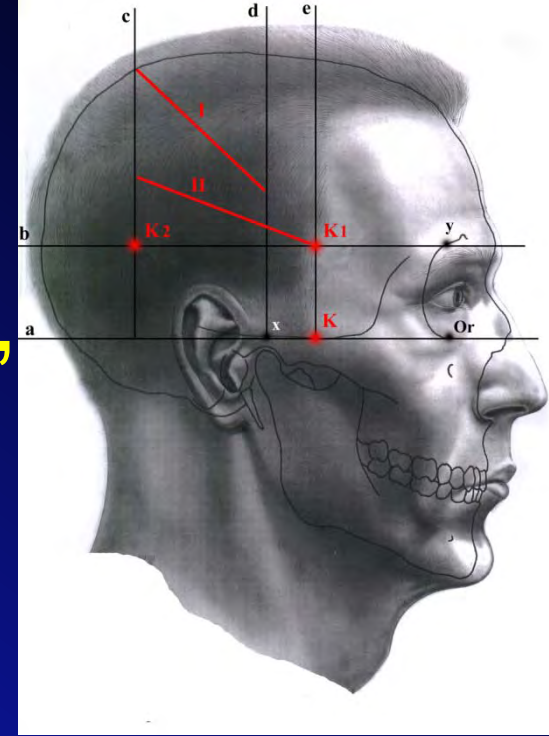


Palpation of the facial skeleton,  
vestibulum; soft tissue in face,  
main craniometric, kefalometric,  
gnathometric points, face  
profile, biometric field, basic x-  
ray views



By

Ivo Klepáček

# Morphologic structures having influence on profile formation and face relief

Skull

Skin

Subdermis

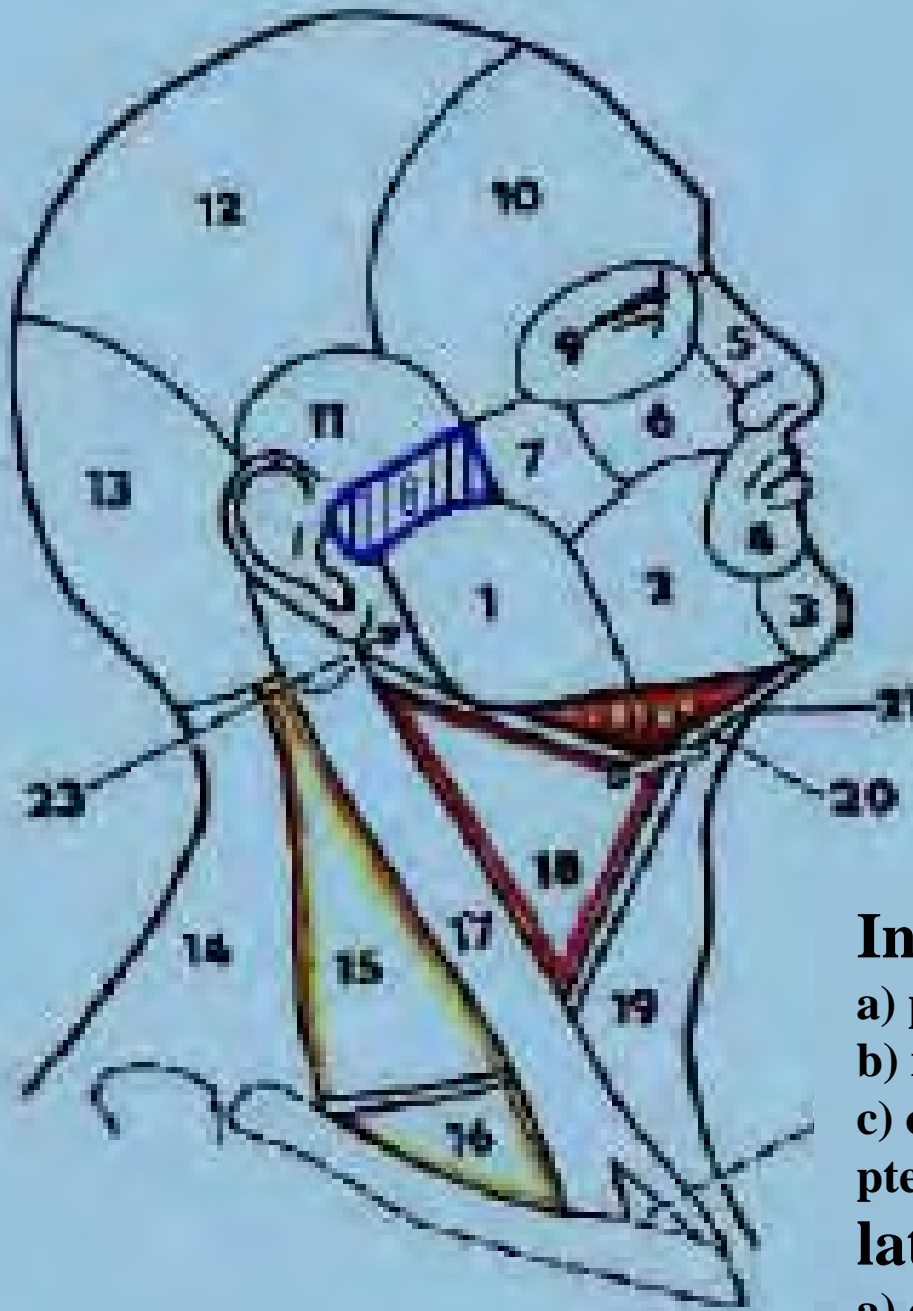
Muscular arrangement

Fat pad

Interdental relations

Intermaxillary relations



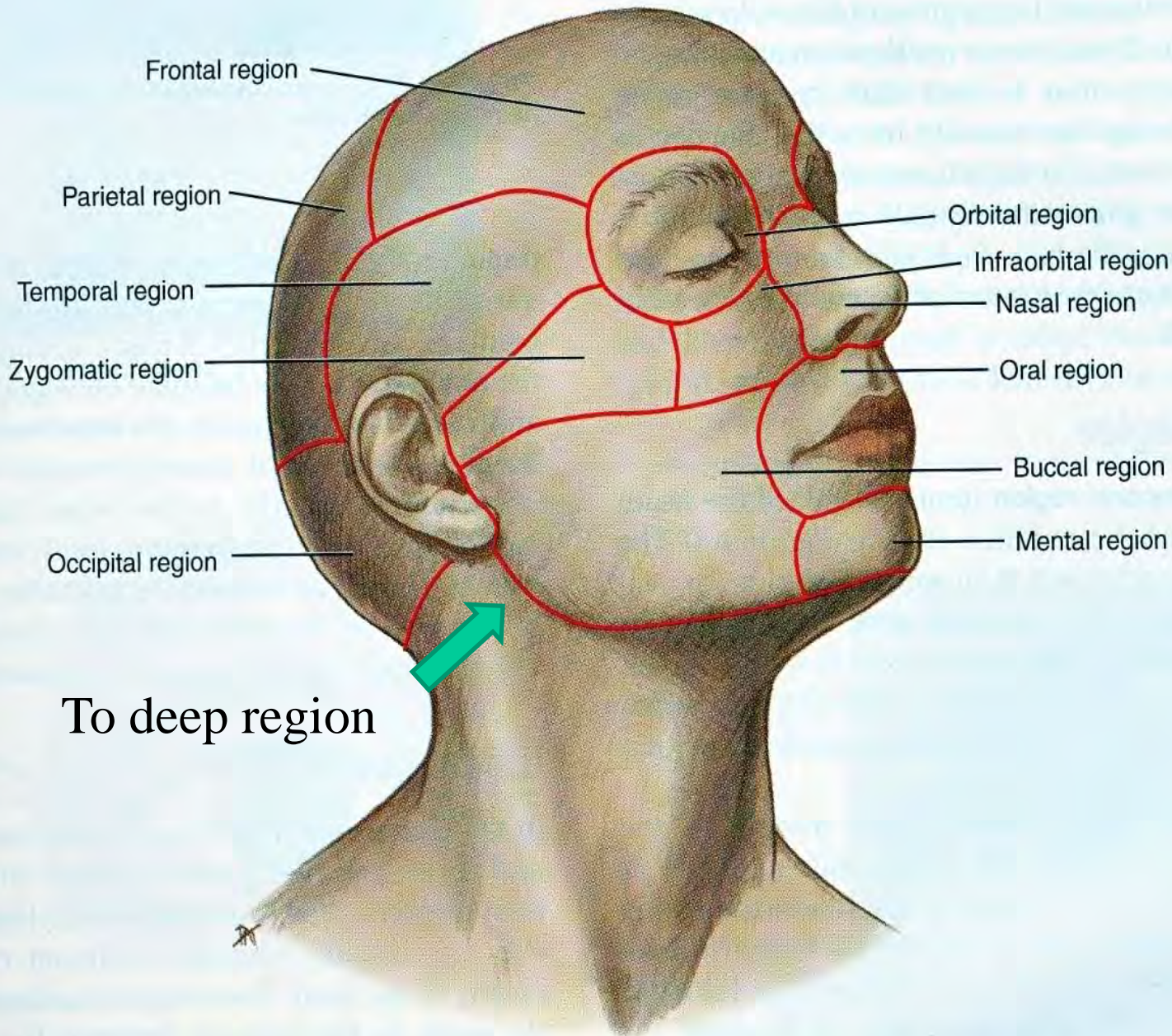


## Infratemporal region:

- a) pterygomandibular space
- b) interpterygoid space (superficial part)
- c) osseous part of infratemporal fossa (deep part)
- pterygopalatine fossa

## lateral neck triangle (15, 16)

- a) omotrapezoid triangle
- b) omoclavicular triangle



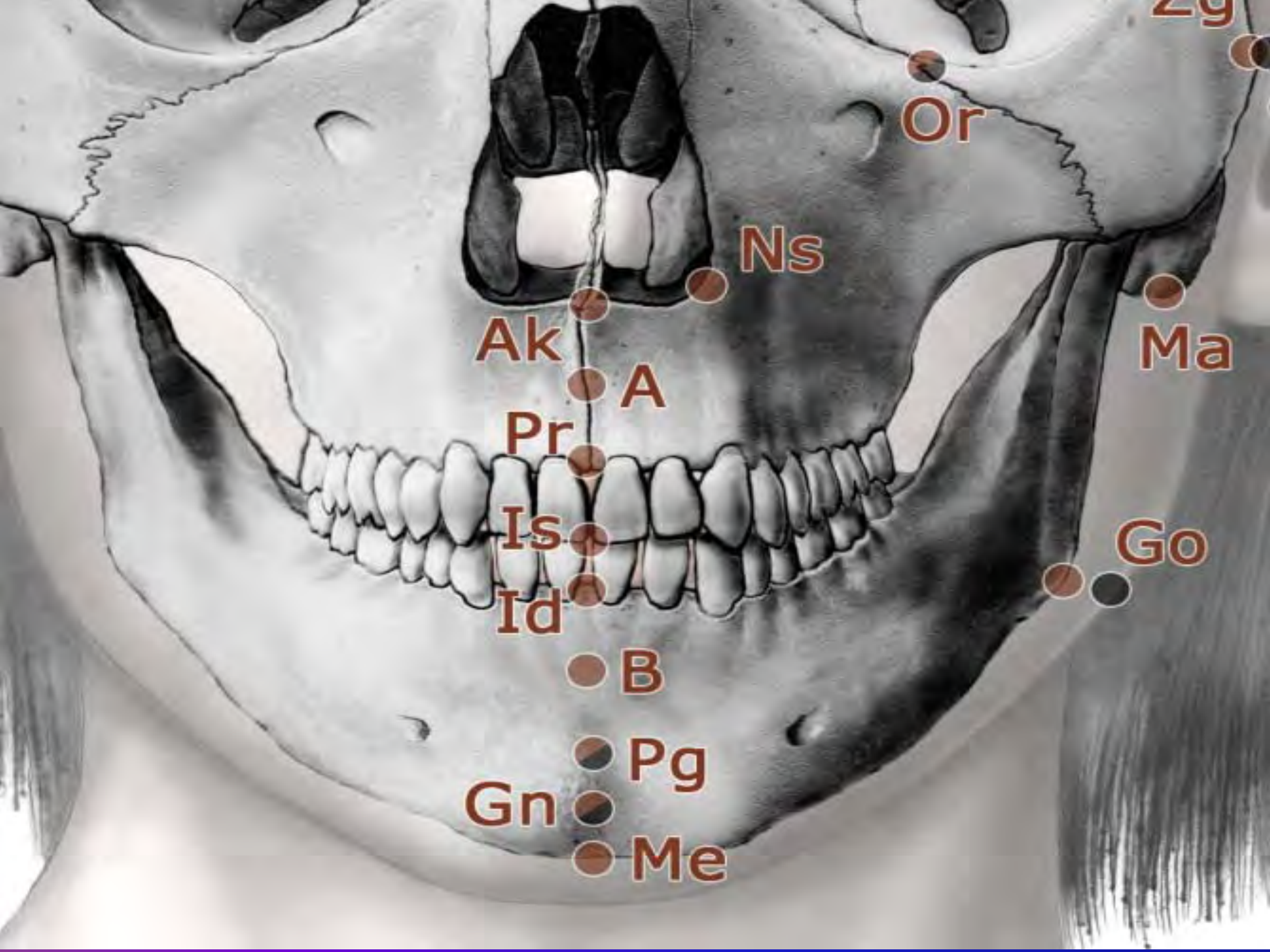
**FIGURE 2-1** Regions of the head: frontal, parietal, occipital, temporal, orbital, nasal, infraorbital, zygomatic, buccal, oral, and mental.

Krajiny  
děleny  
převážně  
podle  
průmětu  
kostí svalů

Regiones  
are selected  
following  
bone and  
muscle  
structures

# Points, lines and planes used in dentistry

Overview of basic points, lines and planes in relation  
to face, dental arches and facial skeleton



Zyg

Or

Ns

Ma

Ak

A

Pr

Go

Is

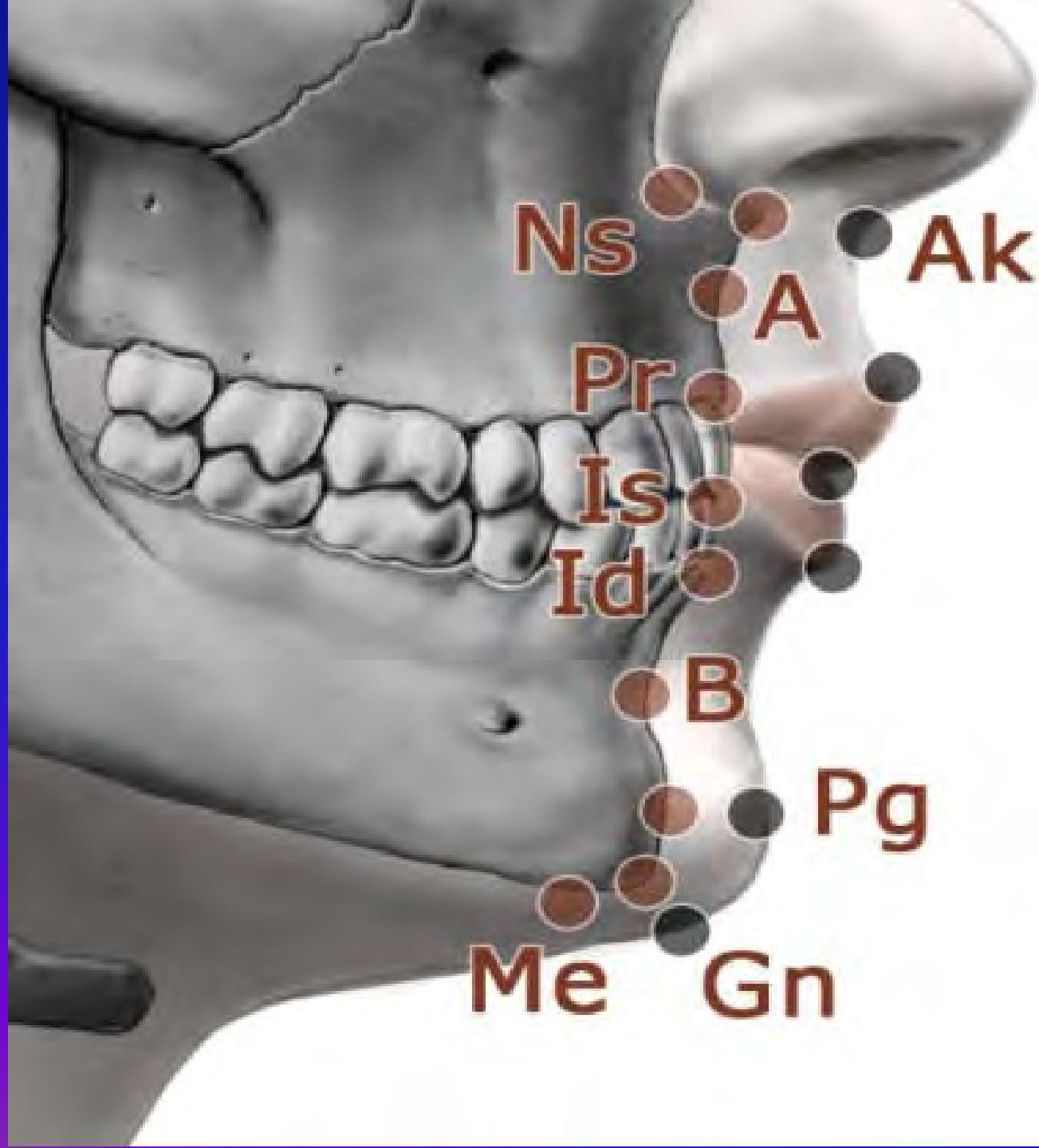
Id

B

Pg

Gn

Me



# Gnathometric points

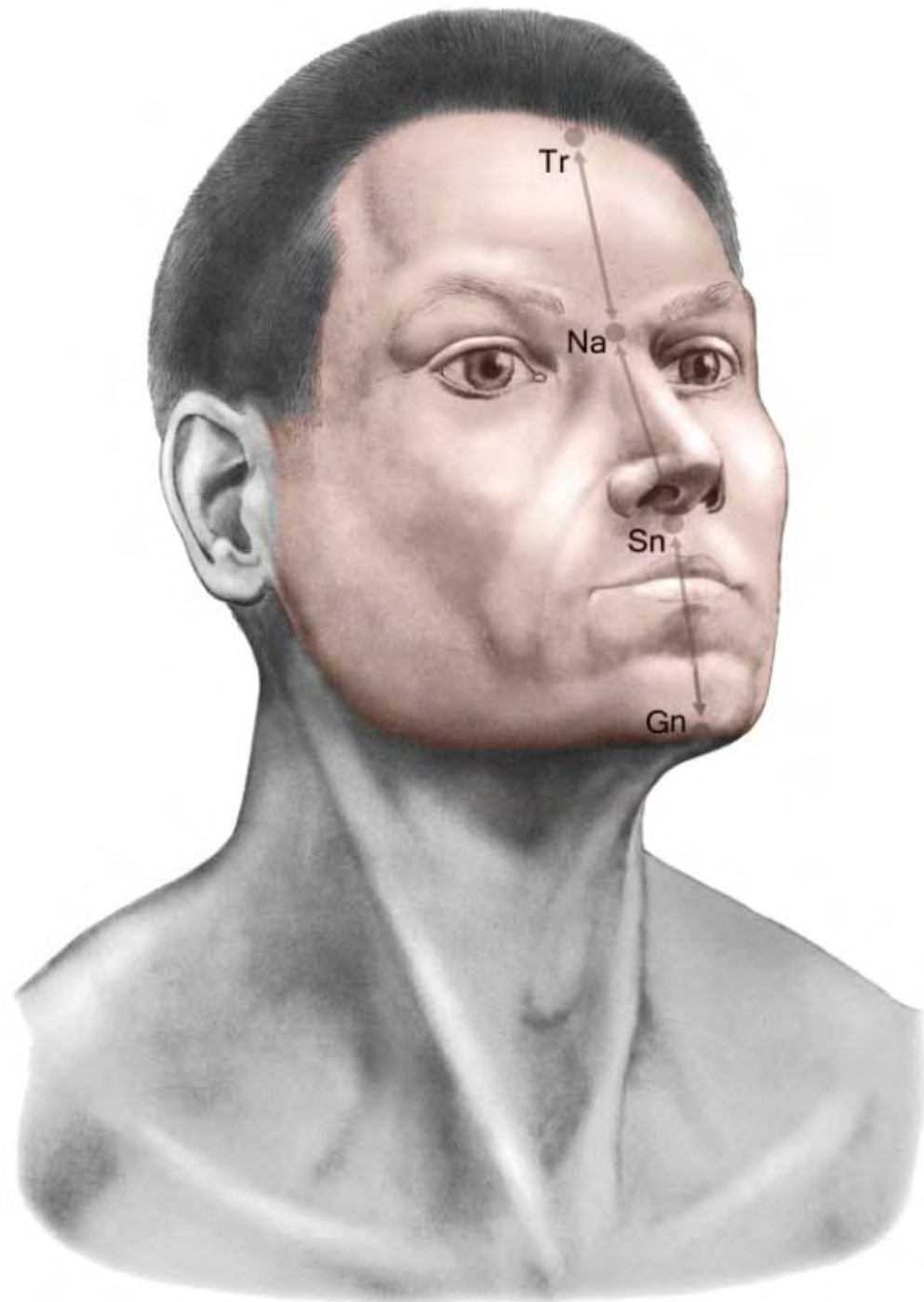
- **Incisale inferius** (Ii) – lower incisal point – crosspoint of both the lines parallel with incisal margins of first lower incisors
- **Incisale superius** (Is) – upper incisal point - crosspoint of both the lines parallel with incisal margins of first upper
- **Infradentale** (Id) – point more up on interalveolar septum between upper incisors.
- **Labrale inferius** (Li) – on the most ventral part of lower lip.
- **Labrale superius** (Ls) – on the most ventral part of upper lip
- **Mentale** (Mn) – the deepest point inside mental canal
- **Nasion** (Na) – on the nose root
- **Nasospinale** (Ns) – in the midline on the base of anterior nasal spine
- **Orale** (Ol) – between ventral incisors on the dorsal margin of their alveolar process (ventral margin of osseous palate)
- **Pogonion** (Pg) – ventral margin of mental protuberance and on skin covering it.
- **Prosthion** (Pr) – between both the first upper incisors on the alveolar margin ventrally
- **Punctum S** (S) - middle of turcic sella
- **Staphylion** (St) – on the top of posterior nasal spine (margin of the hard palate)
- **Stomion** (Sto) – point where upper and lower lips are touching each other
- **Subnasale** (Sn) – on the fusion between columella and philtrum
- **Subspinale** (Sb, after Downs orthodontic upper point A) – labelling position of the upper apical basis); it is in the middle distance between akanthion and prosthion.. It lies on ventral surface of alveolar process.
- **Supramentale** (Sm, after Downs orthodontic lower point B) – labelling position of the lower apical basis); it is on the ventral surface of osseous chin at level of tops of lower first incisors
- **Menton** (Me) – the most dorsally and distally on the osseous chin



