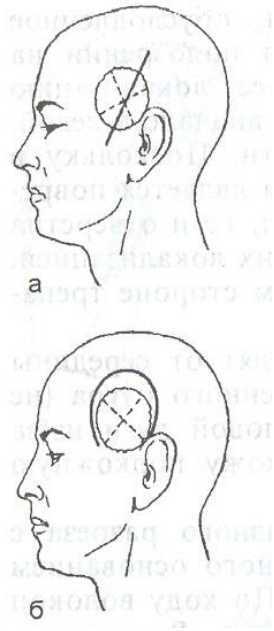
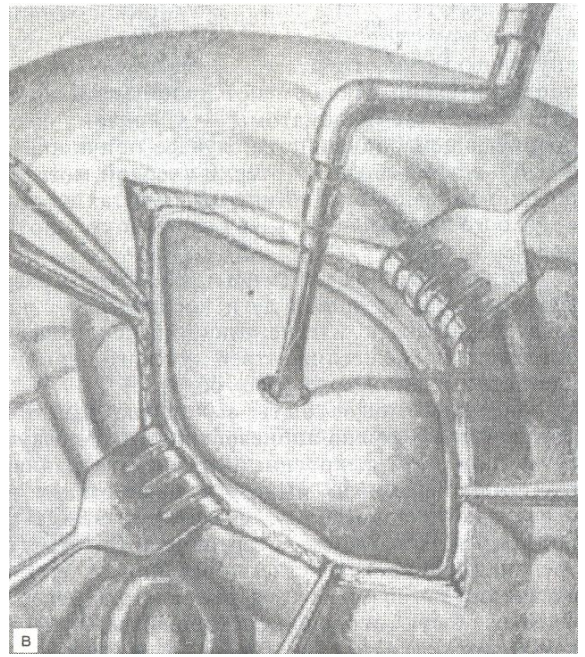
Cranial trepanation (craniotomy)