# OBLIČEJ FACE

Inervační zóny, tukové těleso tváře, inervace v dutině ústní, cévy a uzliny obličeje

Nerves in face, Head's zones, fat pad, oral cavity innervation, vessels and lymph nodes in face

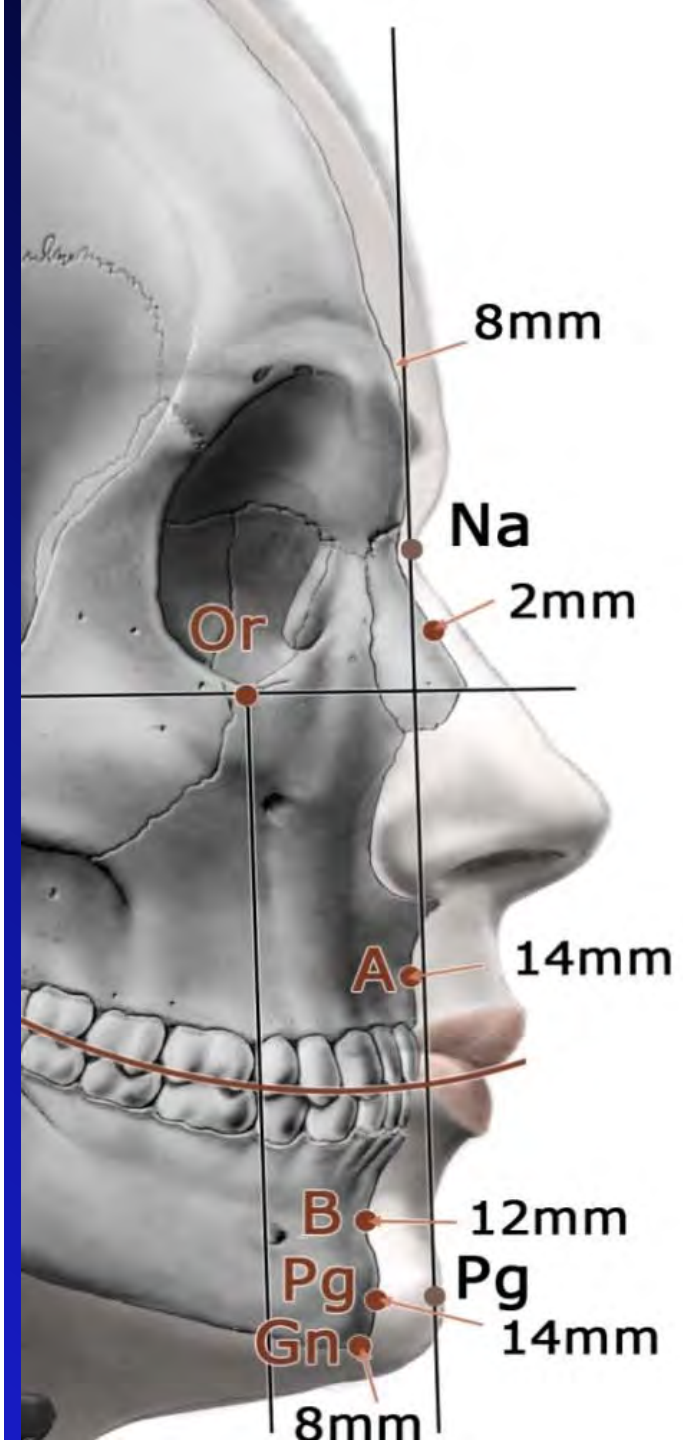
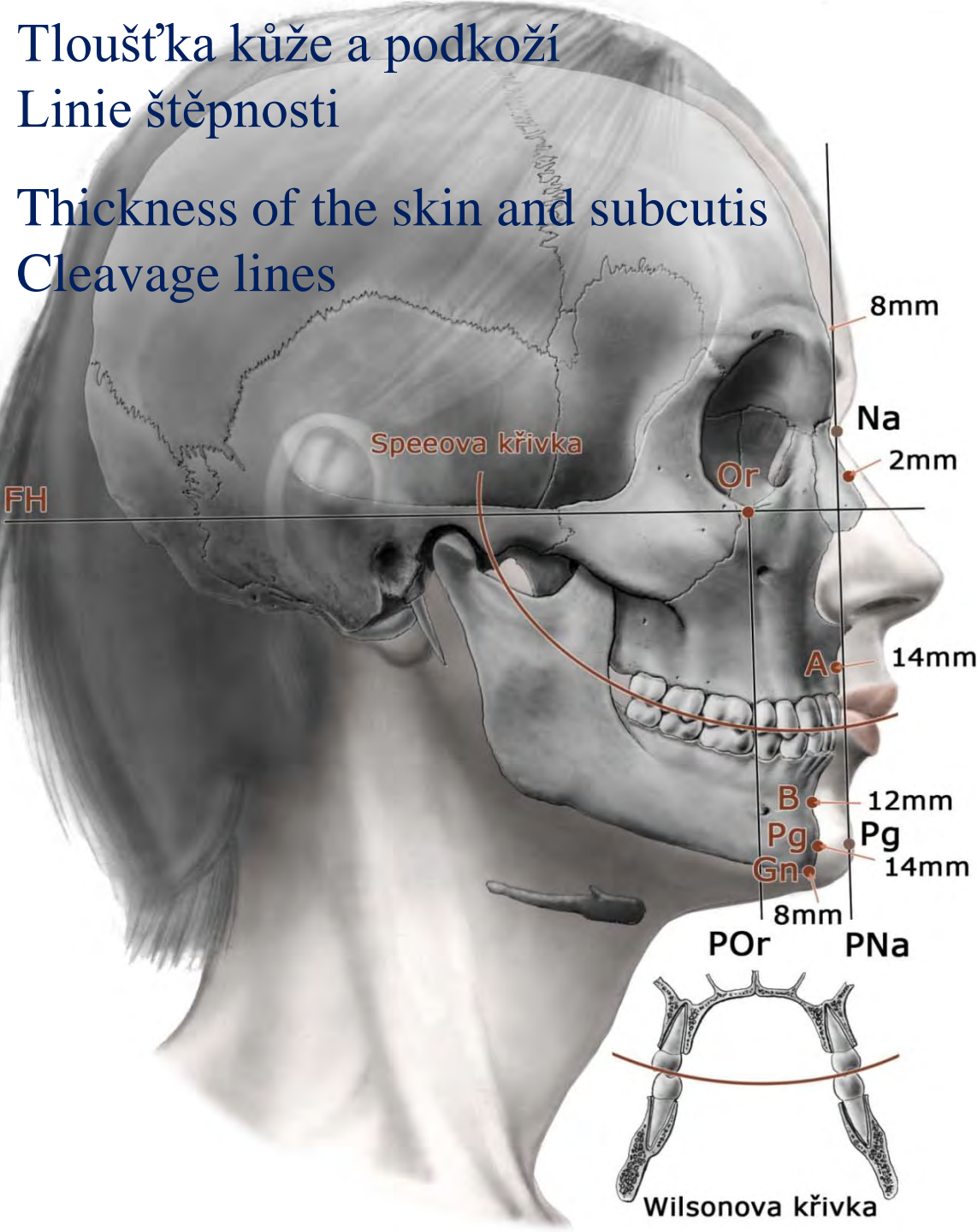


Tloušťka kůže a podkoží

Linie štěpnosti

Thickness of the skin and subcutis

Cleavage lines



Thickness of soft tissues in face –  
profile view:

above *nasion* - 8 mm, above point A  
- 13-15 mm,

above point B - 10-12 mm,

above *gnathion* - 6-8 mm,

above *pogonion* - 14-16 mm.

Lip thickness varies about 12-16 mm.

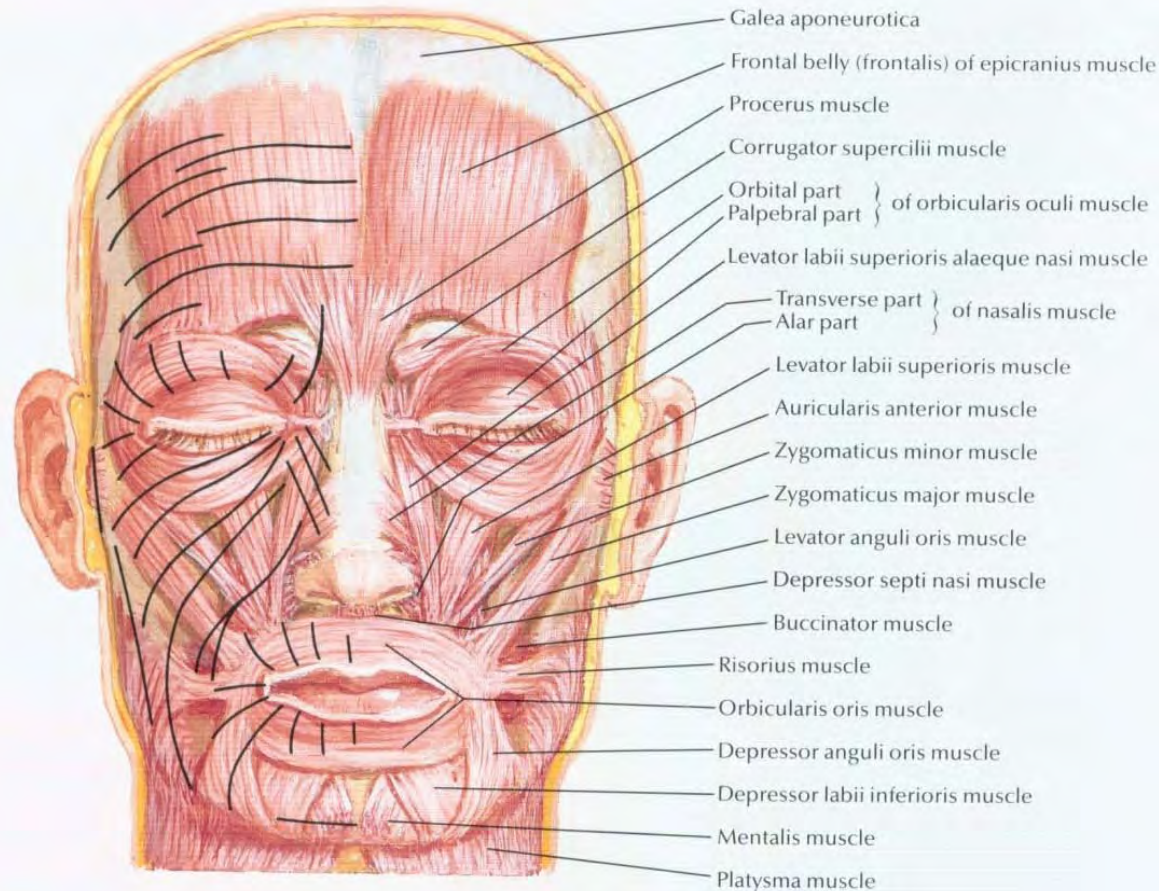
# LANGER'S LINES

## On dead bodies

14-3). These maps indicate that there are definite lines of tension or cleavage lines within the skin that are characteristic for each part of the body. In microscopic sections cut parallel with these lines, most of the collagenous bundles of the reticular layer are cut longitudinally, while in sections cut across the lines, the bundles are in cross section. The cleavage lines correspond closely with the crease lines on the surface of the skin in most parts of the body. The pattern of the cleavage lines, according to Cox (1941), varies with body configuration, but is constant for individuals of similar build regardless of age. There are limited areas of the body in which the orientation of the bundles is irregular and confused. The cleavage lines are of particular interest to the surgeon because an incision made parallel to the lines heals with a fine linear scar, while an incision across the lines may set up irregular tensions that result in an unsightly scar.

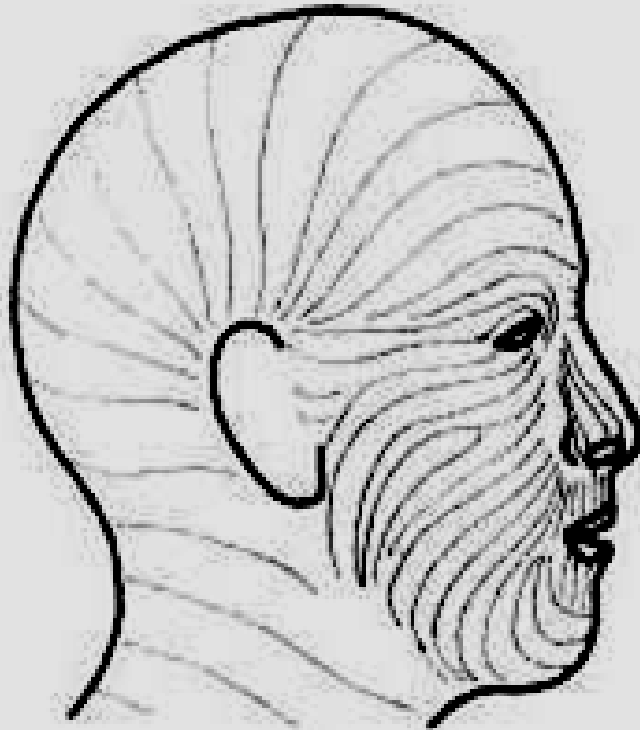


FIG. 14-5. Cleavage lines (Langer's lines) of the skin: Head and neck. (Cox)



Carl Ritter von Eldenberg von Langer (1819-1887) Austrian anatomist  
REF: ANATOMY OF THE HUMAN BODY, HENRY GRAY

## On living bodies

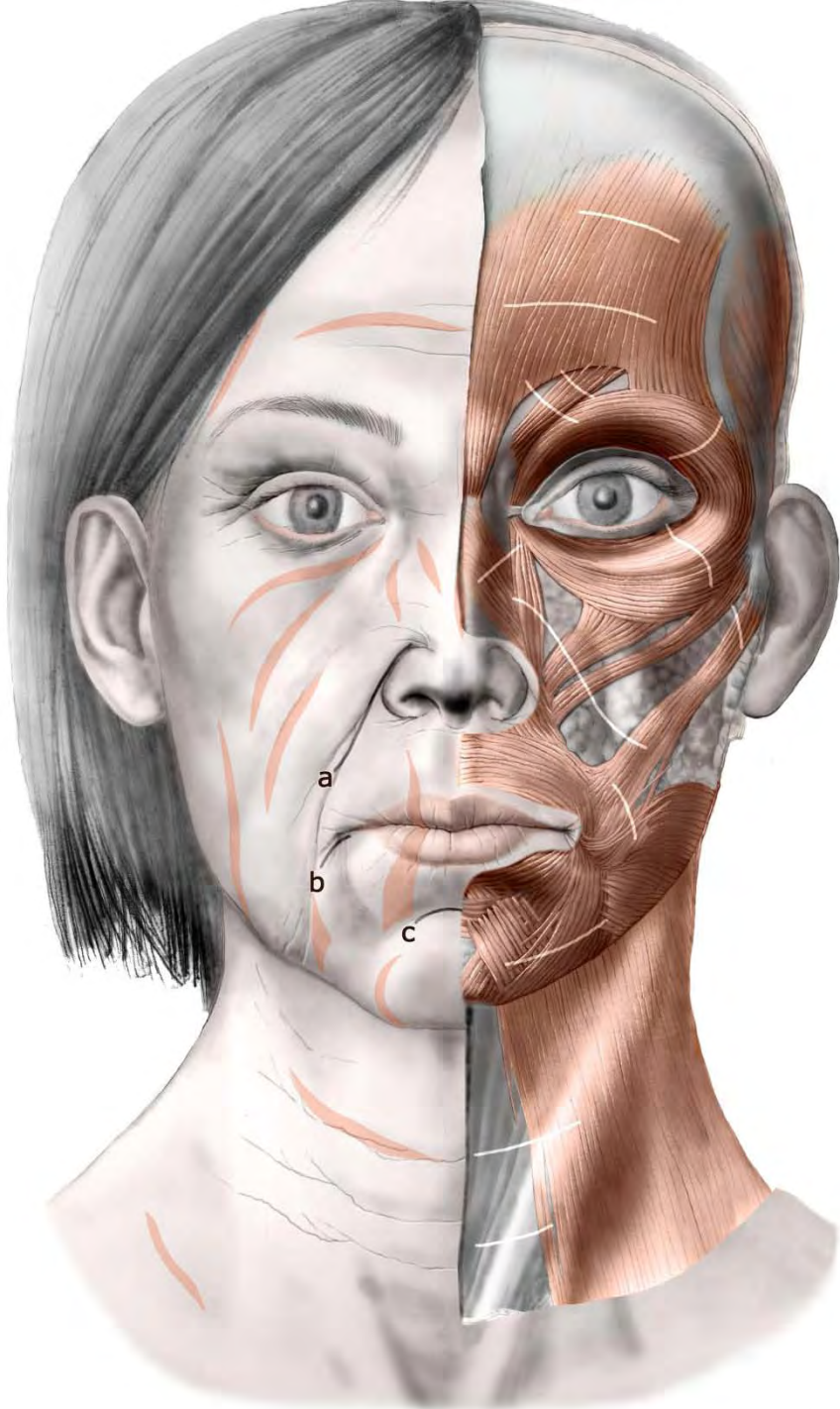


Kraissl's (Kraissl 1951)

Langer's

Lines of skin fissionability (skin cleavage)

**Kraissl:** skin elongates parallel with direction of dermis bundles



Skin cleavage (right, black lines) and location of incisions (left, pink furrows)

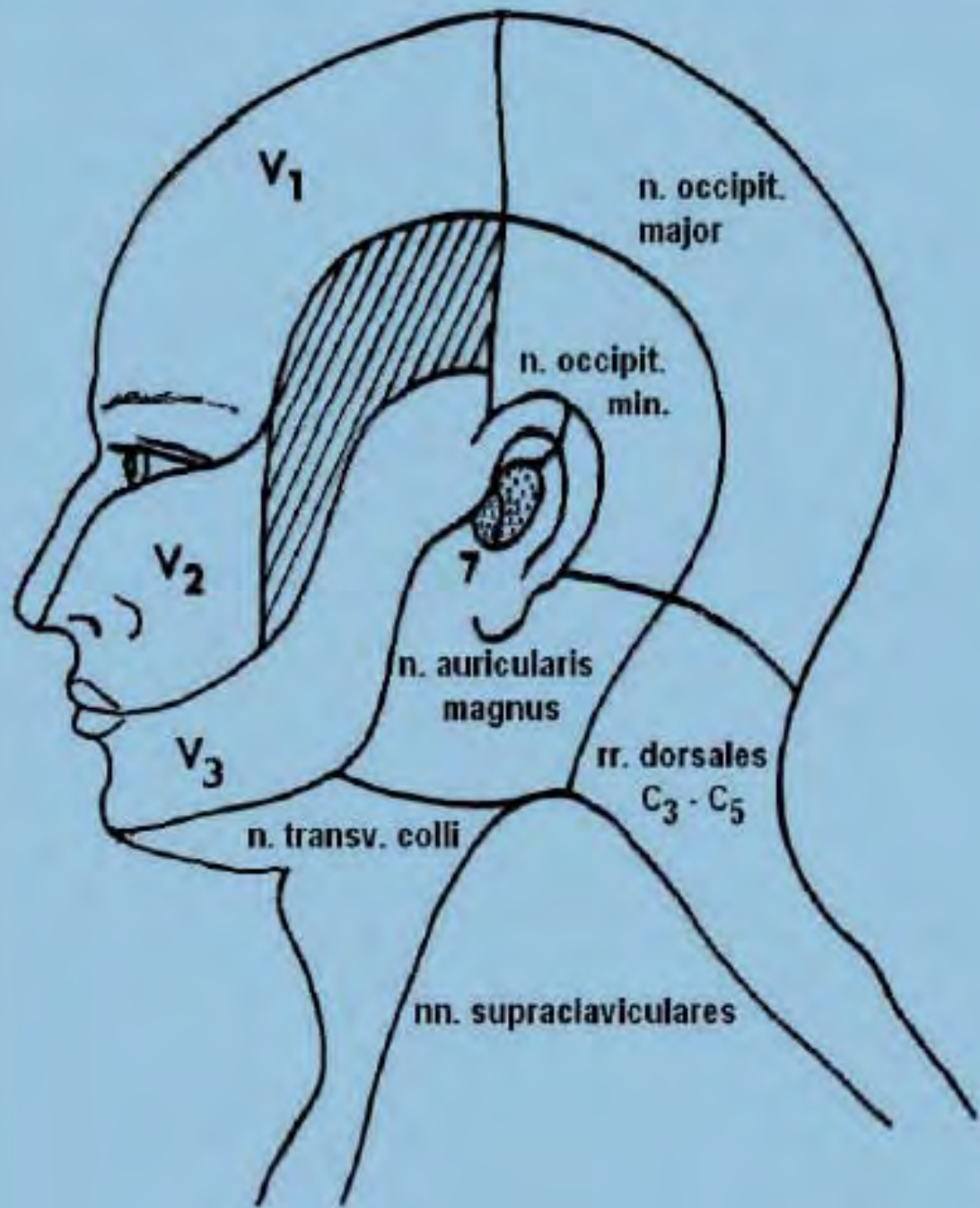
Corrugation – furrows are perpendicular to fibres inside mimic muscles.  
a – nasolabial groove, b – angular groove, c – mentolabial groove