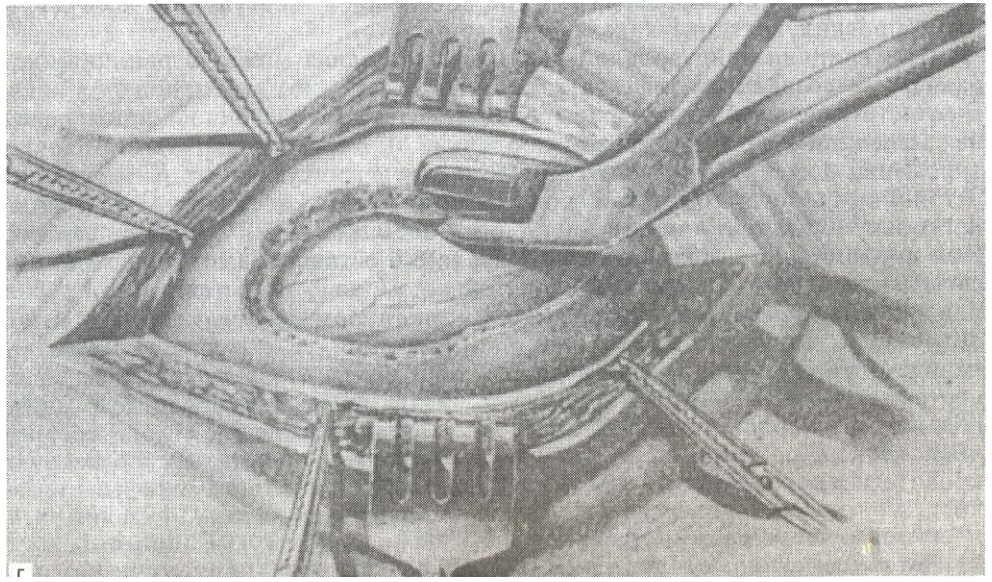












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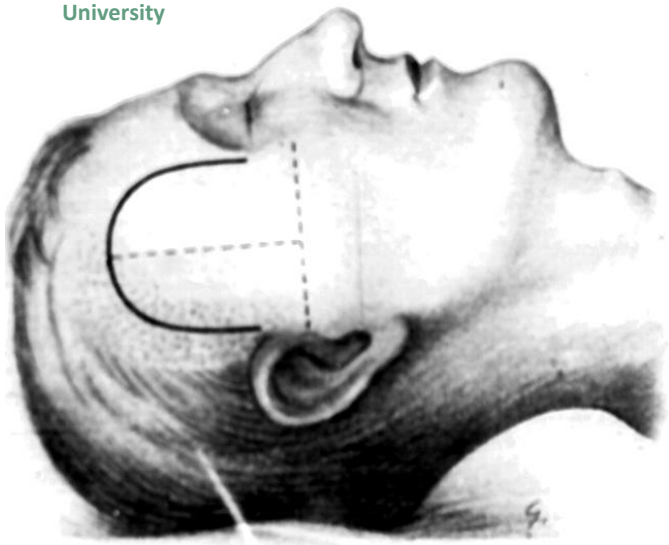
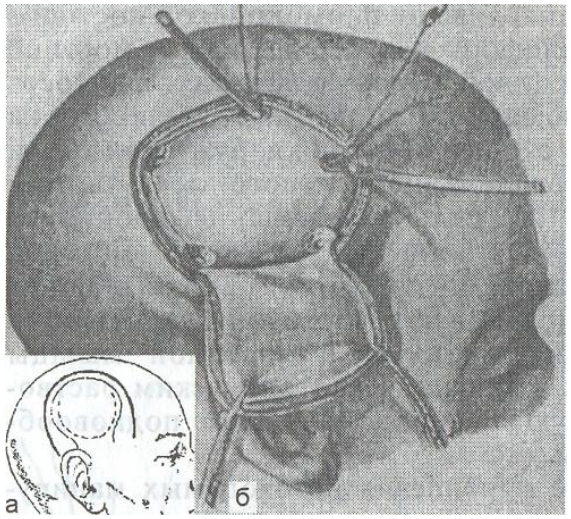
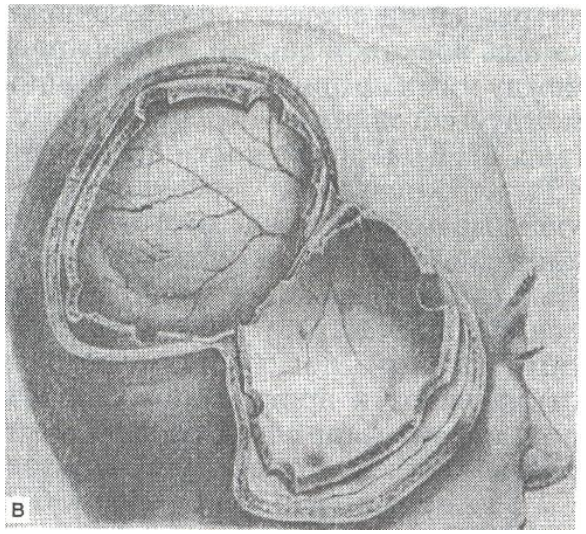
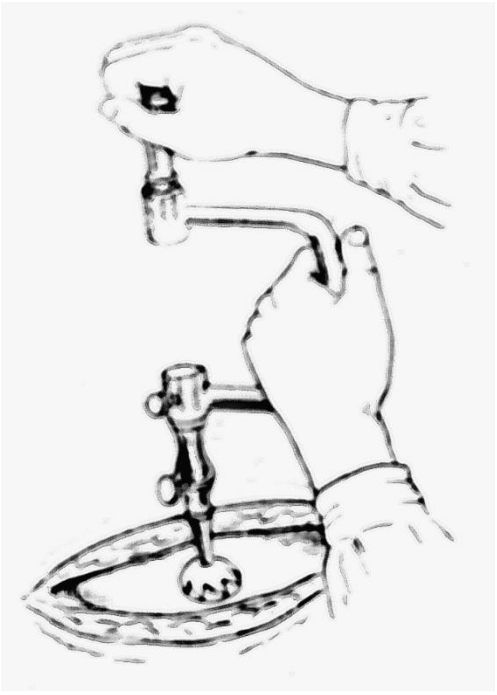
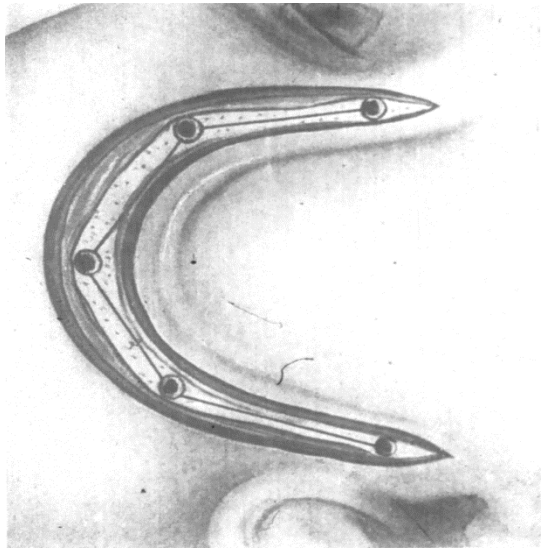
Cranial trepanation (craniotomy)

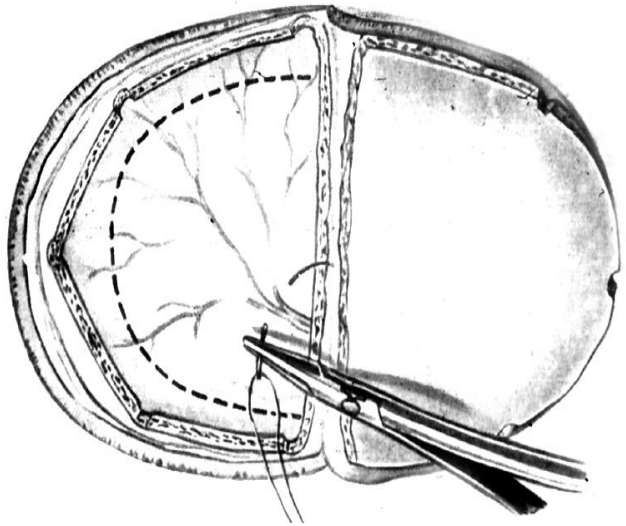


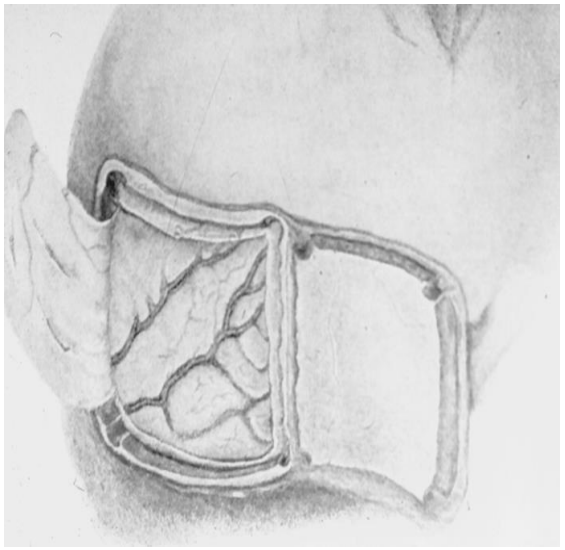


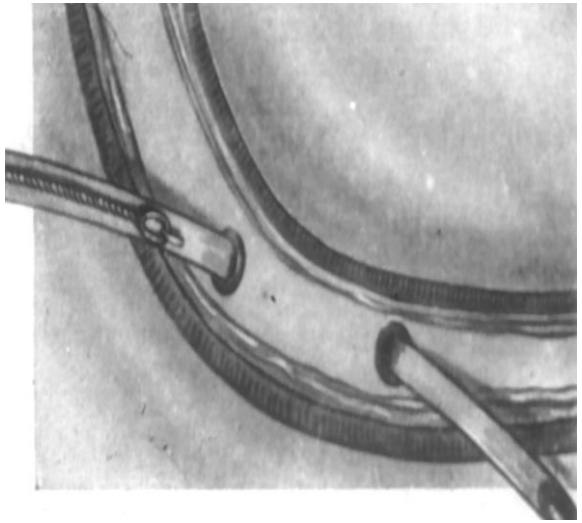












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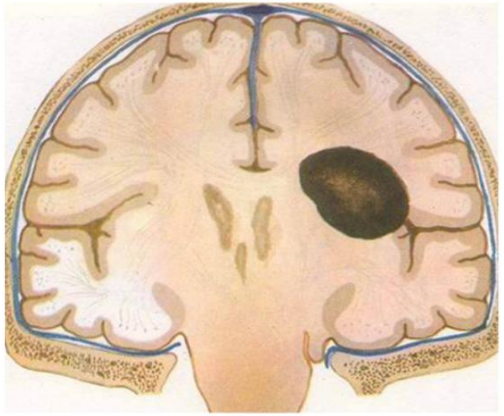
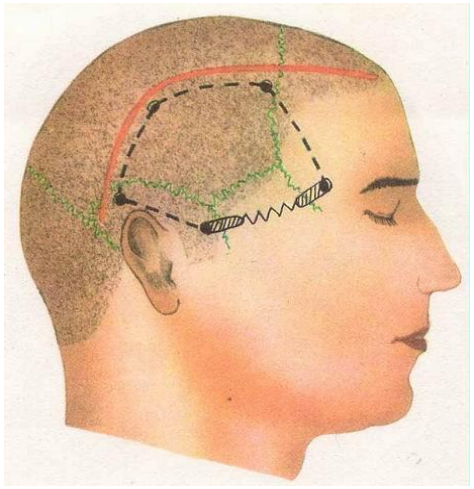
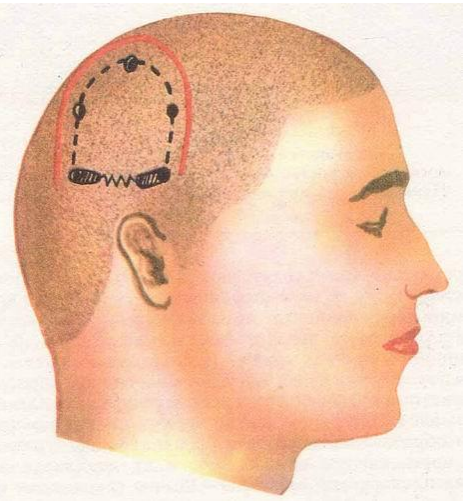
Intracerebral hematoma