Fibromatosa  
ve tváři

Fibromatosis  
in face



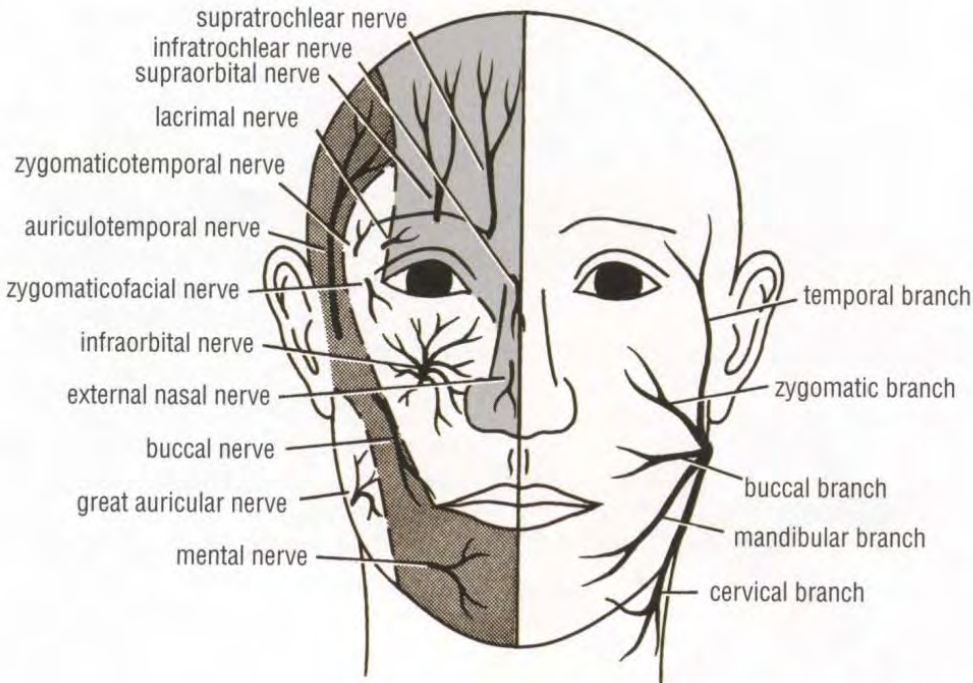
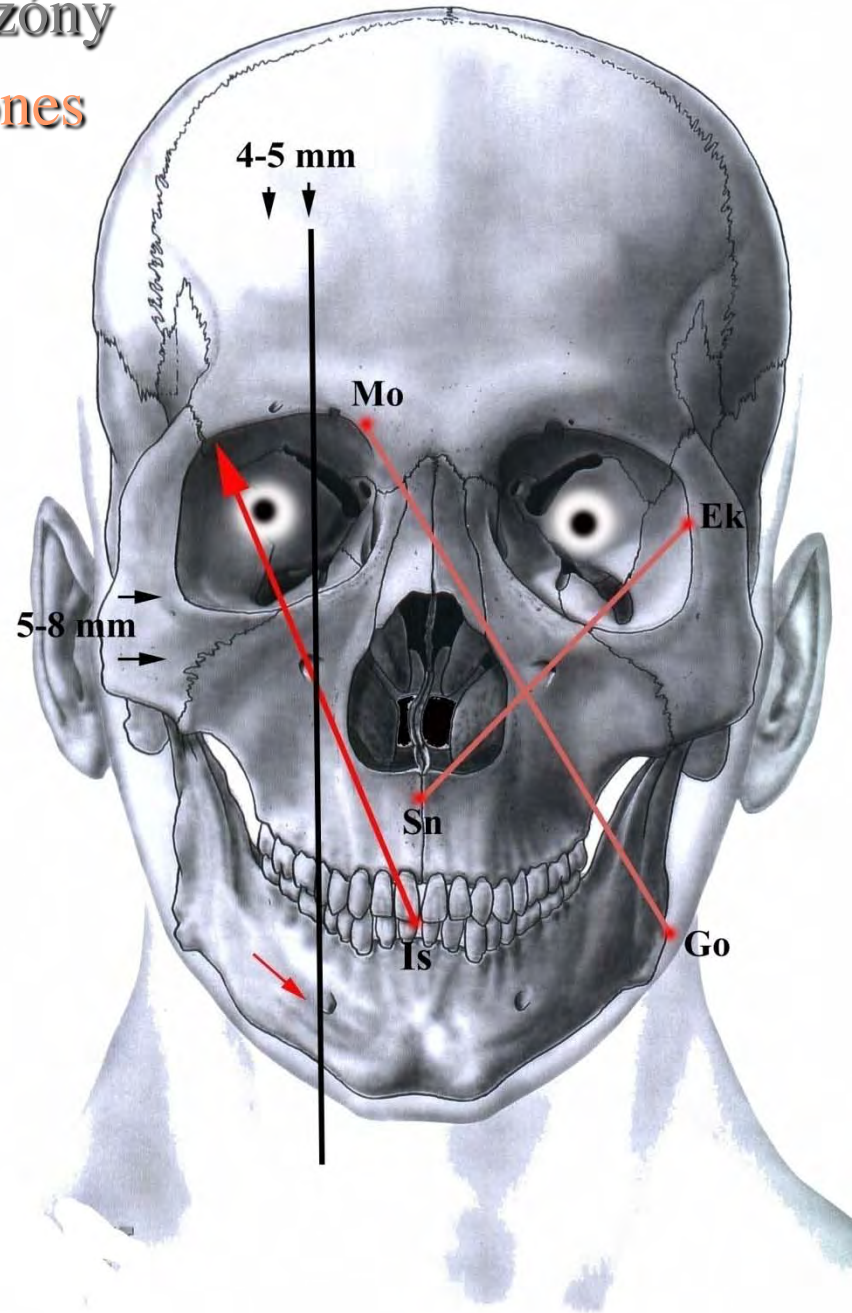
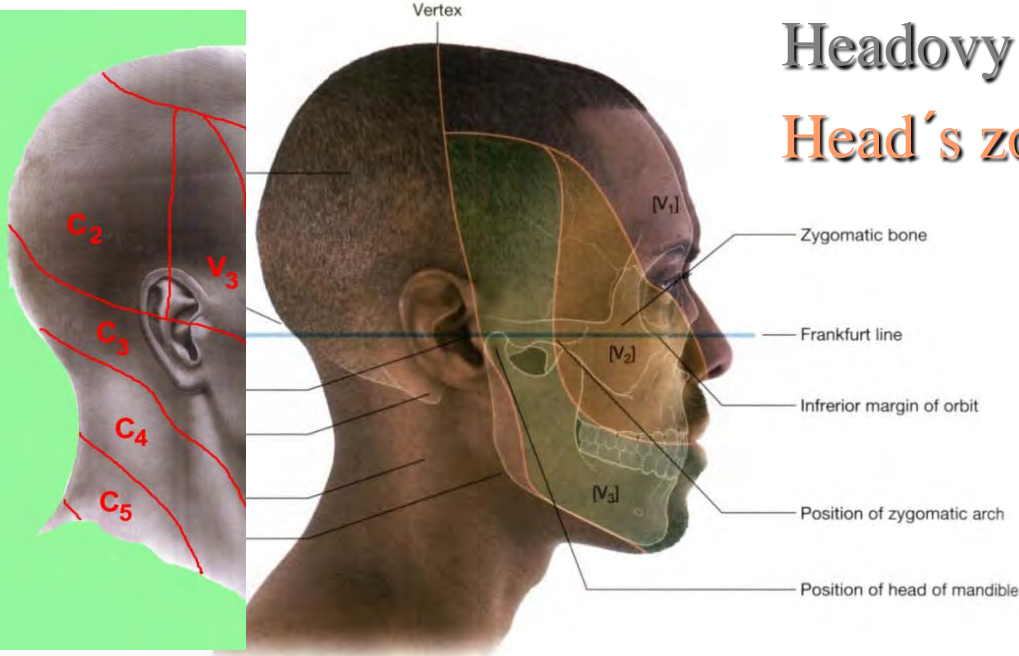


Areae nervinae  
(Head zones)



# Headovy zóny

## Head's zones



## n. V. examination



# Muscles of facial expression

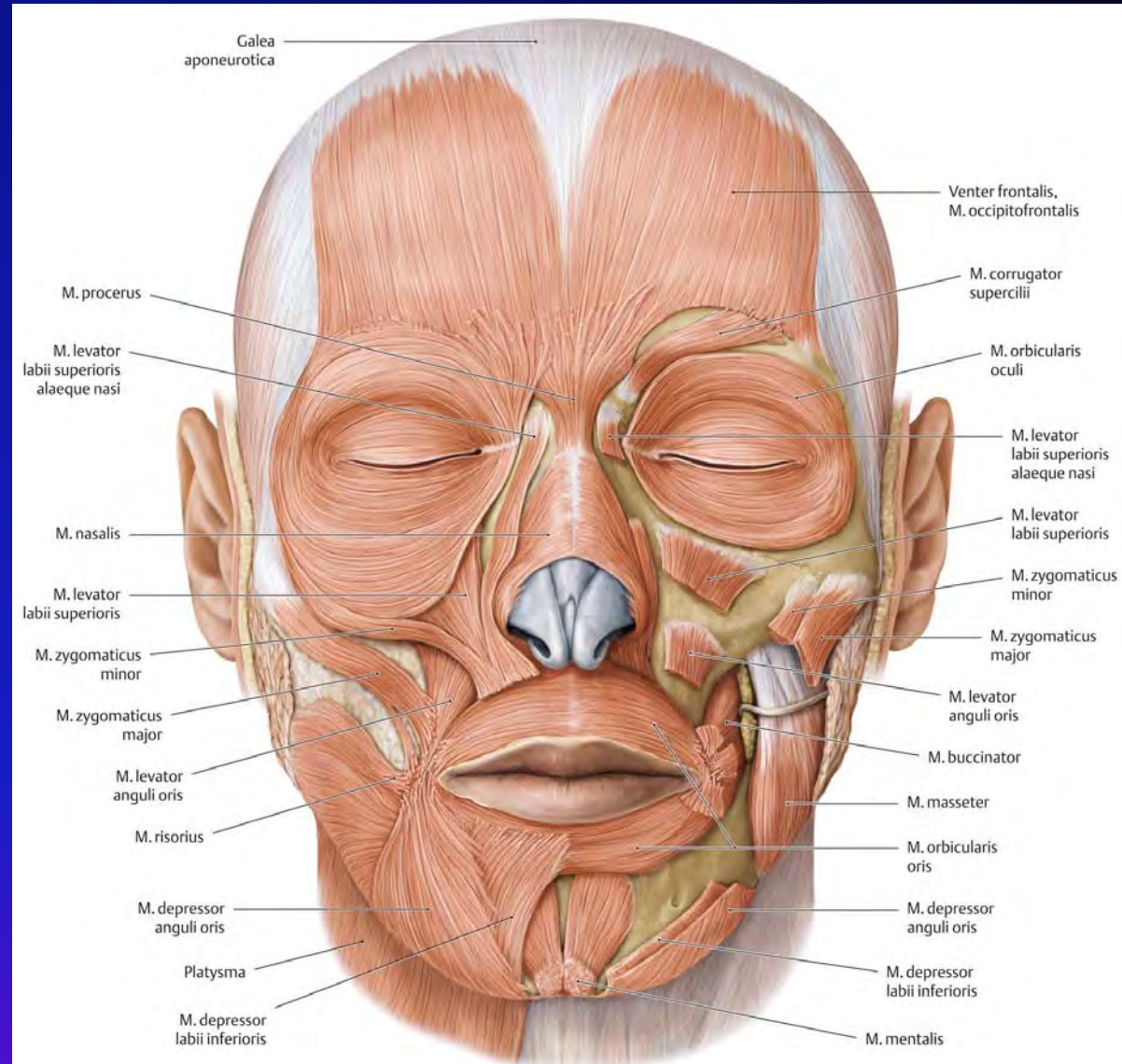
## mm. faciales

VII – FACIALIS:  
follows structures of 2nd  
branchial arch

Innervation from **facial n.**  
(nervus cranialis septimus; VII.)

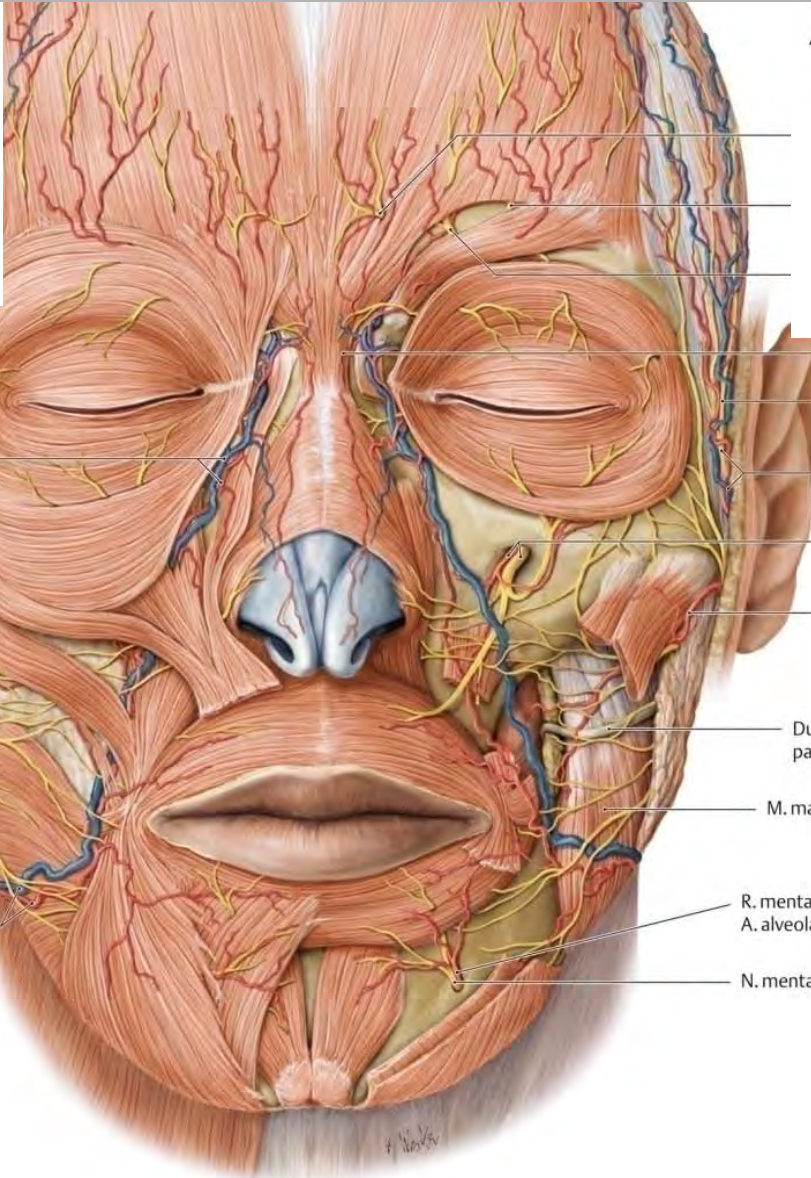
Muscles:

- of skull vault
- of face (proper facial)
  - Mm. surrounding orbit
  - Mm. surrounding external nose
  - Mm. surrounding oral cavity



# Mimické svaly cévy obličeje

## Mimic muscles face vessels



A. dorsalis nasi  
Aa. palpebrales laterales  
A. angularis

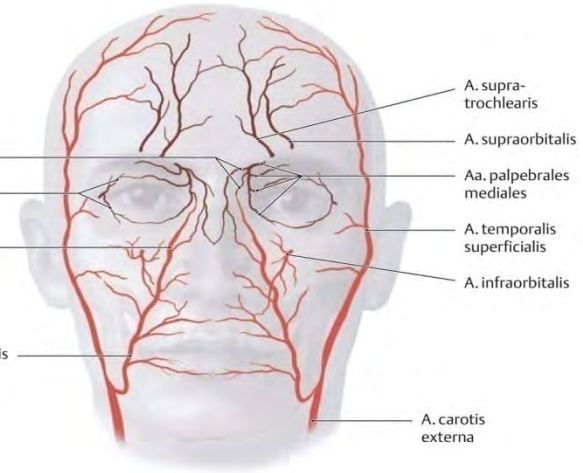
A. dorsalis nasi  
N. auriculo-temporalis  
A. u. V. temporalis superficialis  
A. u. N. infra-orbitalis  
A. transversa faciei