Access to the parietal lobe

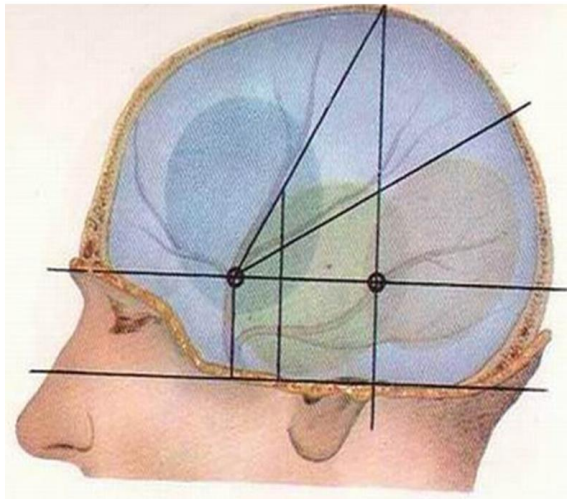


Access to the occipital lobe

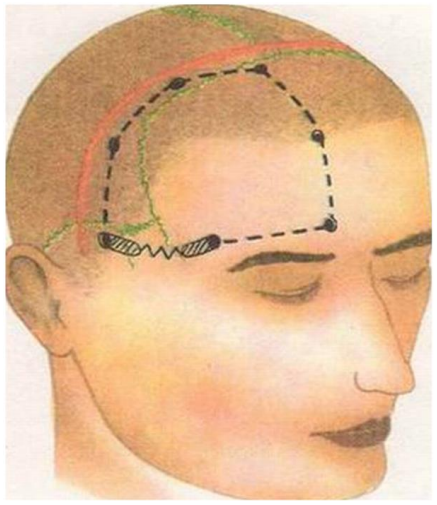


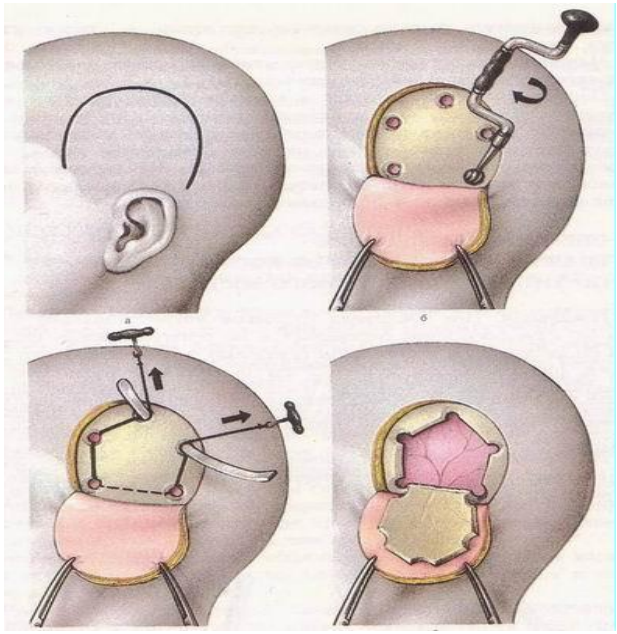
Bone plastic trepanation of the skull

The Krenlane scheme



Access to the frontal lobe





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Antrotomy (trepanation of the mastoid process)

Indications: primary and secondary purulent mastoiditis

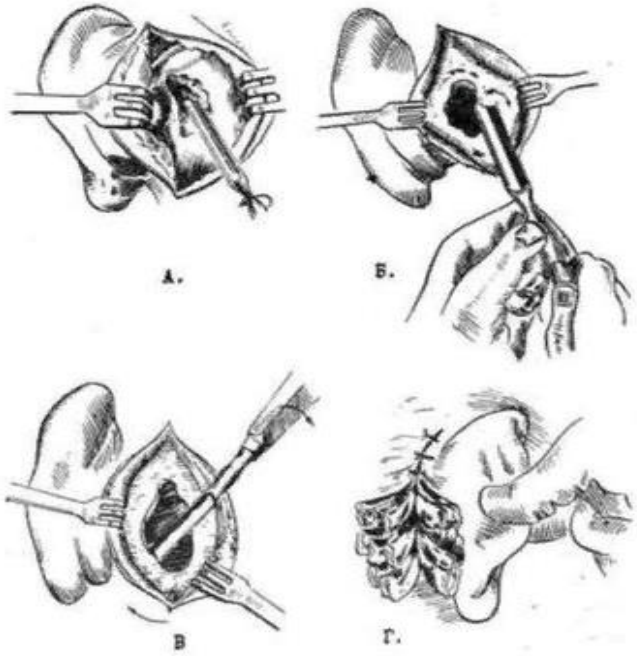
The purpose of the operation is to remove purulent exudate, granulations from the air-bearing cells of the mastoid process, opening and drainage of the mastoid cave

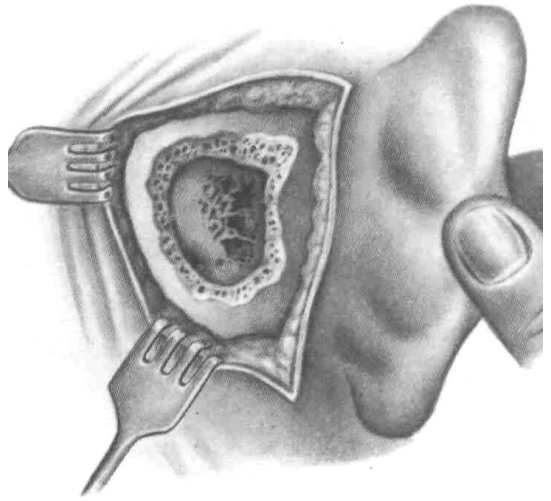
The operation is performed within the Shipo triangle

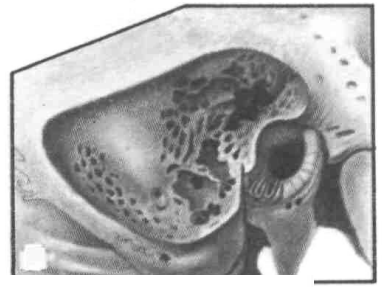
Complications:

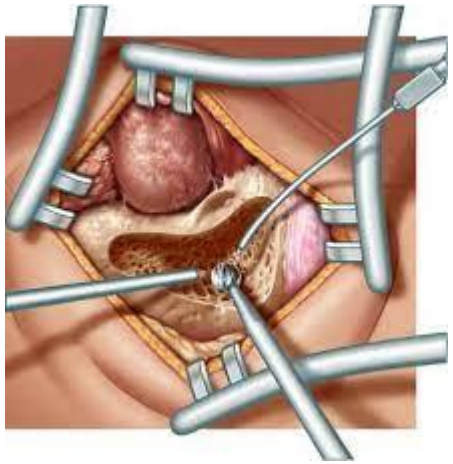
if you deviate from the boundaries of the triangle, the Shipo and equipment can be damaged:

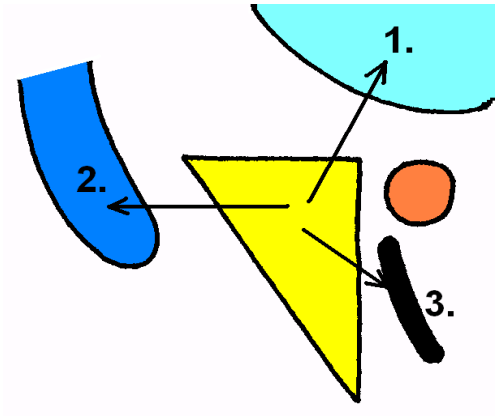
- formation of the middle cranial fossa;
- sigmoid sinus;
- the facial nerve.

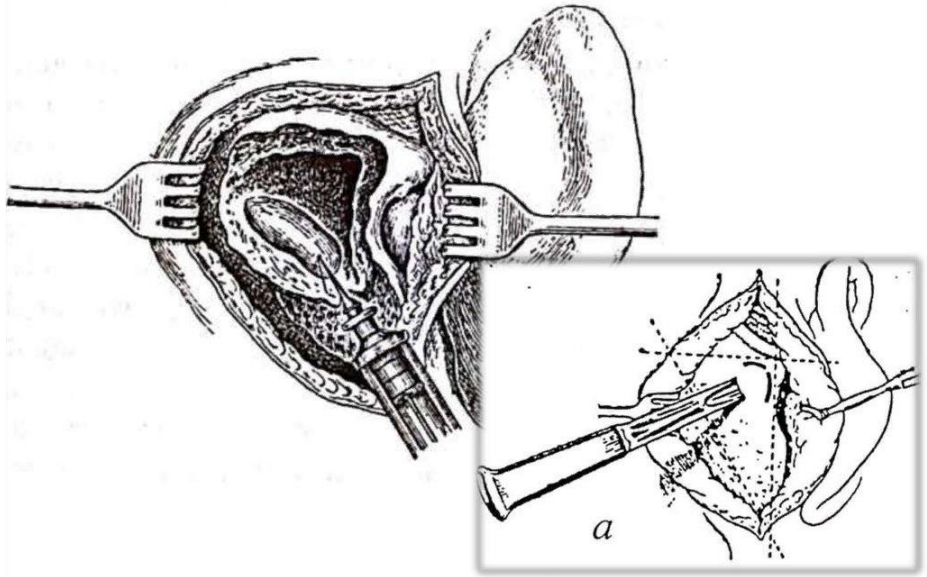












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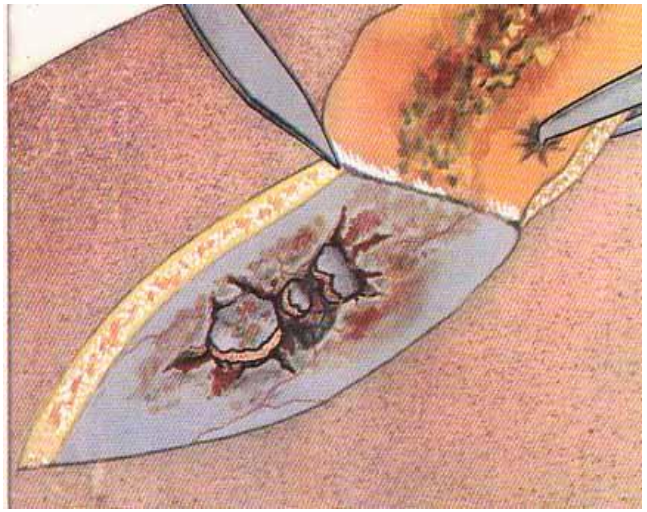
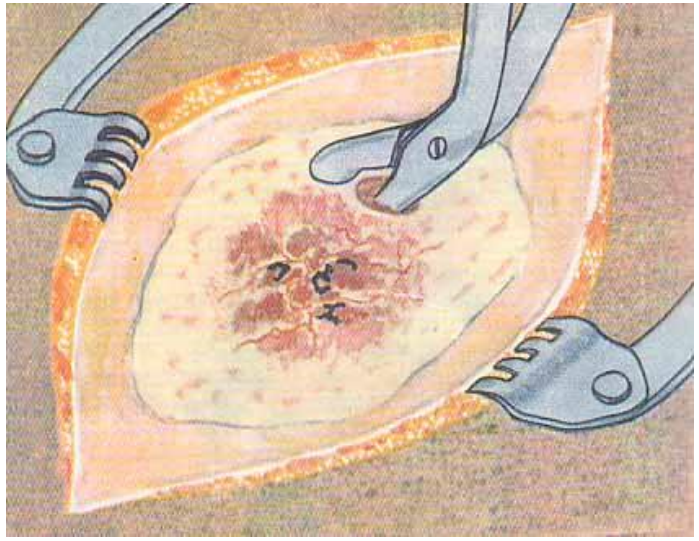
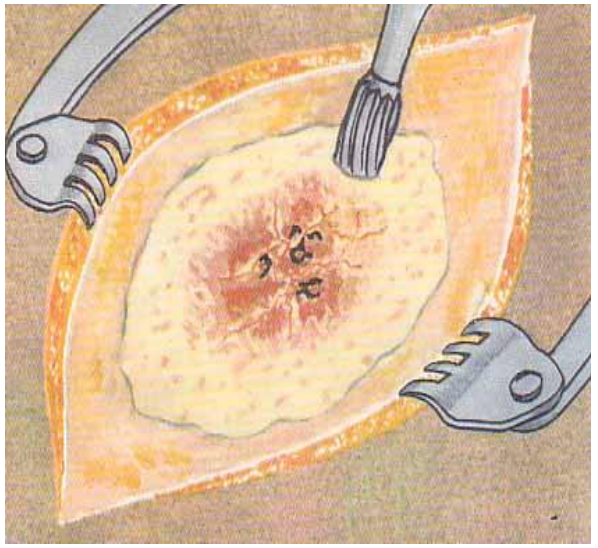
Surgical treatment for acute traumatic brain injury: excision of the wound edges.