Ductus parotideus

M. masseter

R. mentalis, A. alveolaris inferior

N. mentalis



A. supra-trochlearis

A. supraorbitalis

Aa. palpebrales mediales

A. temporalis superficialis

A. infraorbitalis

A. facialis

A. carotis externa

N. facialis, Rr. temporales

A. u. V. angularis

N. facialis, Rr. zygomatici

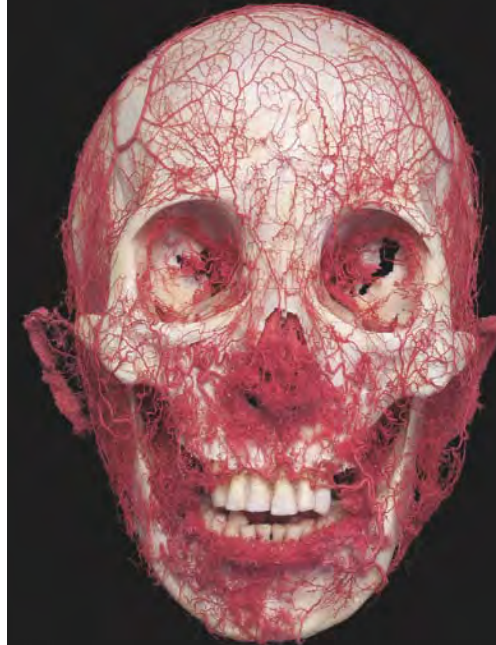
N. facialis, Rr. buccales

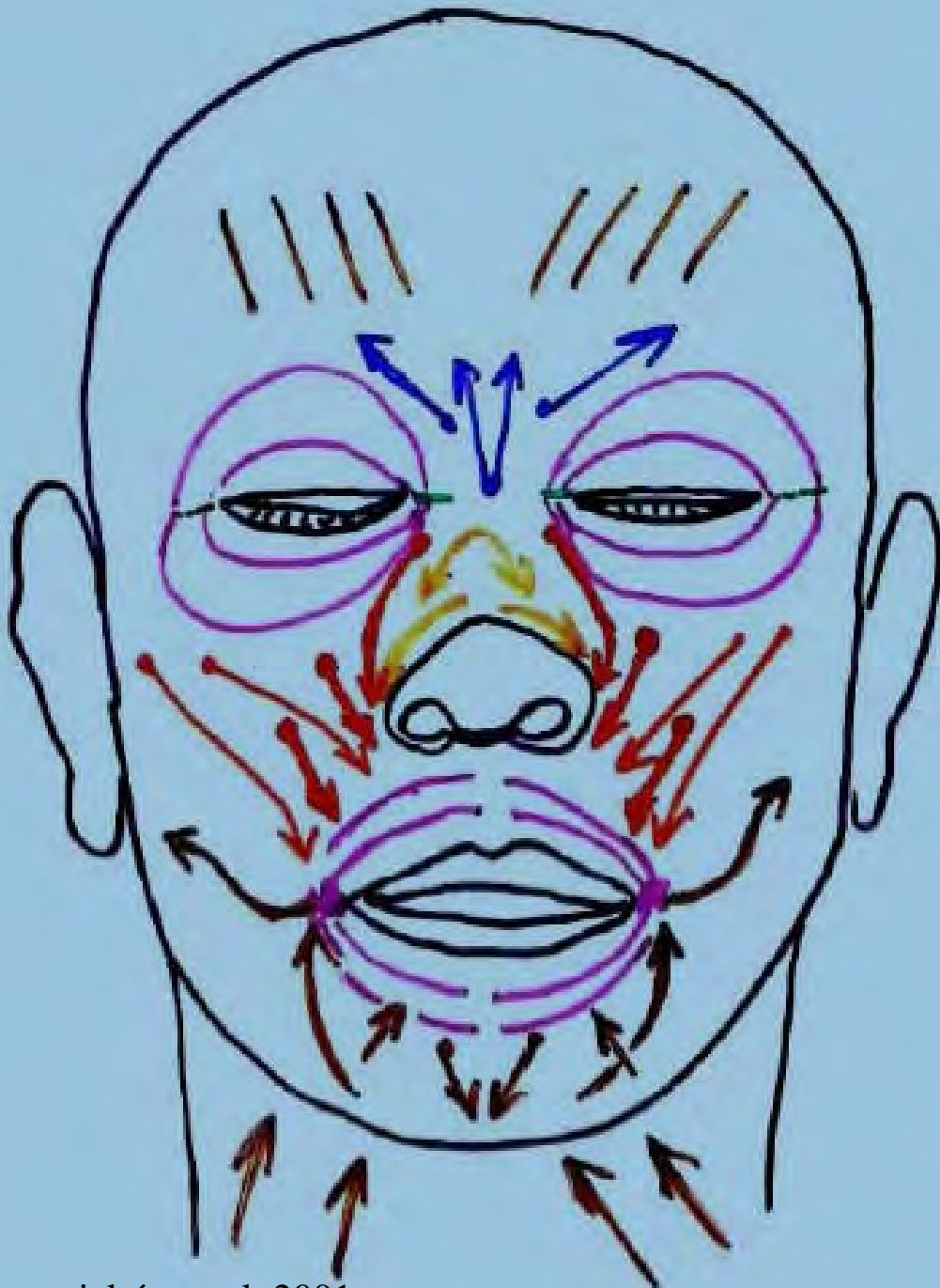
Gl. parotidea

N. facialis, R. marginalis mandibulae

A. u. V. facialis

## trigonum mortis





Depressor anguli oris

Arogance  
aversion

Zygomaticus  
laugh

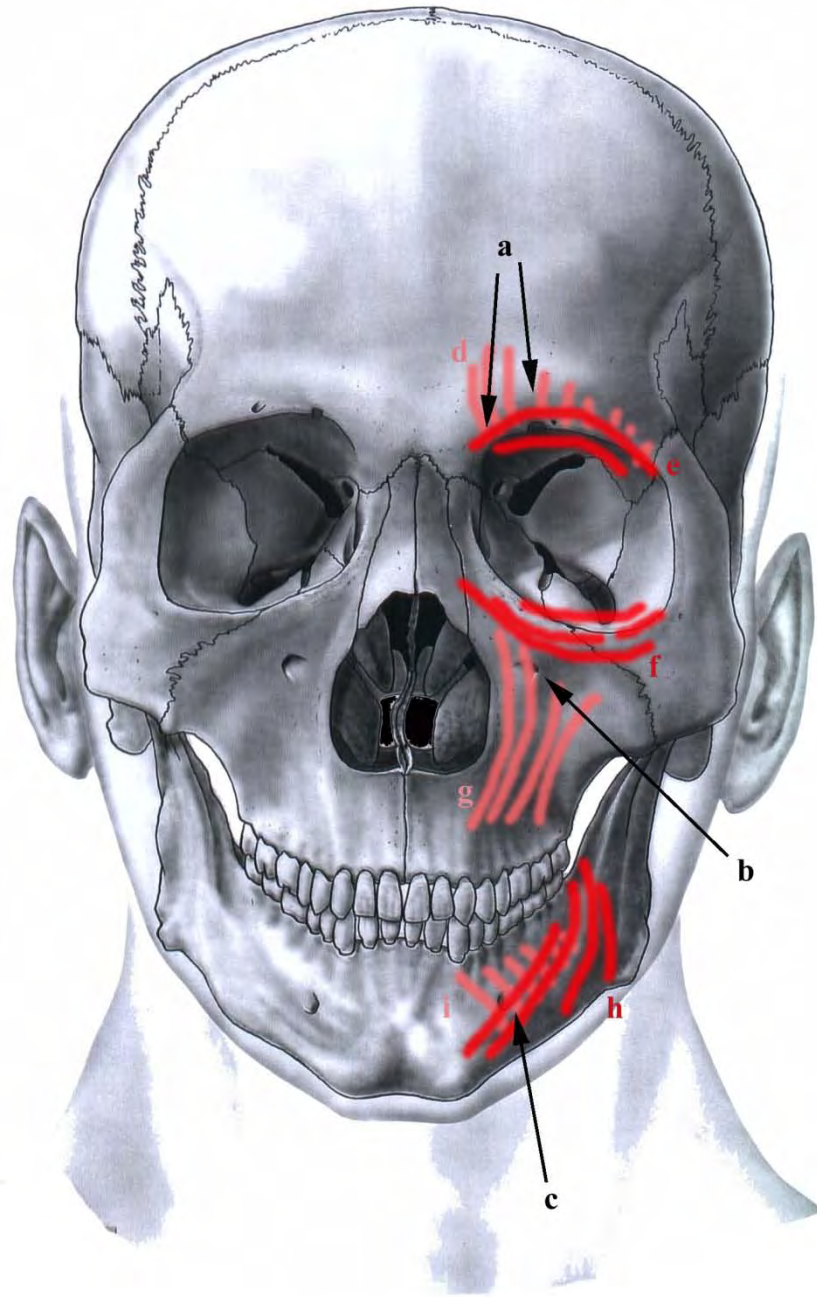


Levator labii superioris

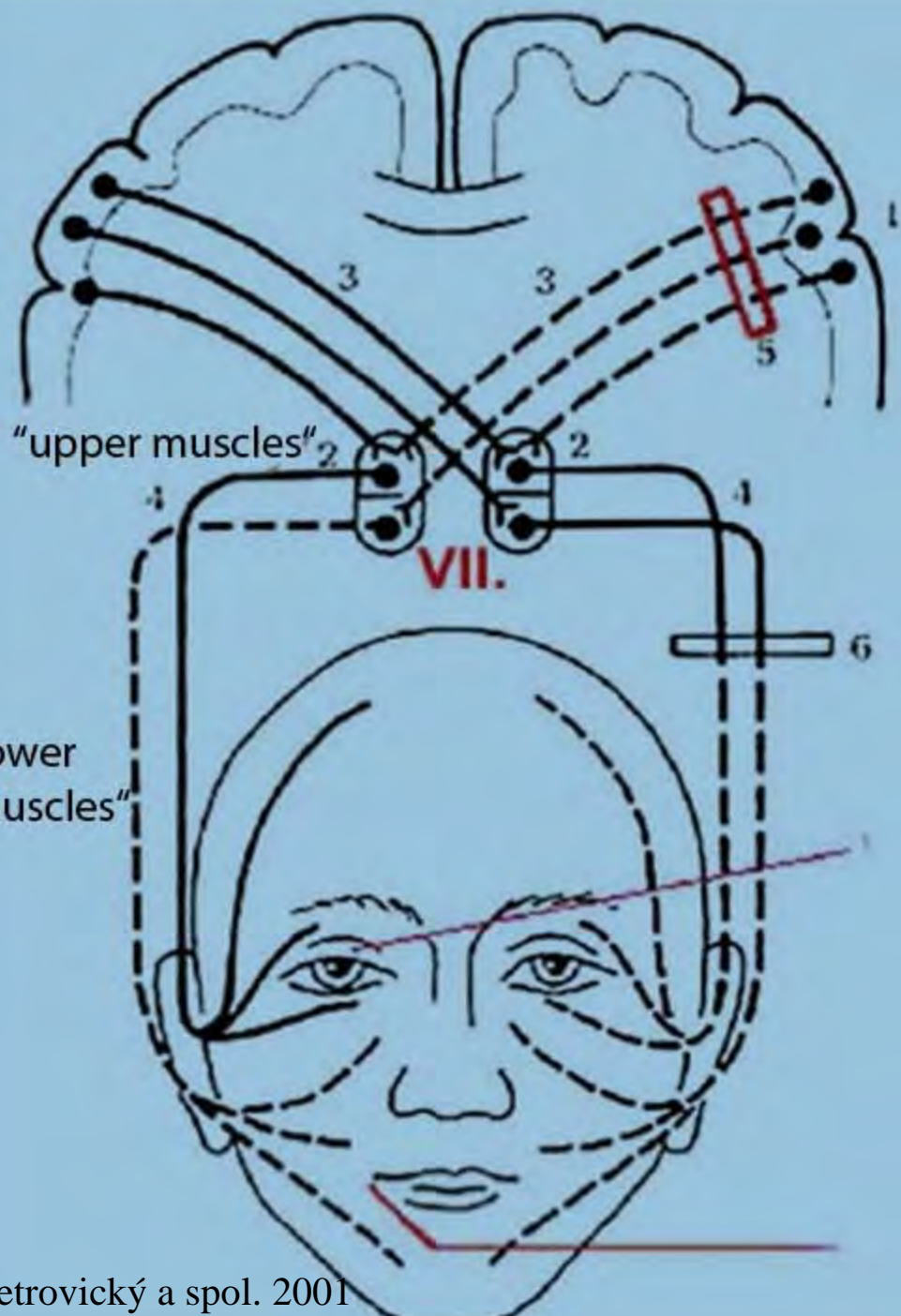
cry

Levator alae nasi

Hopeless cry



central and peripheral palsy of CN VII

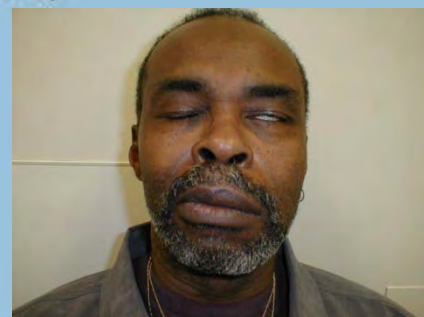


dotted line - damaged fibers  
full line - normal fibers

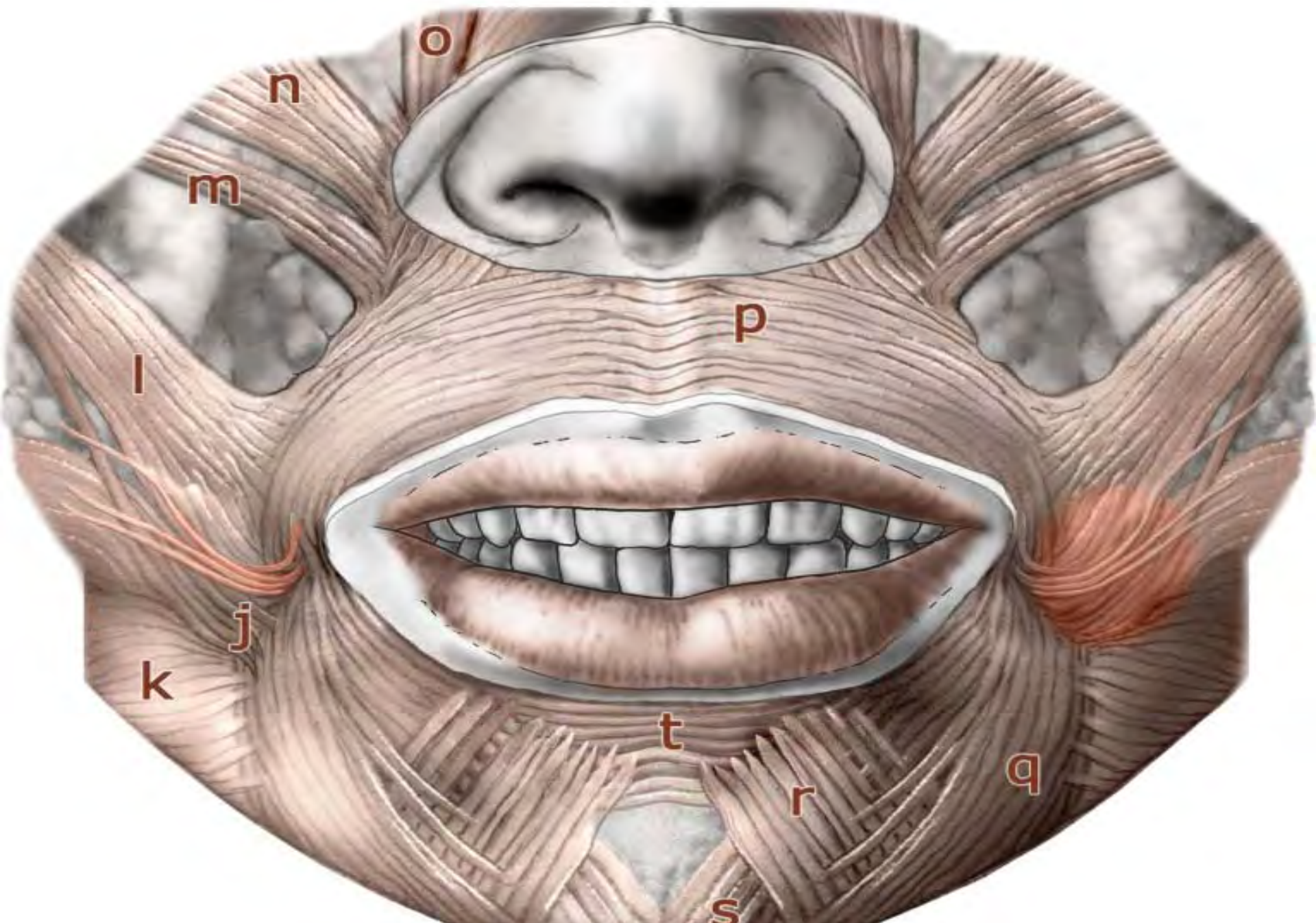
5 - central lesion  
6 - peripheral lesion



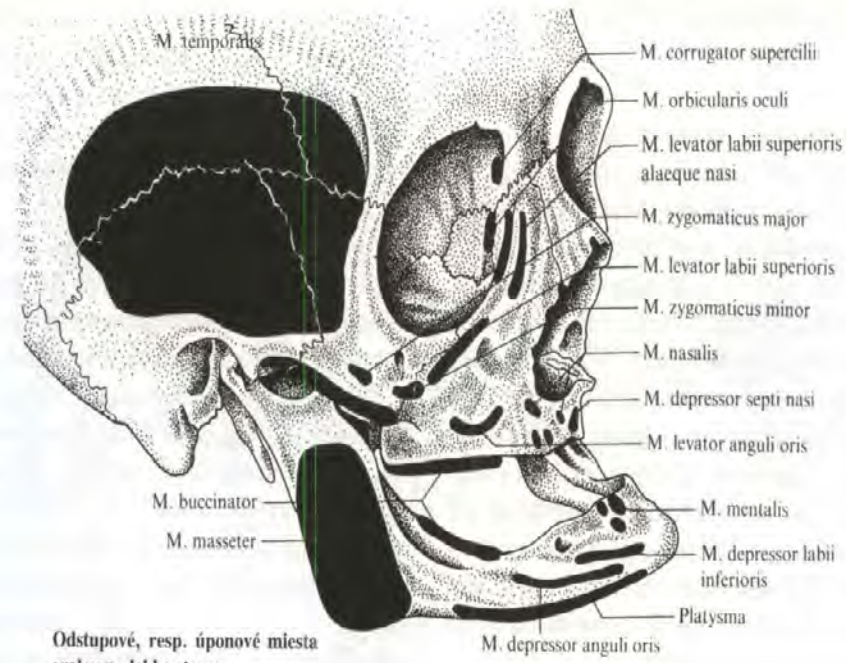
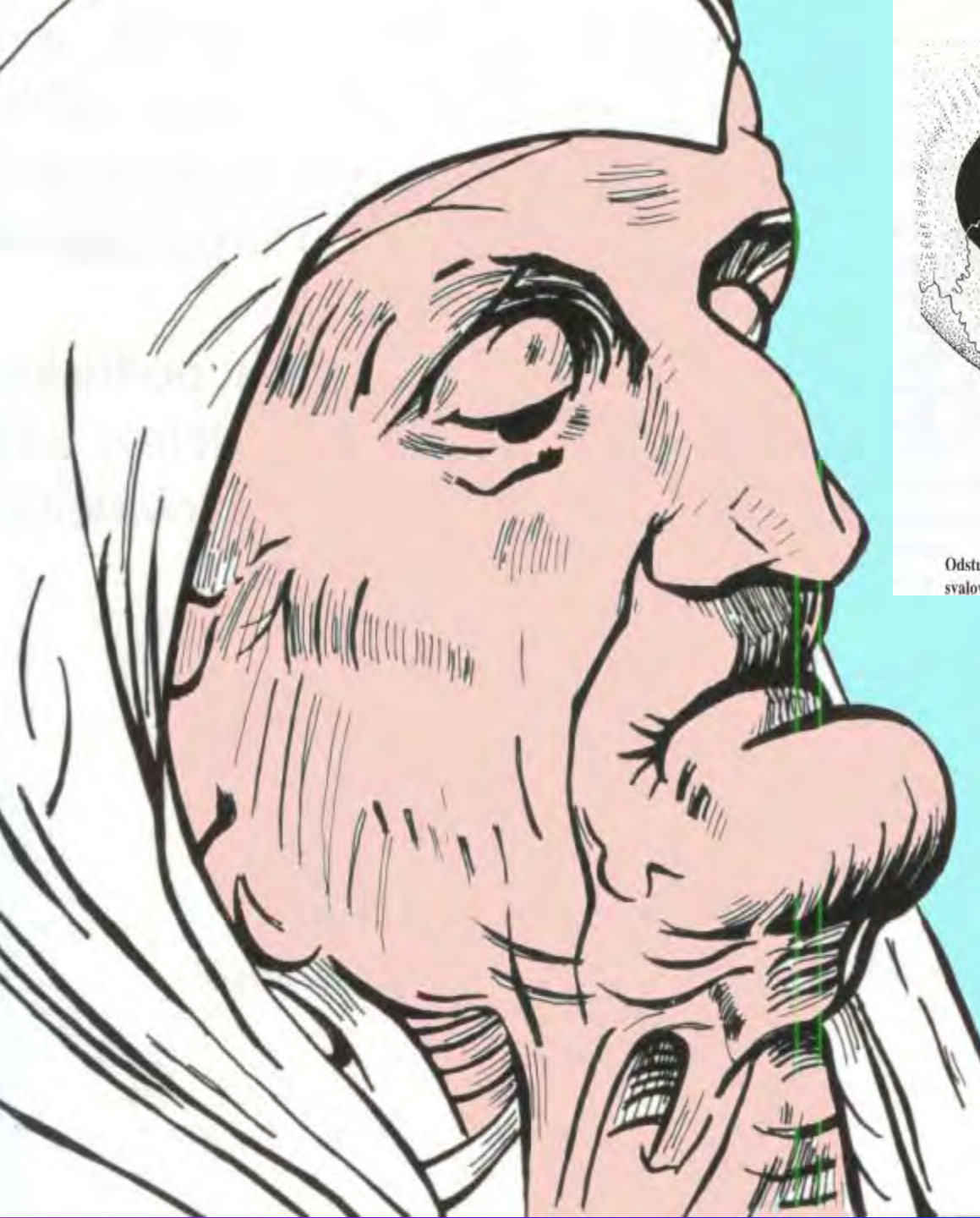
ptosis of eyelid (it has only 1/2 afferent fibers)



mouth corner - slack (no afferent fibers)



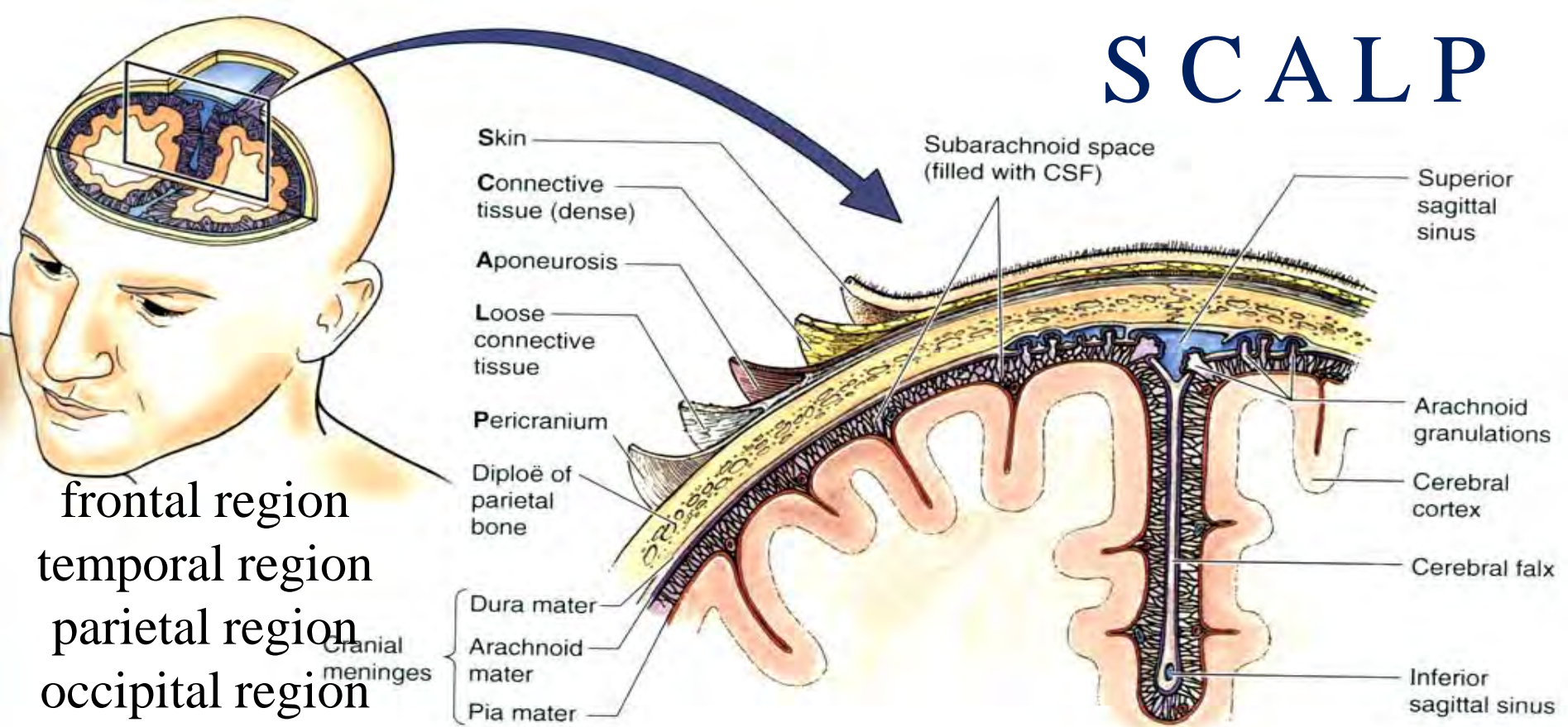




Odstupové, resp. úponové miesta svalov na lebke starca

„Il vecchio“ (štúdie starnutia Leonarda da Vinciho; z E. Belta, 1952)

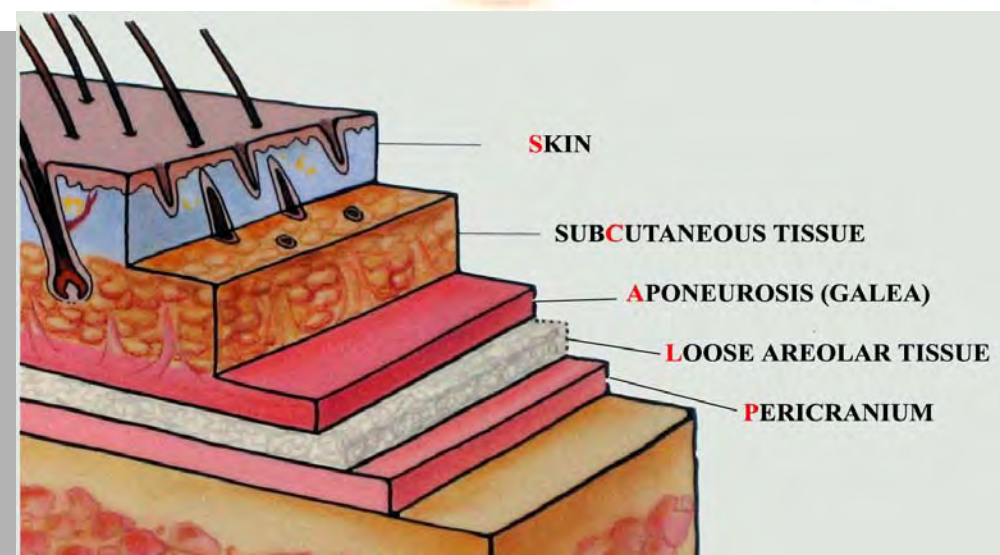
# SCALP



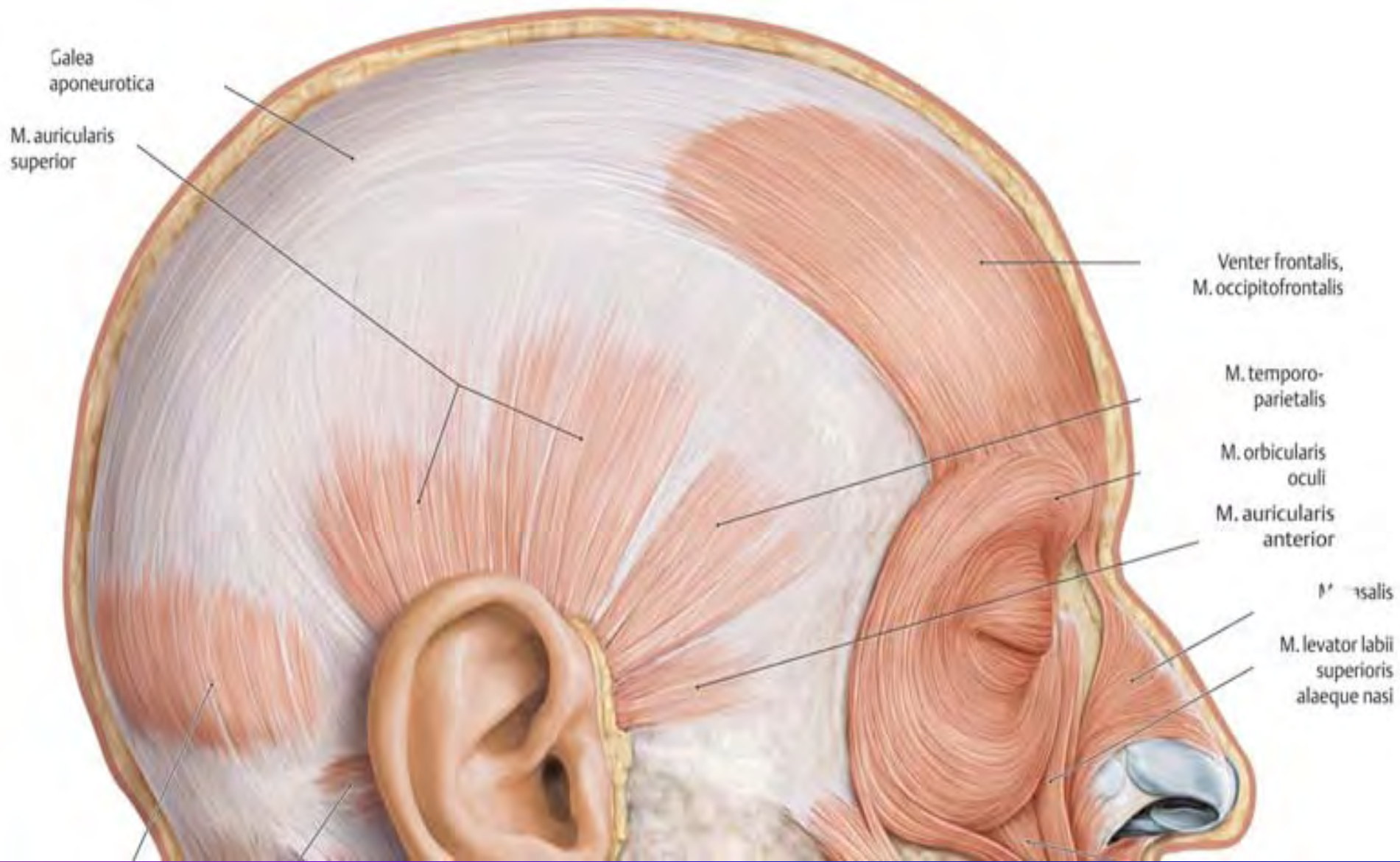
frontal region  
temporal region  
parietal region  
occipital region

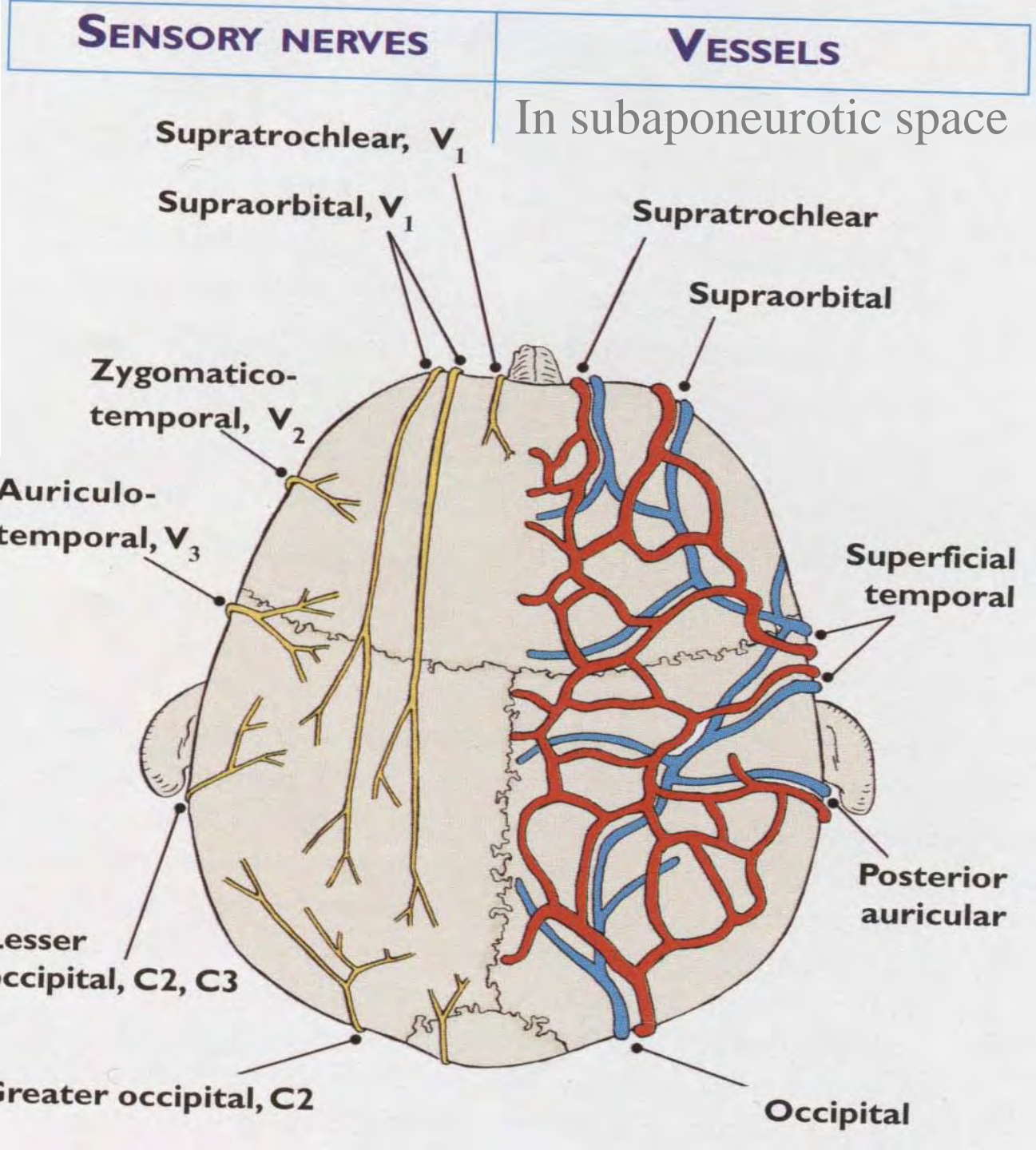
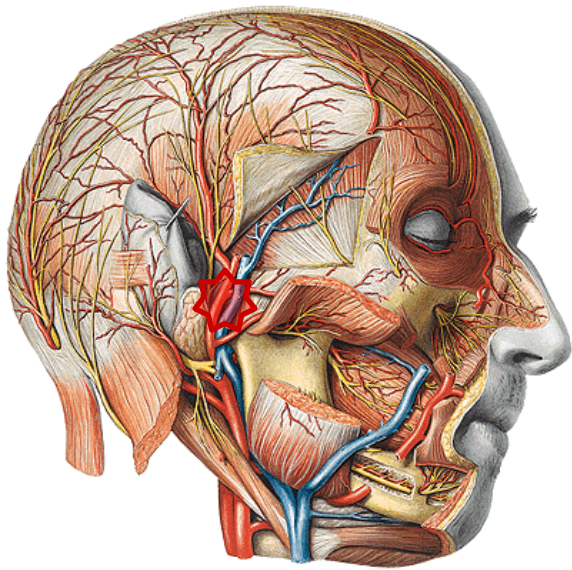
Cranial meninges

- Skin**
- Dense subcutaneous tissue (many collagen fibers)**
- Aponeurosis (galea aponeurotic galea)**
- Sparse connective tissue**
- Periosteum (pericranium)**



# Epicranial (vault) muscle



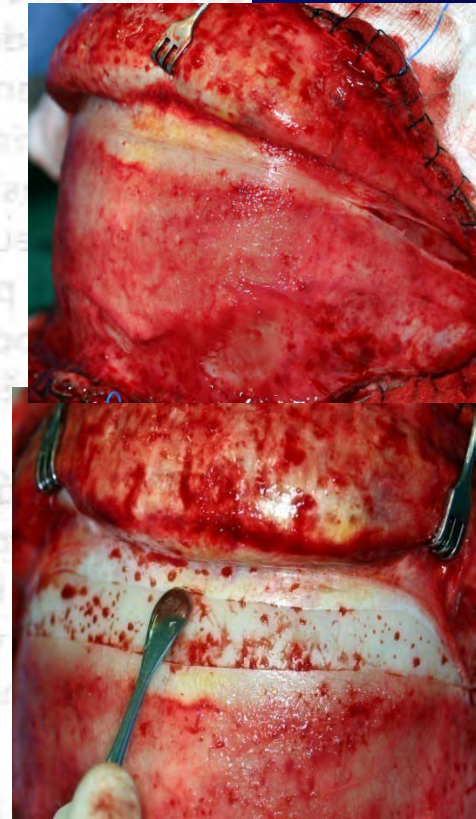
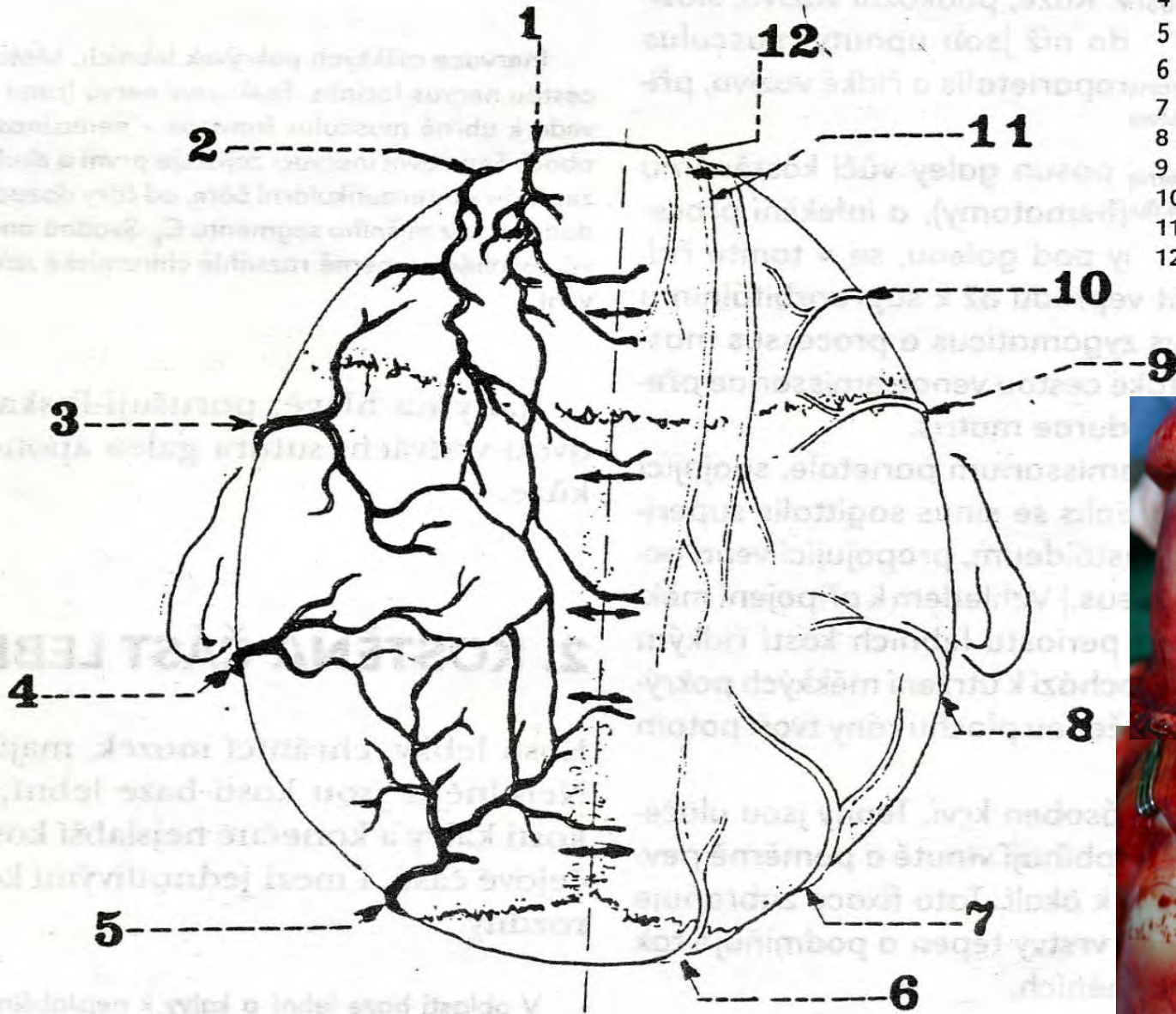


Veins - from v. venae jugularis externa, supraorbitalis, occipitalis

arteriae upraorbitales, superficiales temporales, posteriores auriculares, occipitales

nervi cervicales and trigeminal V<sub>1</sub>, V<sub>2</sub> branches

- 1 - a. supratrochlearis
- 2 - a. supraorbitalis
- 3 - a. temporalis superficialis
- 4 - a. auricularis posterior
- 5 - a. occipitalis
- 6 - n. occipitalis tertius
- 7 - n. occipitalis major
- 8 - n. occipitalis minor
- 9 - n. auriculotemporalis
- 10 - n. zygomaticotemporalis
- 11 - n. supraorbitalis
- 12 - n. supratrochlearis



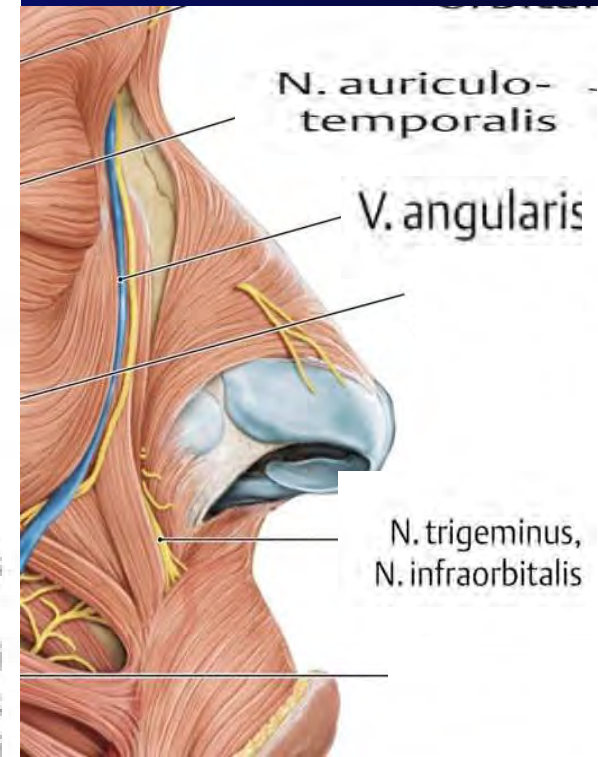
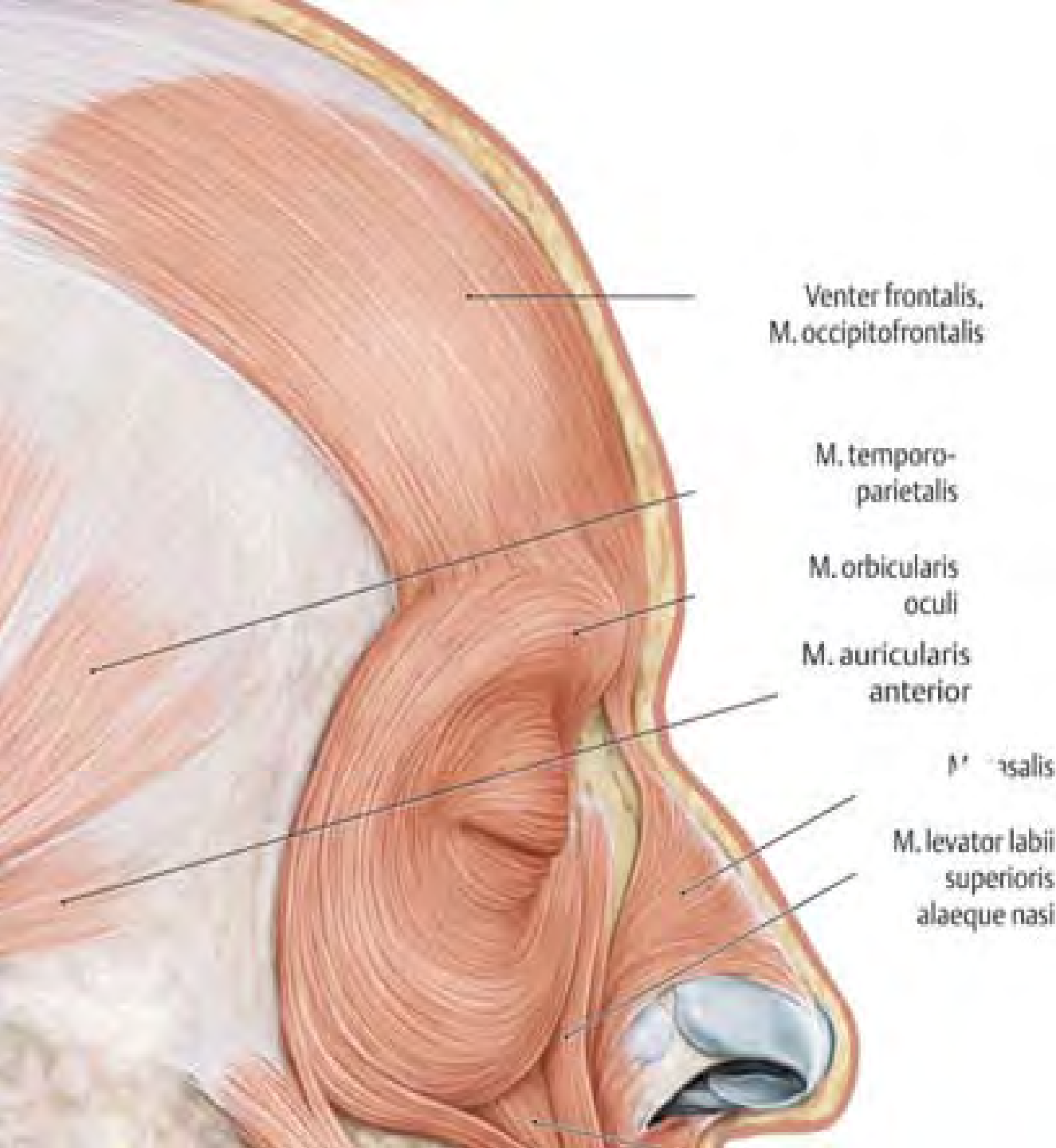