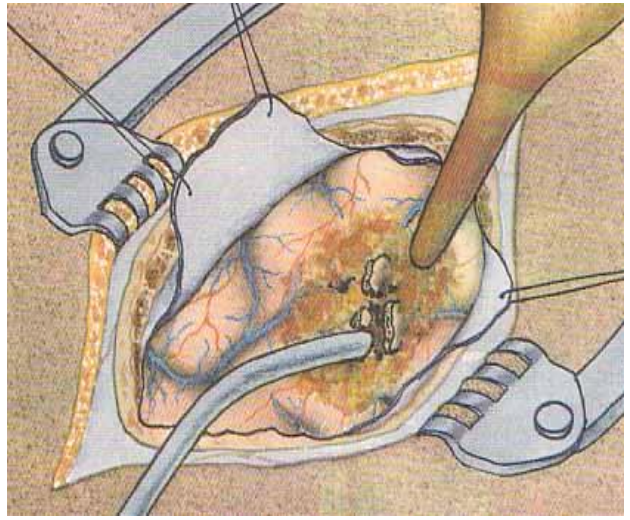
Alignment of a bone defect with Luer pliers



Applying a milling hole



Opening of the dura mater



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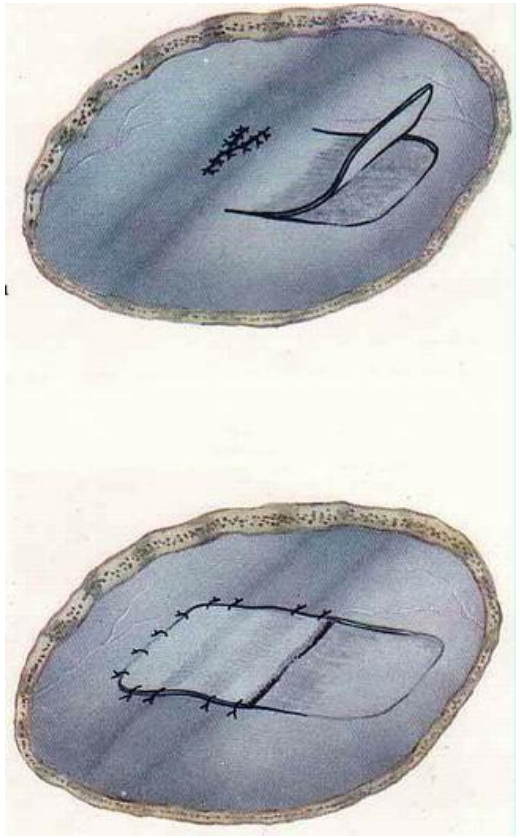
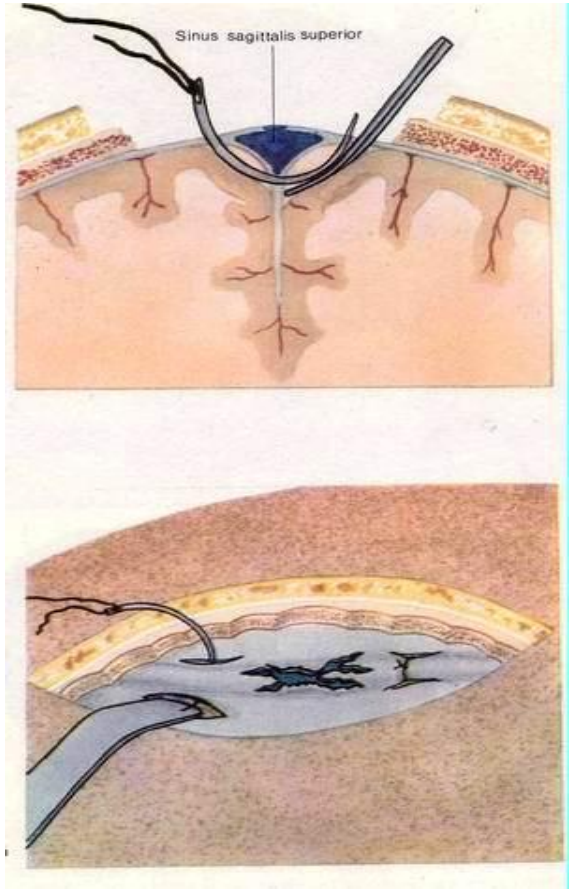
Surgical treatment of hydrocephalus:

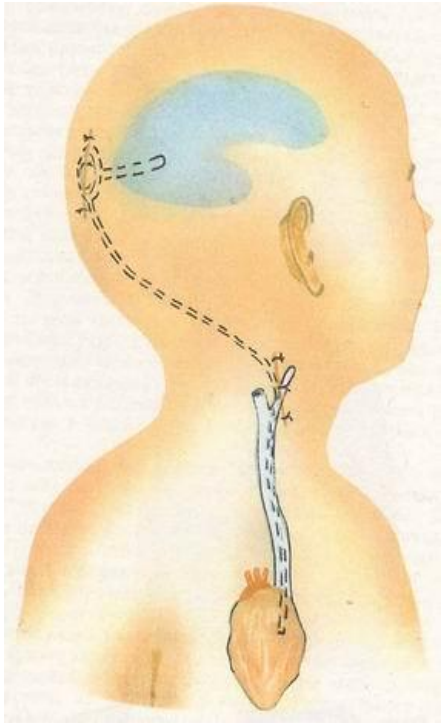
Plastic surgery of the venous sinus according to Burdenko



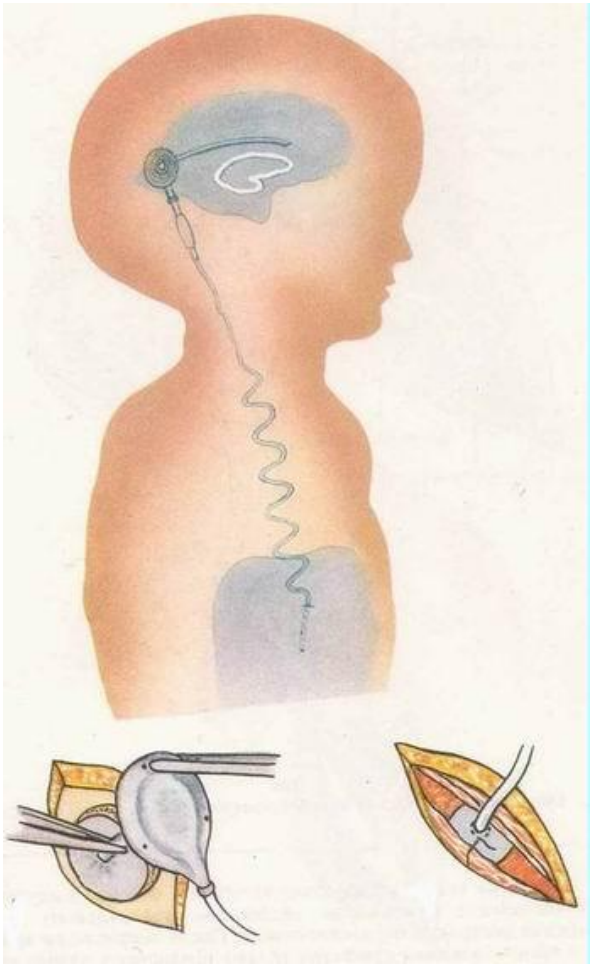
Stitching of the upper sagittal sinus



Ventriculoauriculostomy



Ventriculoperitoneostomy



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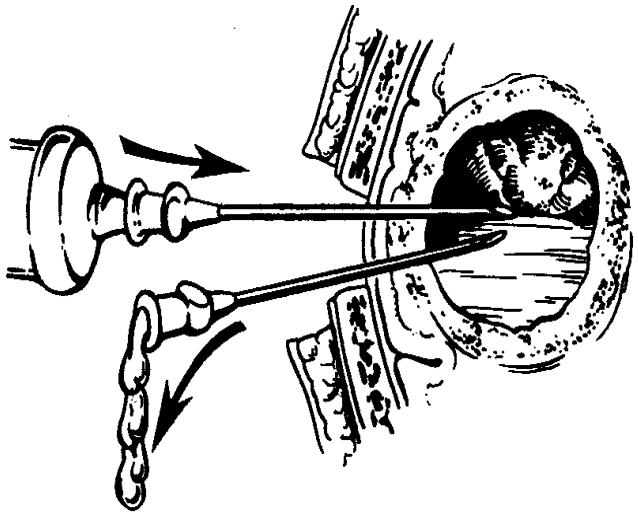
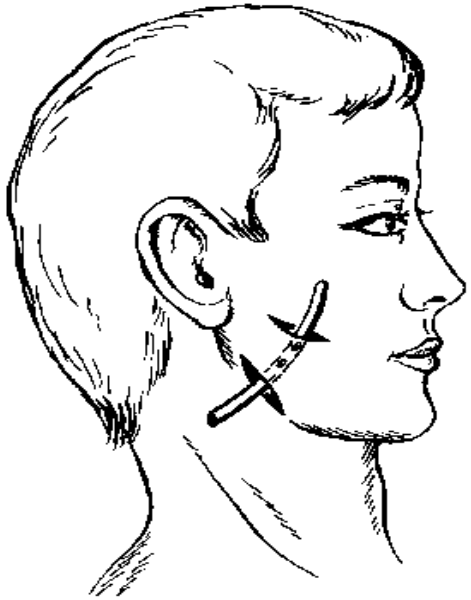
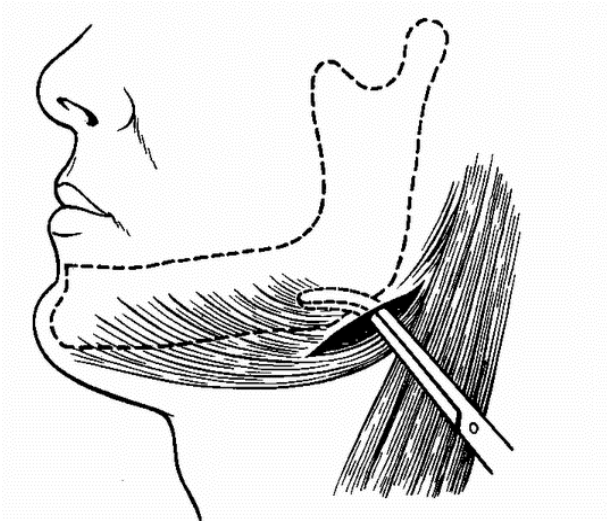
Autopsy and drainage of a brain abscess