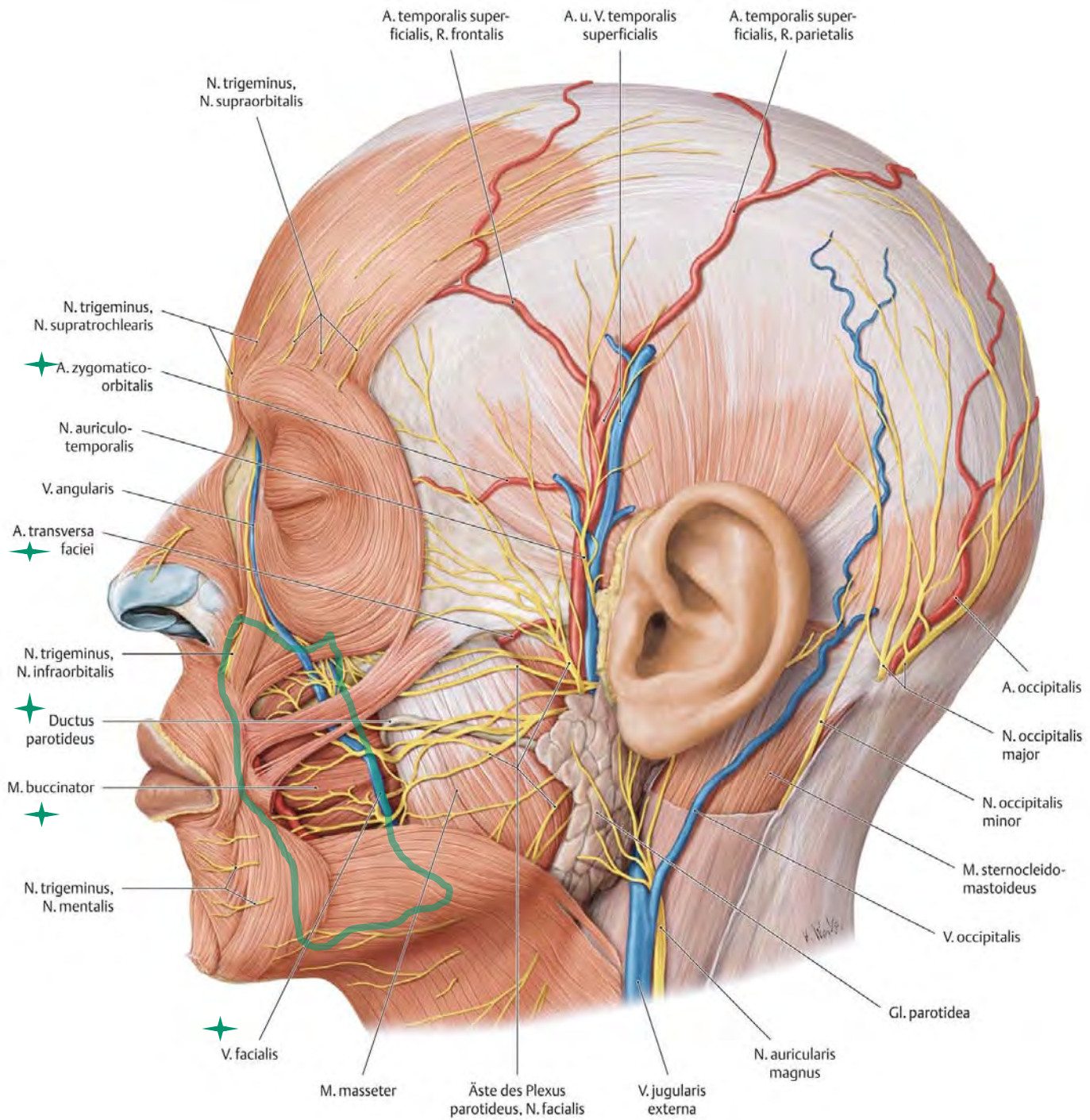
Brýlový hematom

Hematoma in eyelids “spectacle haematoma“

# Regio nasalis

## Nasal region

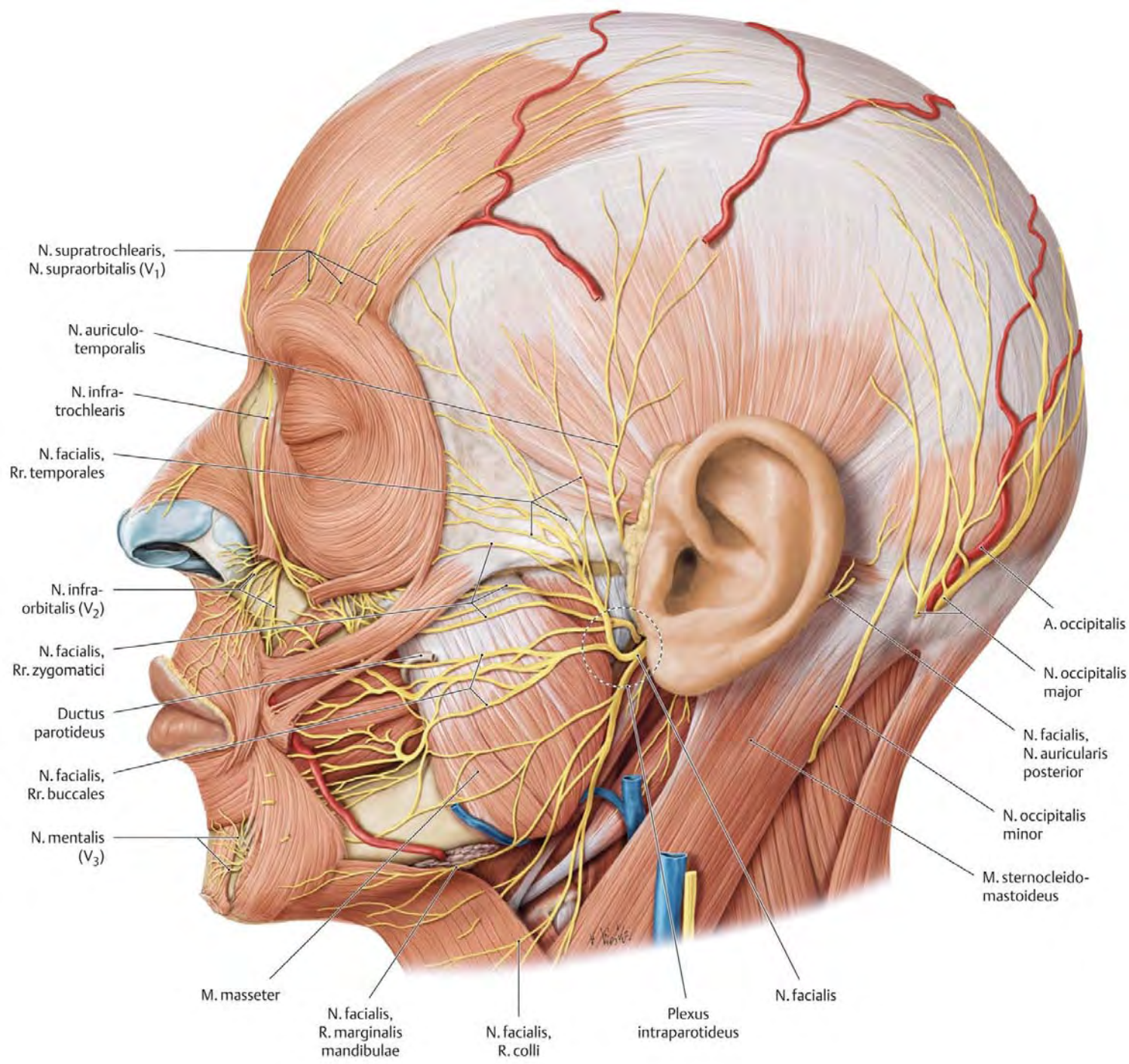




# Regio buccalis

# Buccal region





N. supratrochlearis,  
N. supraorbitalis (V<sub>1</sub>)

N. auriculo-temporalis

N. infra-trochlearis

N. facialis,  
Rr. temporales

N. infra-orbitalis (V<sub>2</sub>)

N. facialis,  
Rr. zygomatici

Ductus parotideus

N. facialis,  
Rr. buccales

N. mentalis (V<sub>3</sub>)

M. masseter

N. facialis,  
R. marginalis mandibulae

N. facialis,  
R. colli

Plexus intraparotideus

N. facialis

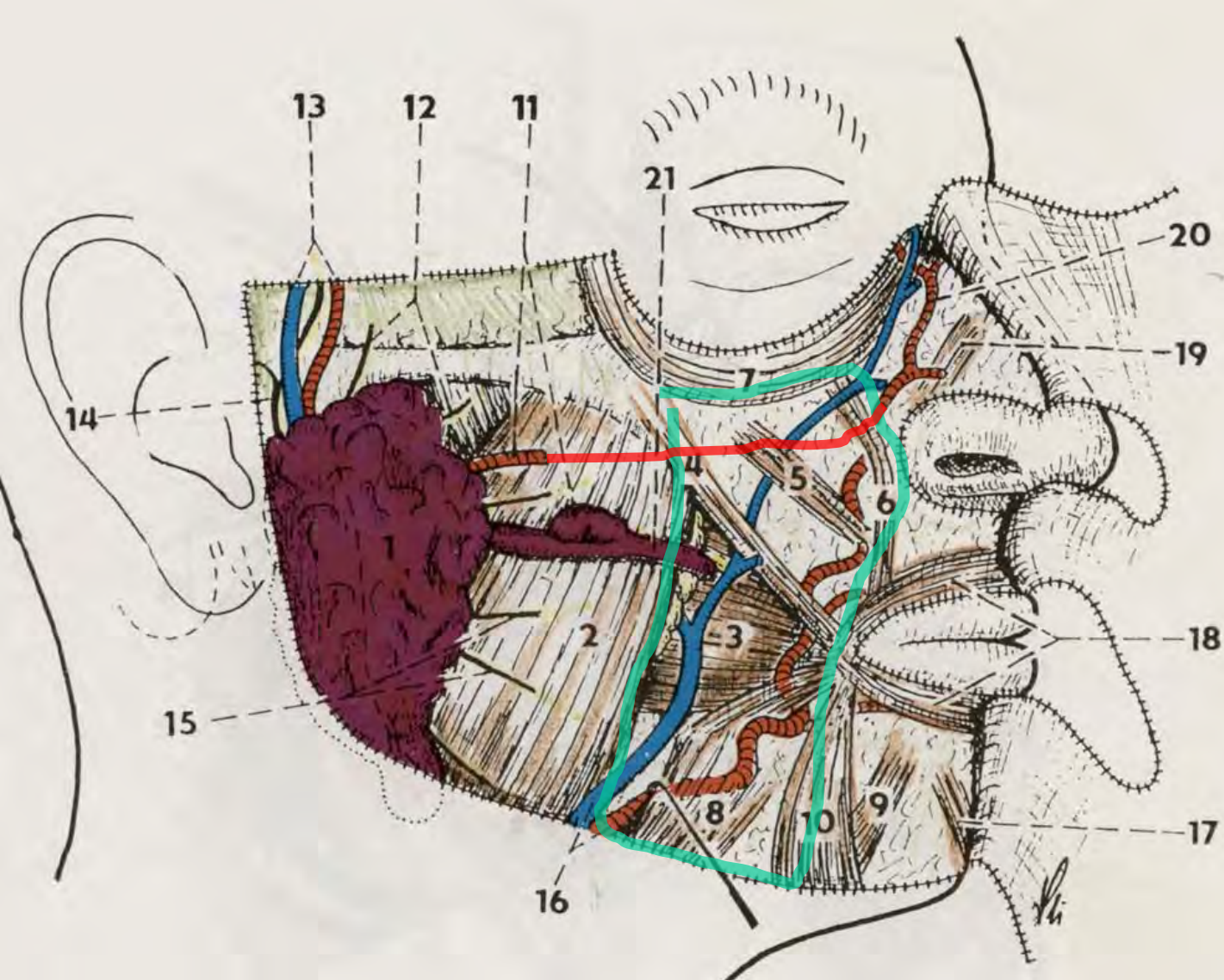
A. occipitalis

N. occipitalis major

N. facialis,  
N. auricularis posterior

N. occipitalis minor

M. sternocleidomastoideus



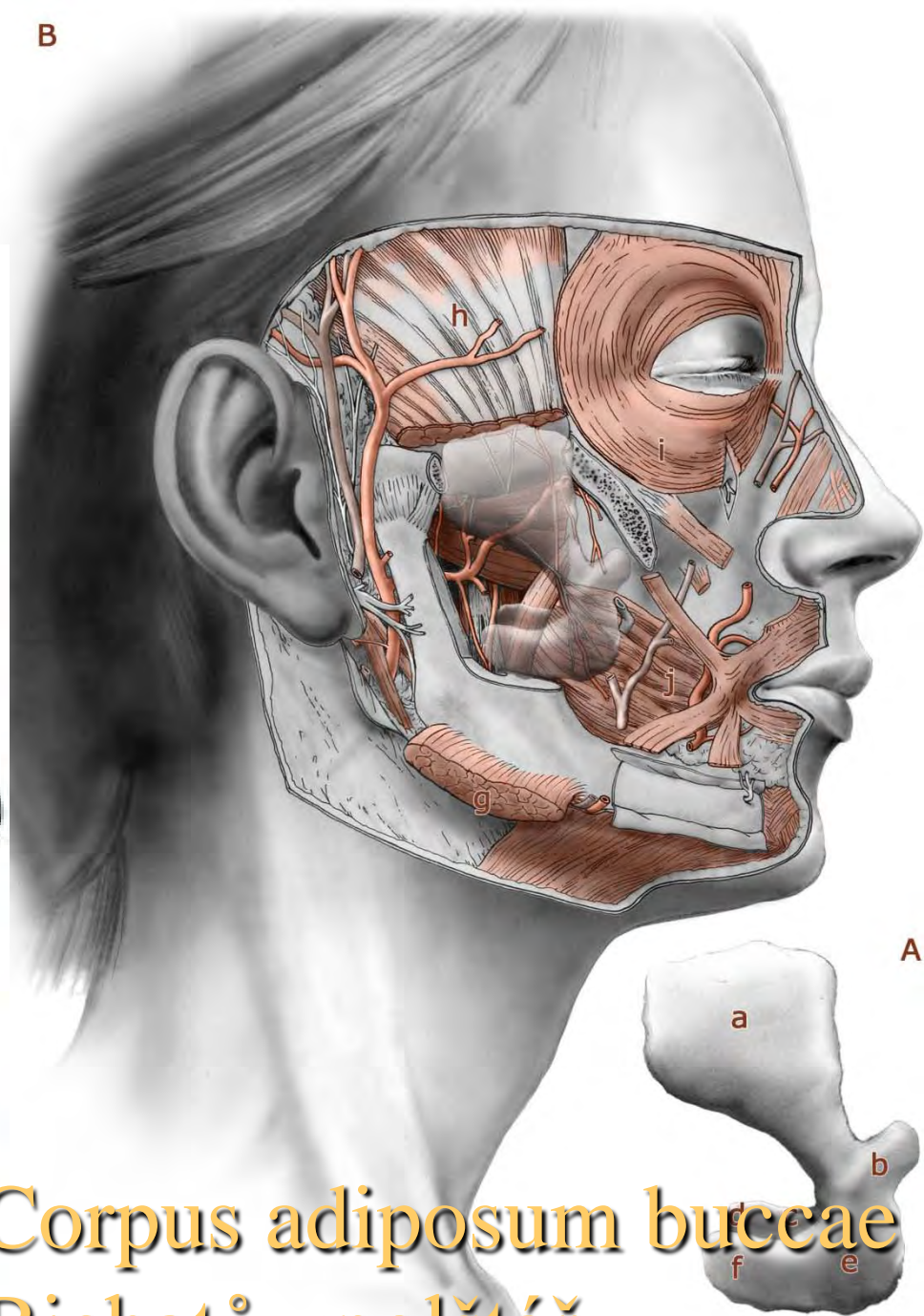
- 1 - glandula parotis
- 2 - m. masseter (pars superfic.)
- 3 - m. buccinator
- 4 - m. zygomaticus major
- 5 - m. zygomaticus minor
- 6 - m. levator labii superioris alaeque nasi
- 7 - m. orbicularis oculi (pars orbitalis)
- 8 - m. platysma
- 9 - m. depressor labii inferioris
- 10 - m. depressor anguli oris
- 11 - a. transversa faciei et gl. parotis accessoria

- 12 - r. temporalis et r. zygomaticus (n. VII.)
- 13 - a. et v. temporalis superfic.
- 14 - n. auriculotemporalis
- 15 - rr. buccales (n. VII.)
- 16 - a. et v. facialis
- 17 - m. mentalis
- 18 - m. orbicularis oris
- 19 - m. nasalis
- 20 - a. angularis
- 21 - ductus parotideus

## Regio buccalis

### Buccal region

# Regio buccalis et infraorbitalis



Corpus adiposum buccae  
Bichatův polštář



Fig. 115a The buccal fat pad and its processes (after Kahn, Sick, and Koritké 1988 after Bichat 1901)

- 1 Inferior portion of fat pad (jugal part)
- 2 Superior portion (latero-orbital part, laterosinusoidal part)
- 3 Masseteric process
- 4 Superficial temporal process
- 5 Deep temporal process
- 6 Pterygomandibular process
- 7 Interpterygoid process and pterygomandibular process
- 8 Sphenopalatine process
- 9 Inferior orbital process

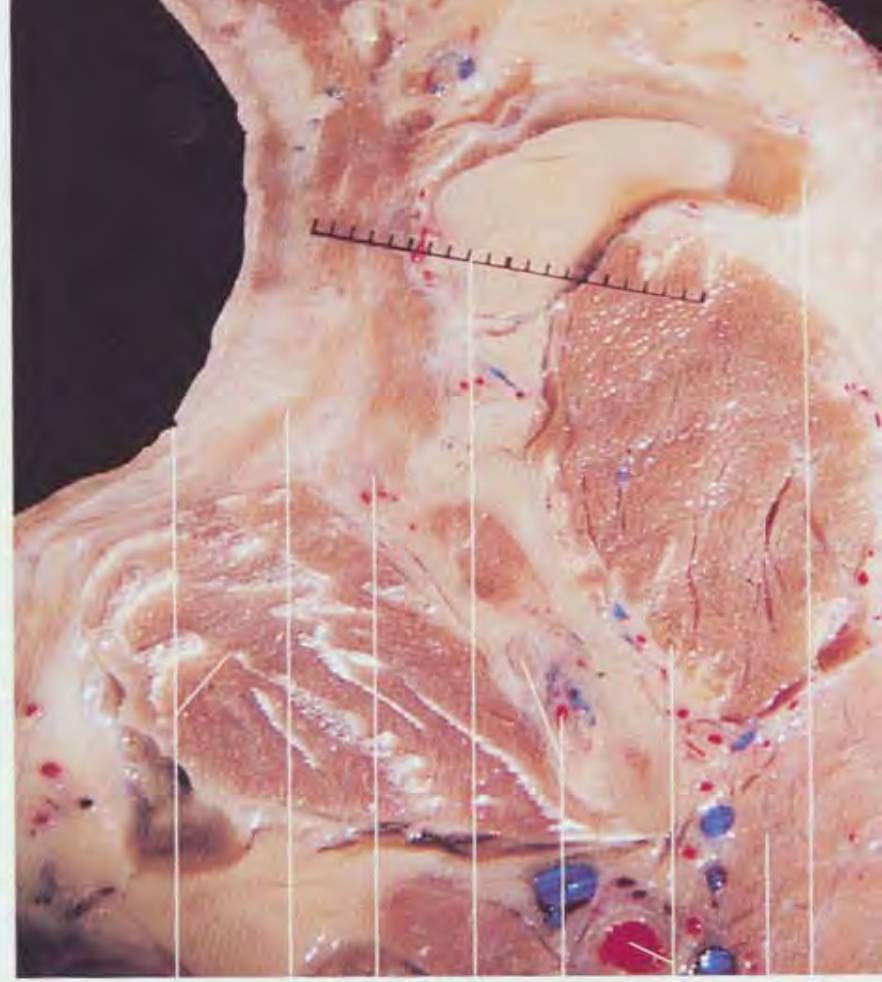
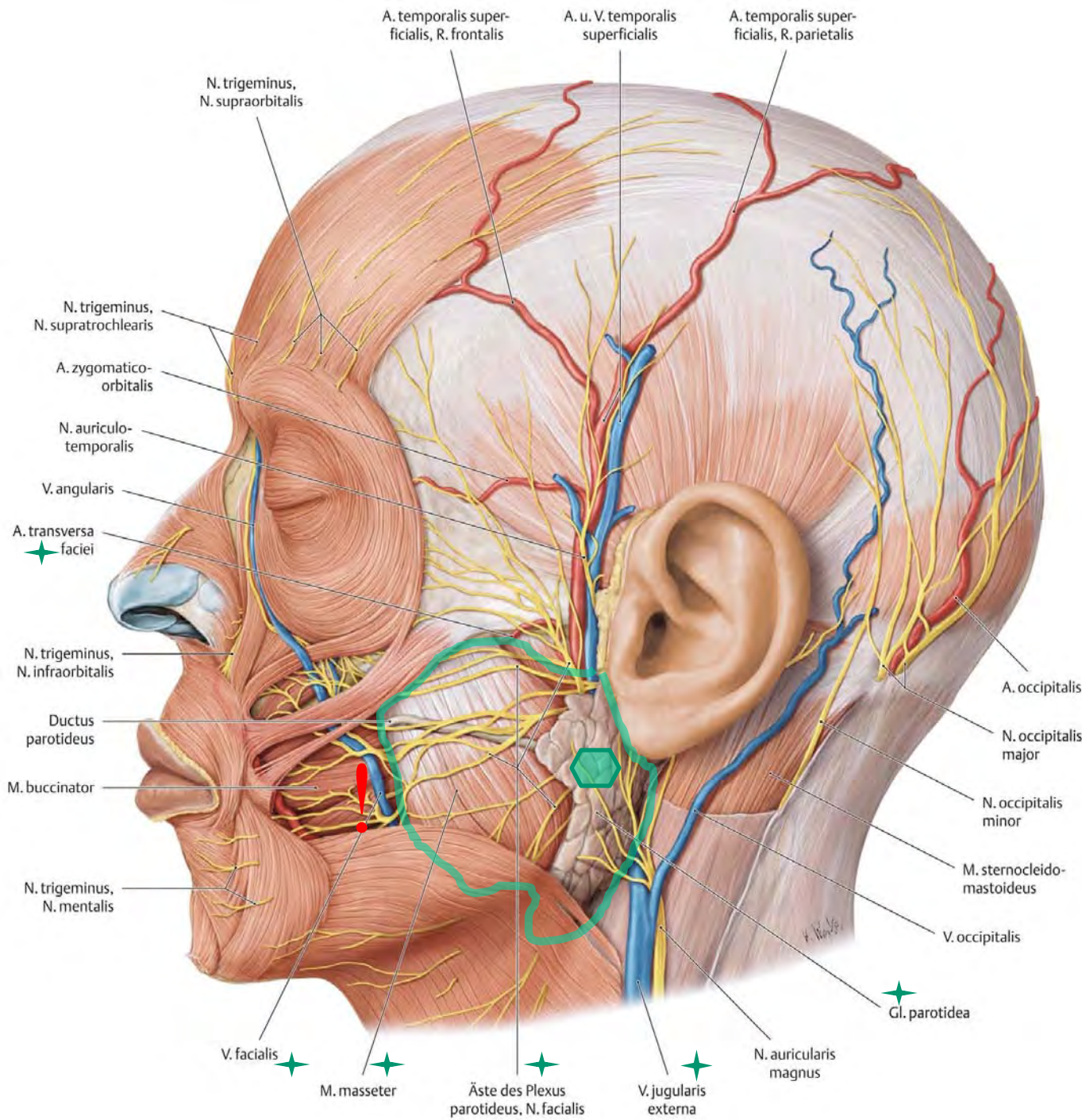


Fig. 115b Buccal fat pad in a 67-year-old man

- 1 Oral mucosa and medial pterygoid muscle
- 2 Posterior and medial fibers of buccinator muscle
- 3 Mandibular insertion of buccinator muscle
- 4 Buccal fat pad and millimeter scale
- 5 Inferior alveolar nerve and artery (canal segment)
- 6 Masseter muscle and external carotid artery
- 7 Parotid gland
- 8 Fascia of buccal fat pad

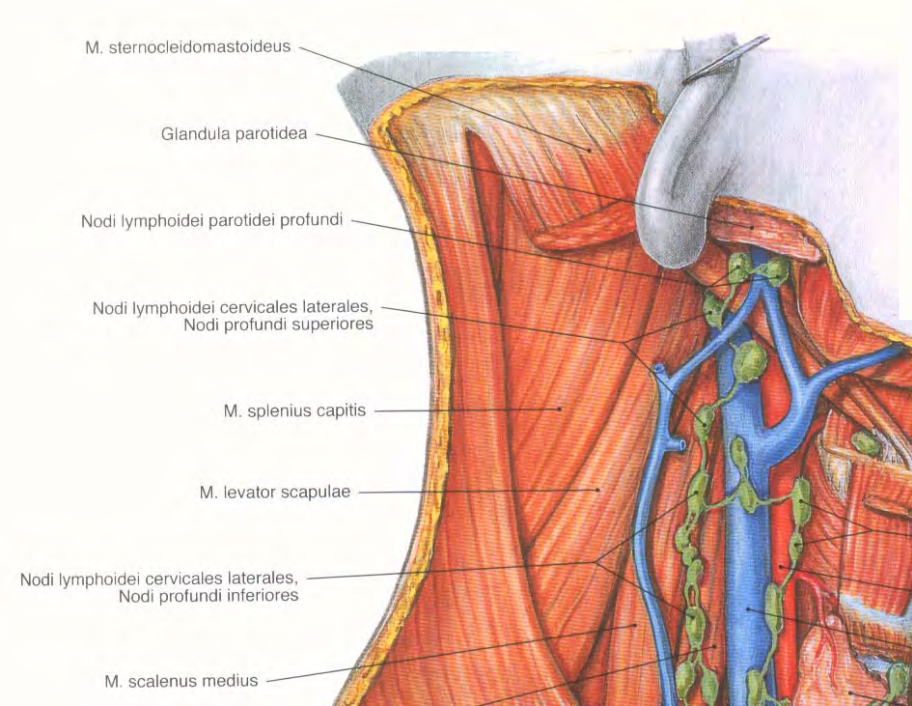
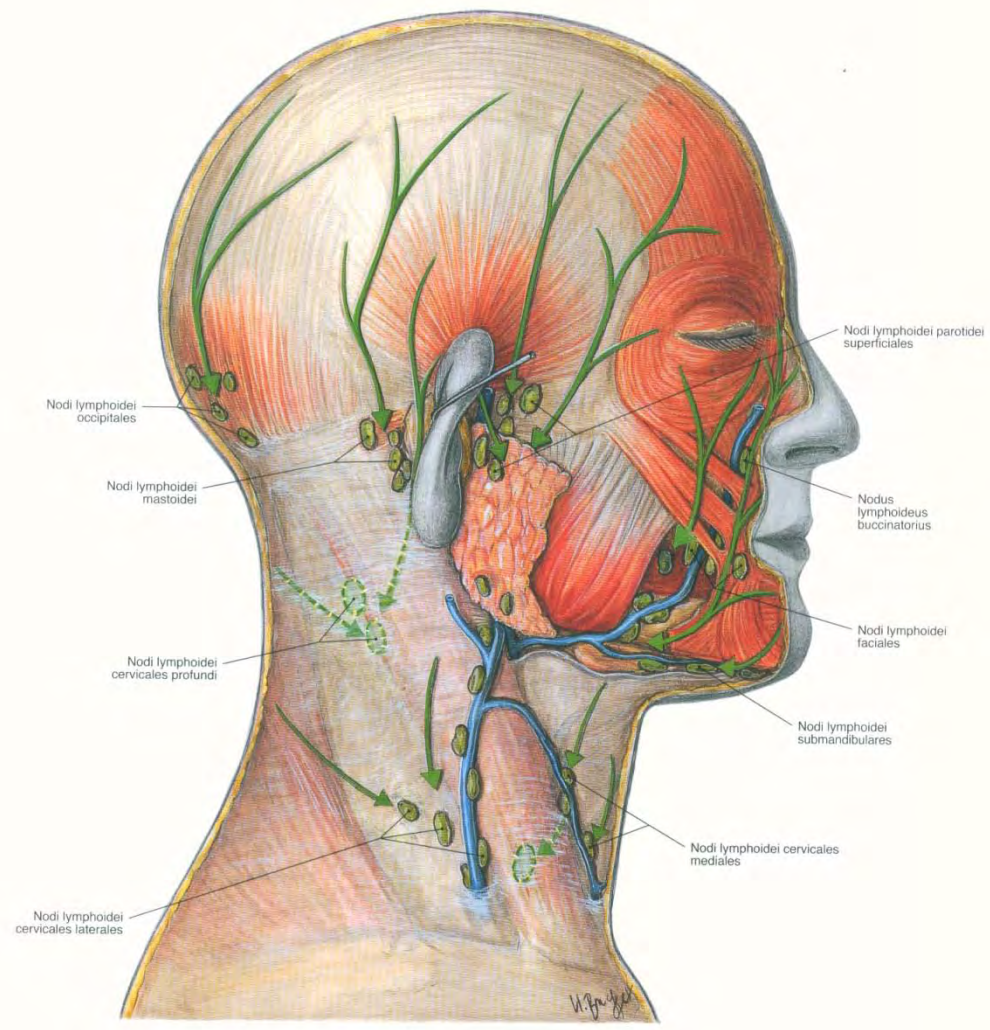


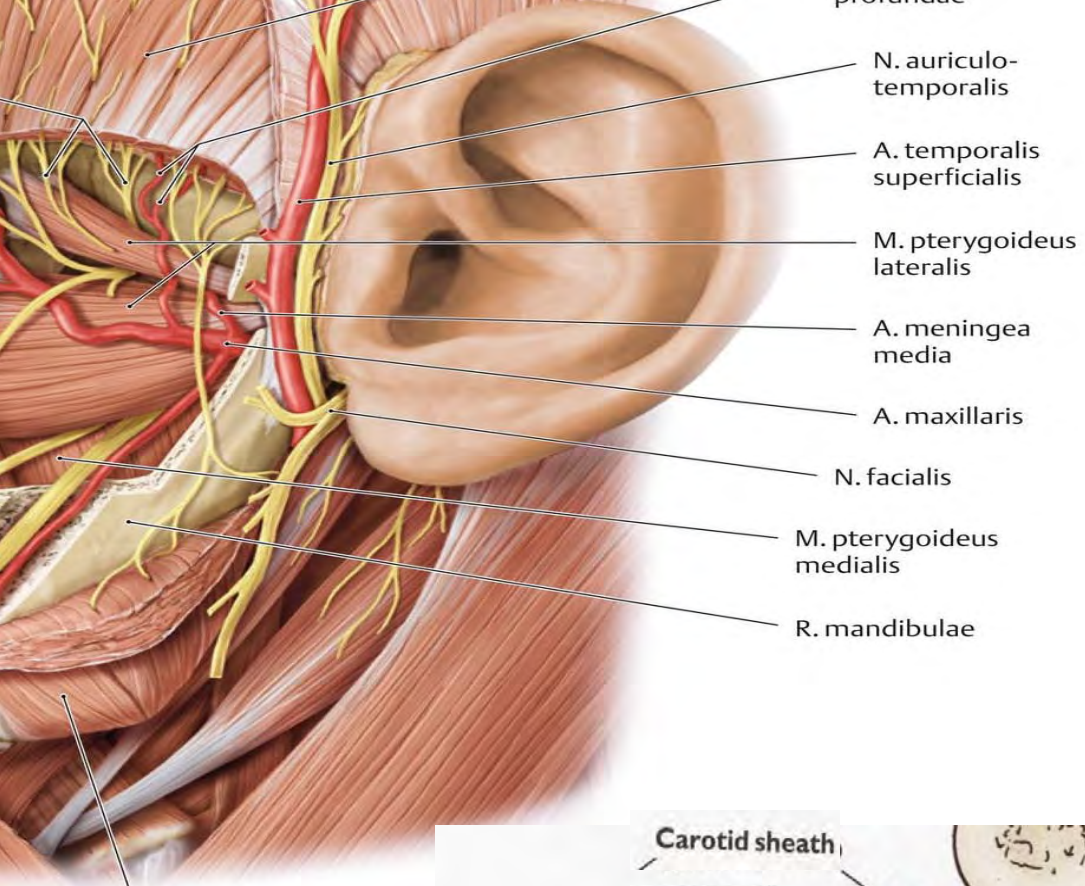
# Regio parotideo masseterica

# Parotideo masseteric region

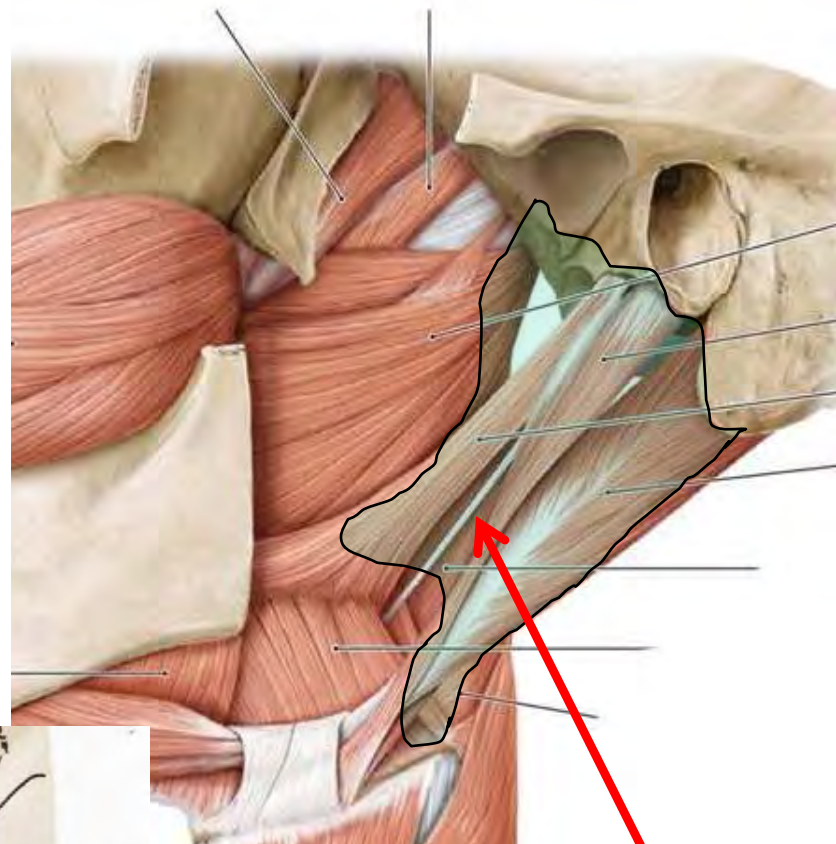
Nodi lymphatici parotidei  
Parotid nodes



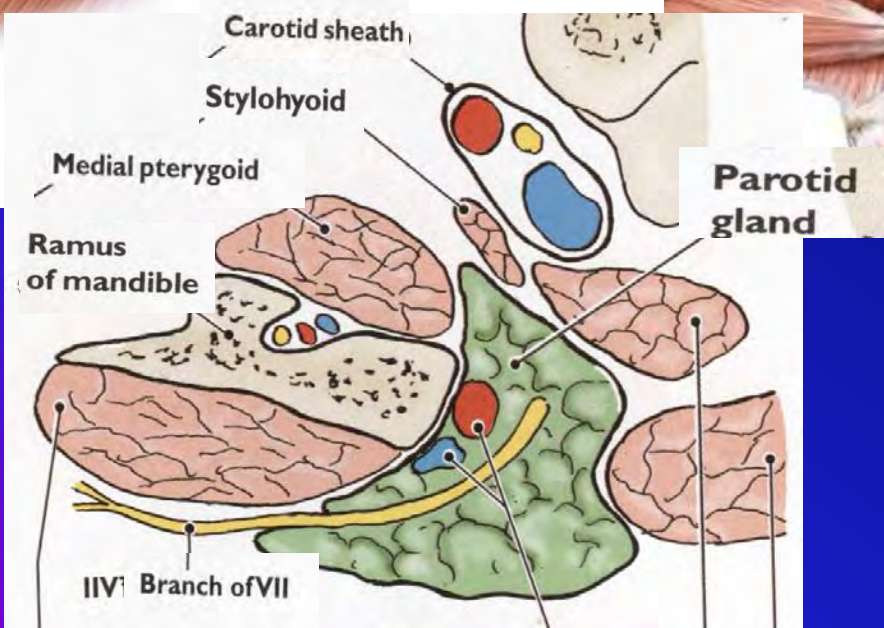




M. masseter



**Septum styloideum**



Mediální stěna spatium parotideum  
 Medial wall of parotid space

Tumour of parotid gl. Compress CN  
VII. – ipsilateral peripheral palsy  
(Bell's palsy).

Ptosis of mouth corner and lower  
eylid.