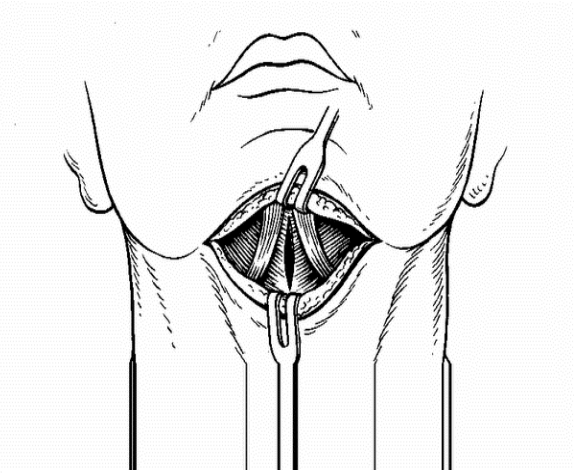
Drainage of the parotidsalivary gland bed



Autopsy of the subcostal abscess of the mandible



Opening of the phlegmon of the bottom of the oral cavity



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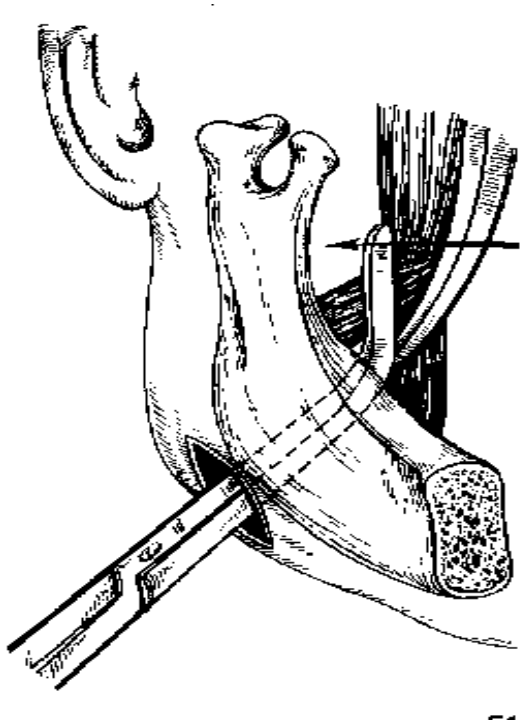
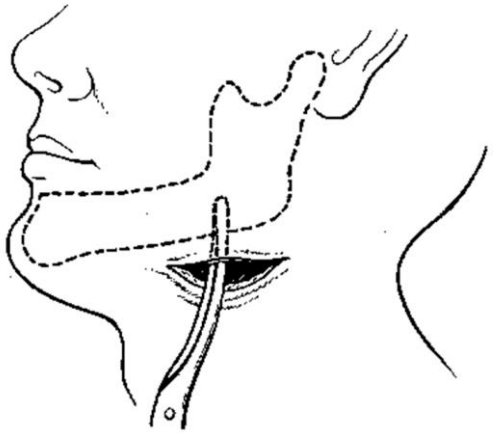
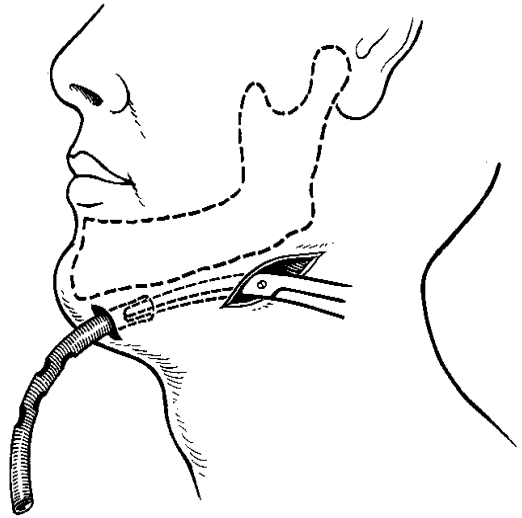
Opening of the pterygoid-maxillary space



Opening of the submasseter space



Drainage of the submandibular salivary gland bed



Opening of the tongue abscess