t. frontale

glabella

m. supraorbitalis

s. frontozygomatica

i. supraorbitalis et supratrochlearis

c. lacrimalis ant., lig. palp. mediale

m. infraorbitalis, s. zygomaticomaxillaris

sp. nasalis ant., ap. piriformis

c. infrazygomatica

f. canina

juga alveolaria

ang. mandibulae

corp. mandibulae

prot. mentalis

tub. mentale

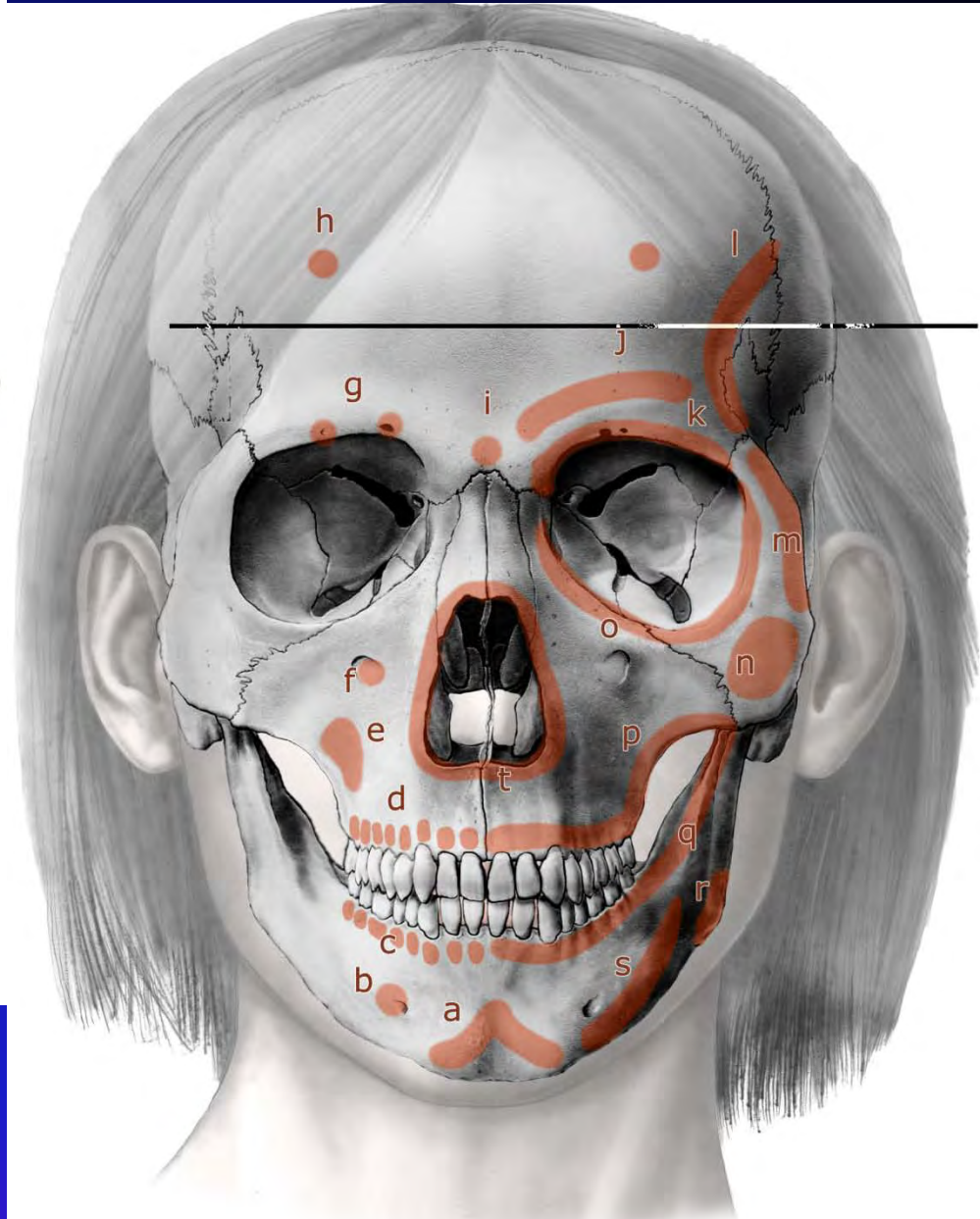


# Testing pictures

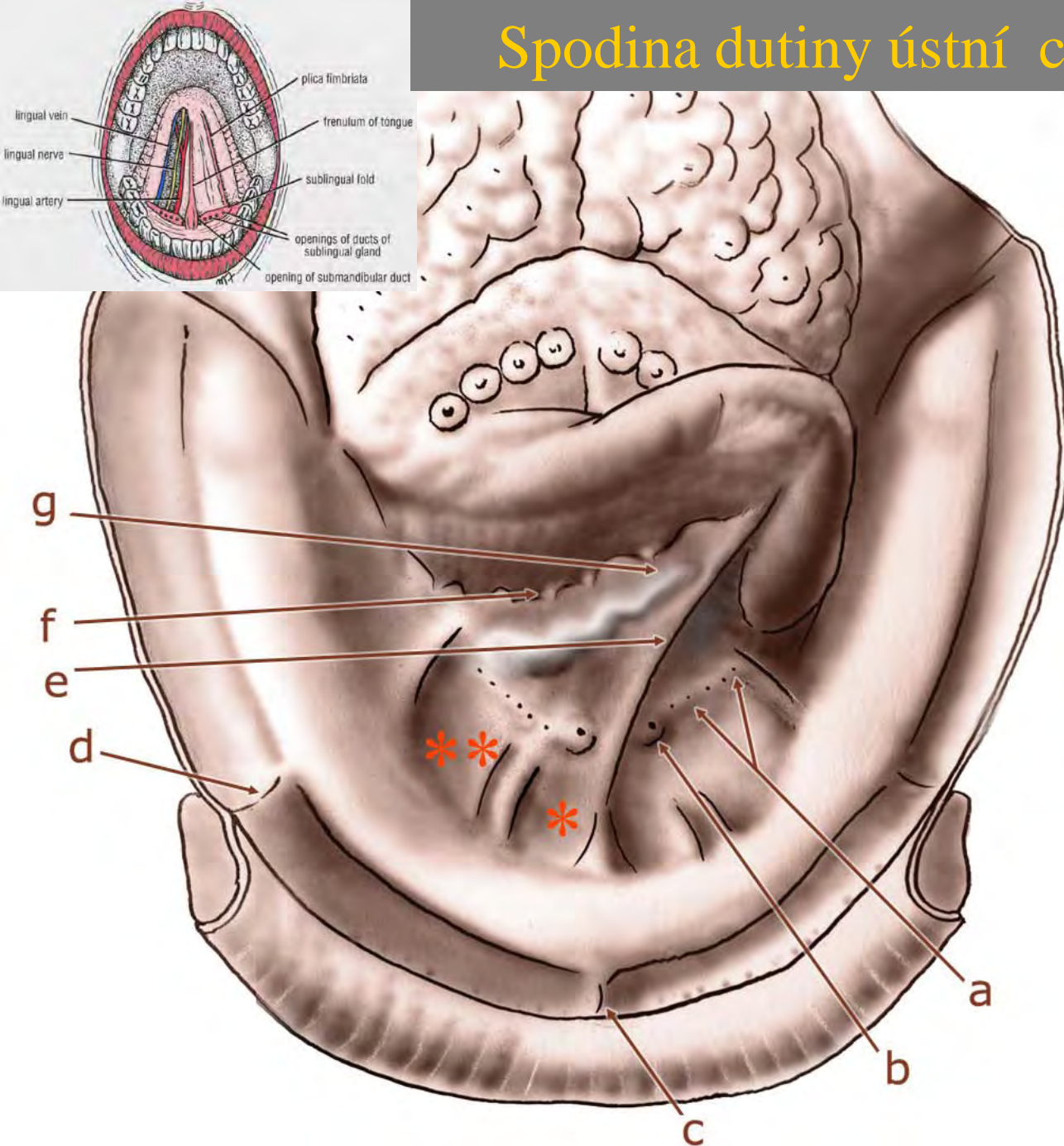


# Palpable structures

# Hmatné struktúry



# Spodina dutiny ústní cavum oris bottom



a Plica sublingualis

b Caruncula sublingualis

c Frenulum labii inferius

d Plica buccogingivalis

e Frenulum linguae

f Plica fimbriata

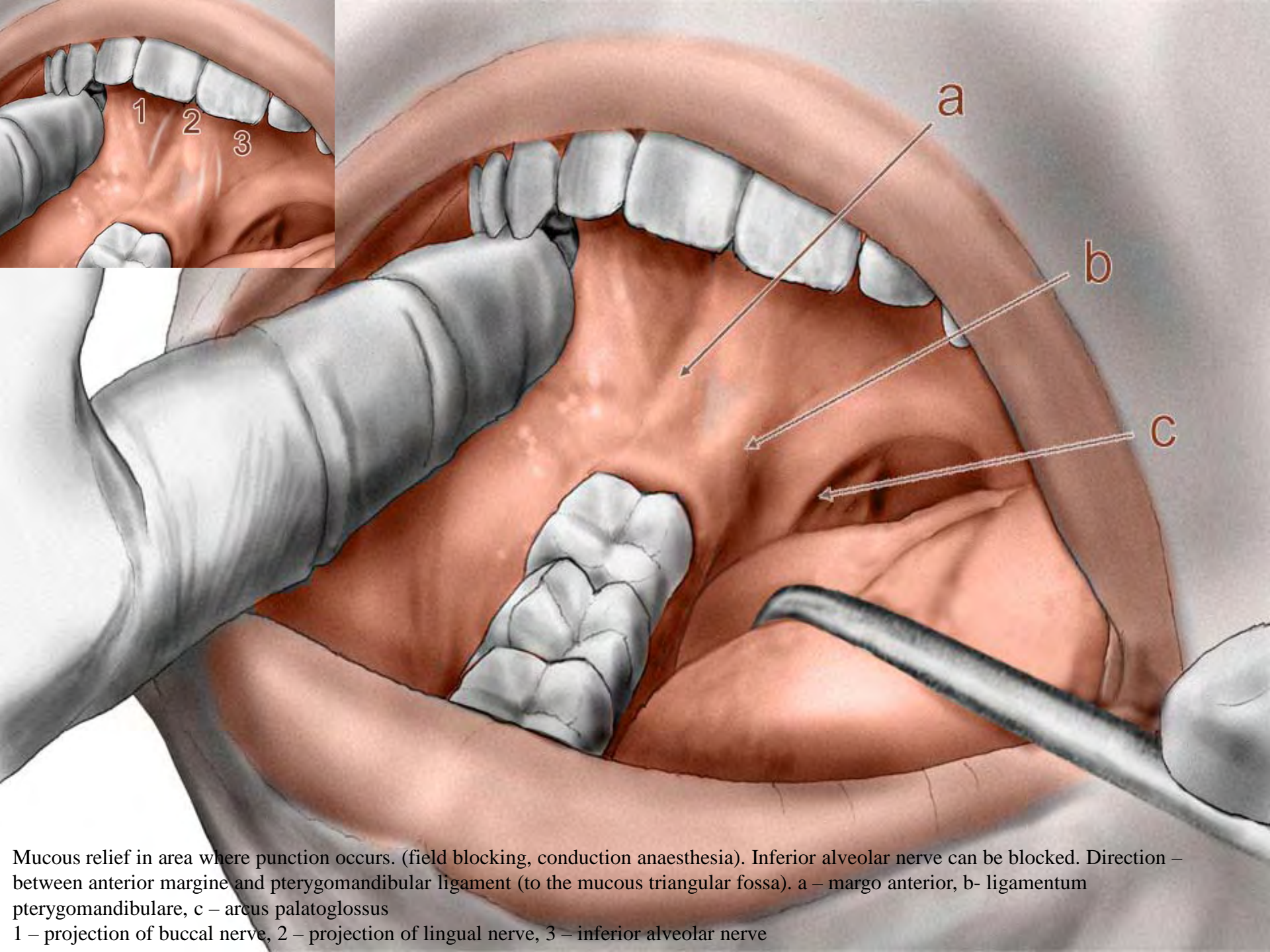
Plicae gingivolabiales

\* Area sublingualis

\*\* Area submandibularis

Canalis paralingualis

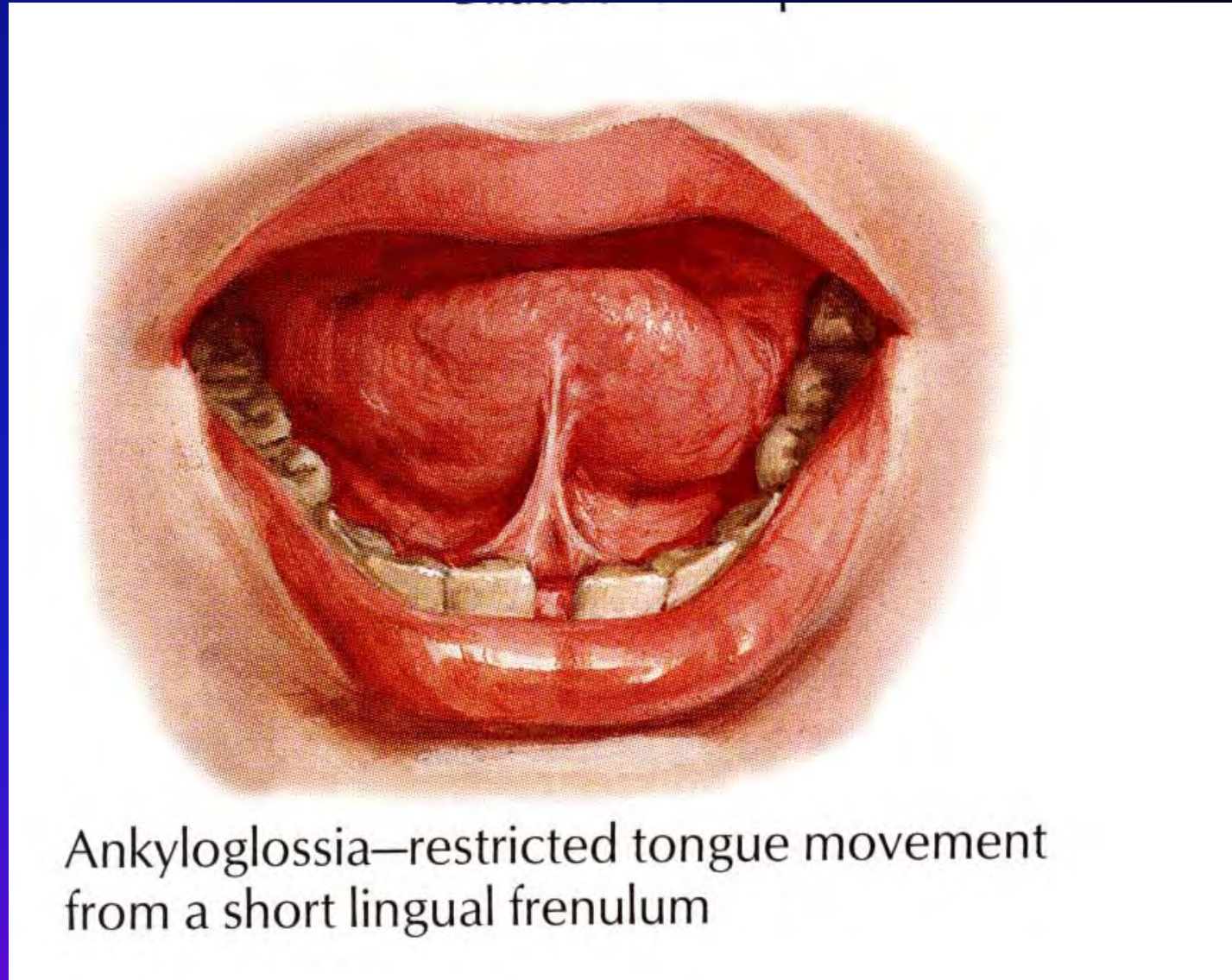
Paralingual canal =  
between hyoglossus and  
genioglossus



Mucous relief in area where puncture occurs. (field blocking, conduction anaesthesia). Inferior alveolar nerve can be blocked. Direction – between anterior margin and pterygomandibular ligament (to the mucous triangular fossa). a – margo anterior, b- ligamentum pterygomandibulare, c – arcus palatoglossus  
1 – projection of buccal nerve, 2 – projection of lingual nerve, 3 – inferior alveolar nerve



# Ankyloglossia — influence on oral cavity bottom formation



Ankyloglossia—restricted tongue movement from a short lingual frenulum

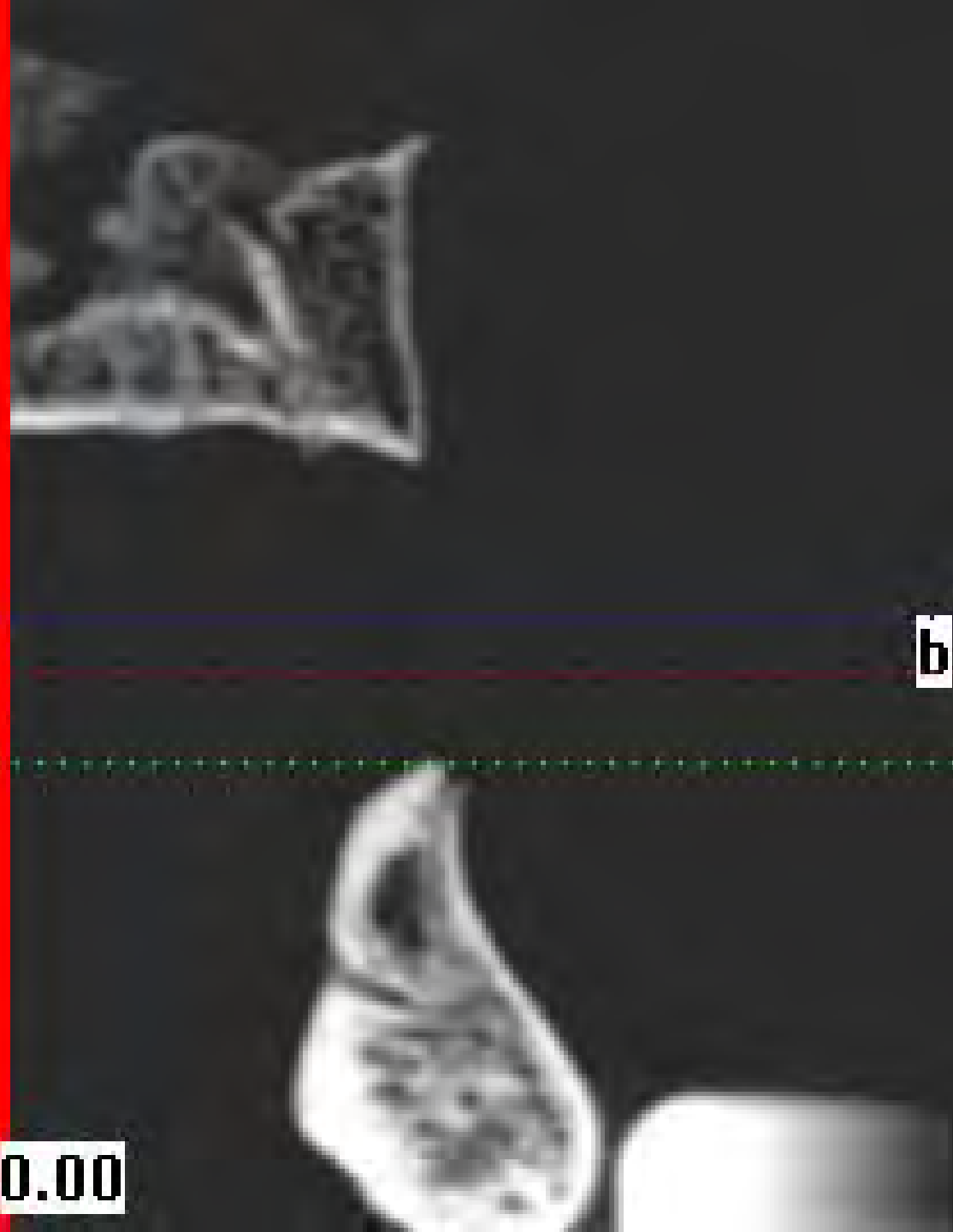
Tongue-tie —  
Ankyloglossia —  
fusion between  
tongue and floor  
of the mouth,  
Tongue  
frenulum  
extends to the  
tongue top

Combined with (Pierre-Robin, Treacher Collins syndromes)

# Ankyloglossia Tongue-tie

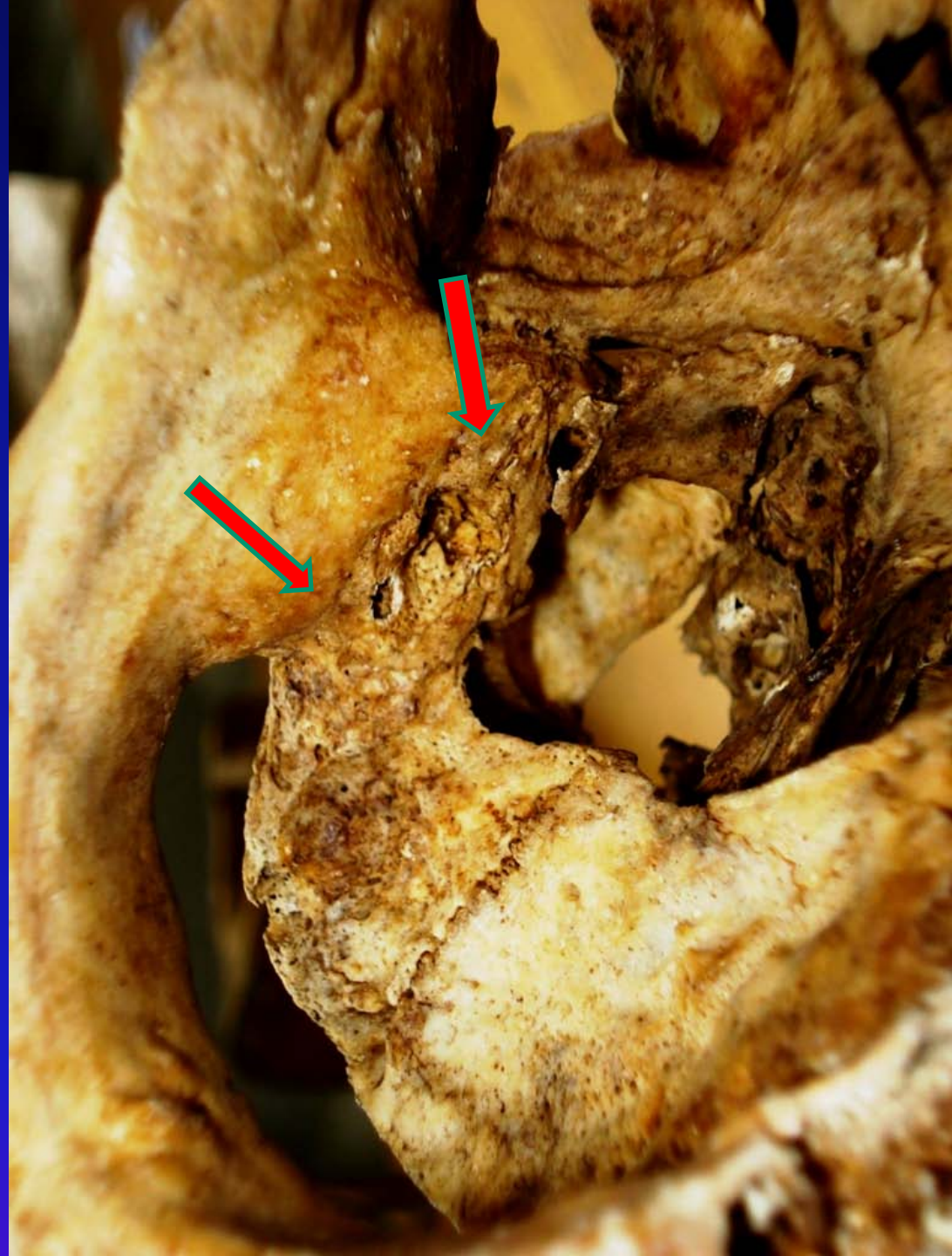


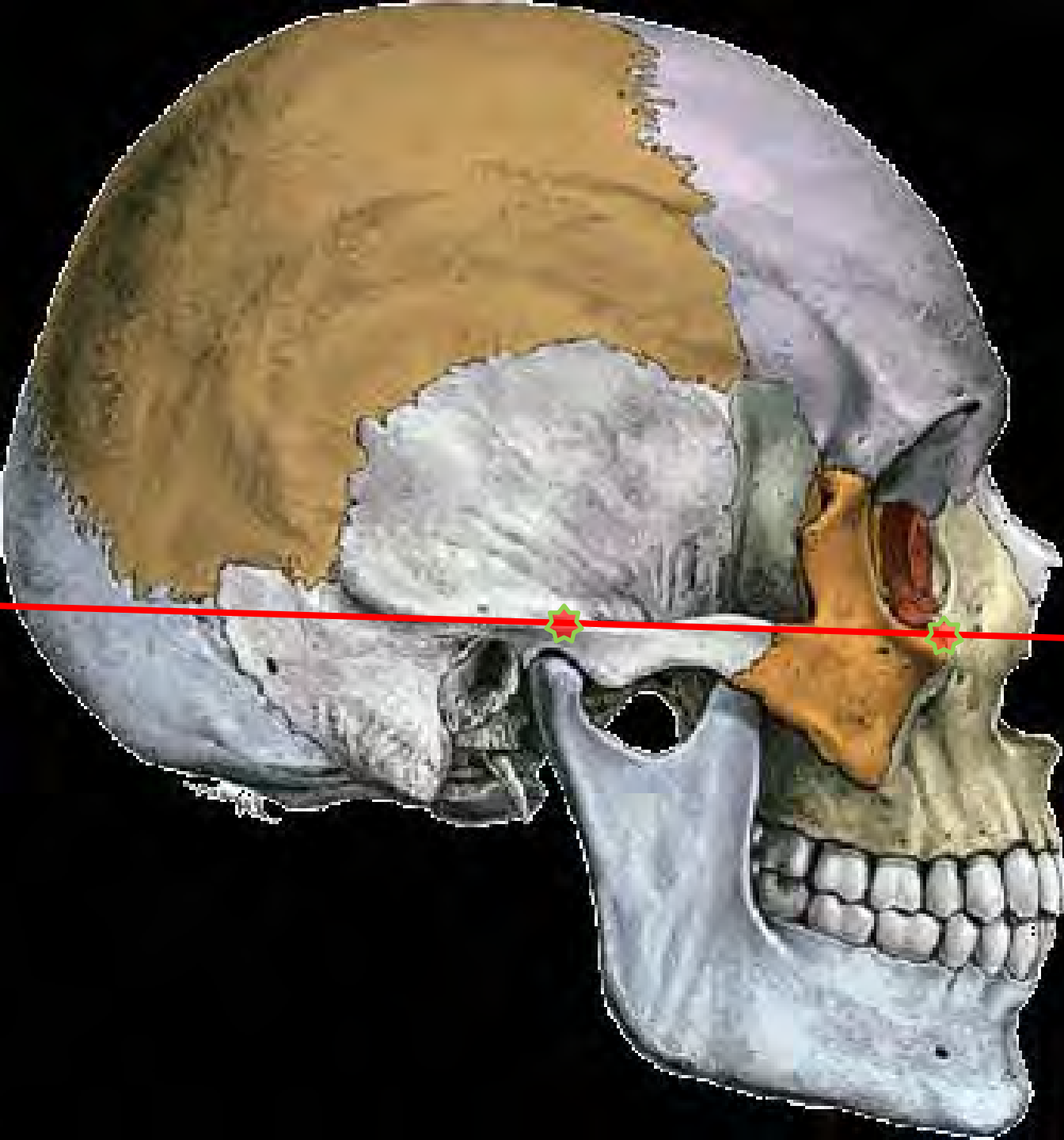




Tongue  
presses on  
alveolar  
crest, which  
is deviated  
ventrally

Palate is compressed and deformed; middle palatal suture is wide





Reidova čára,  
Linie lícní kosti,  
Frankfurtská  
horizontála

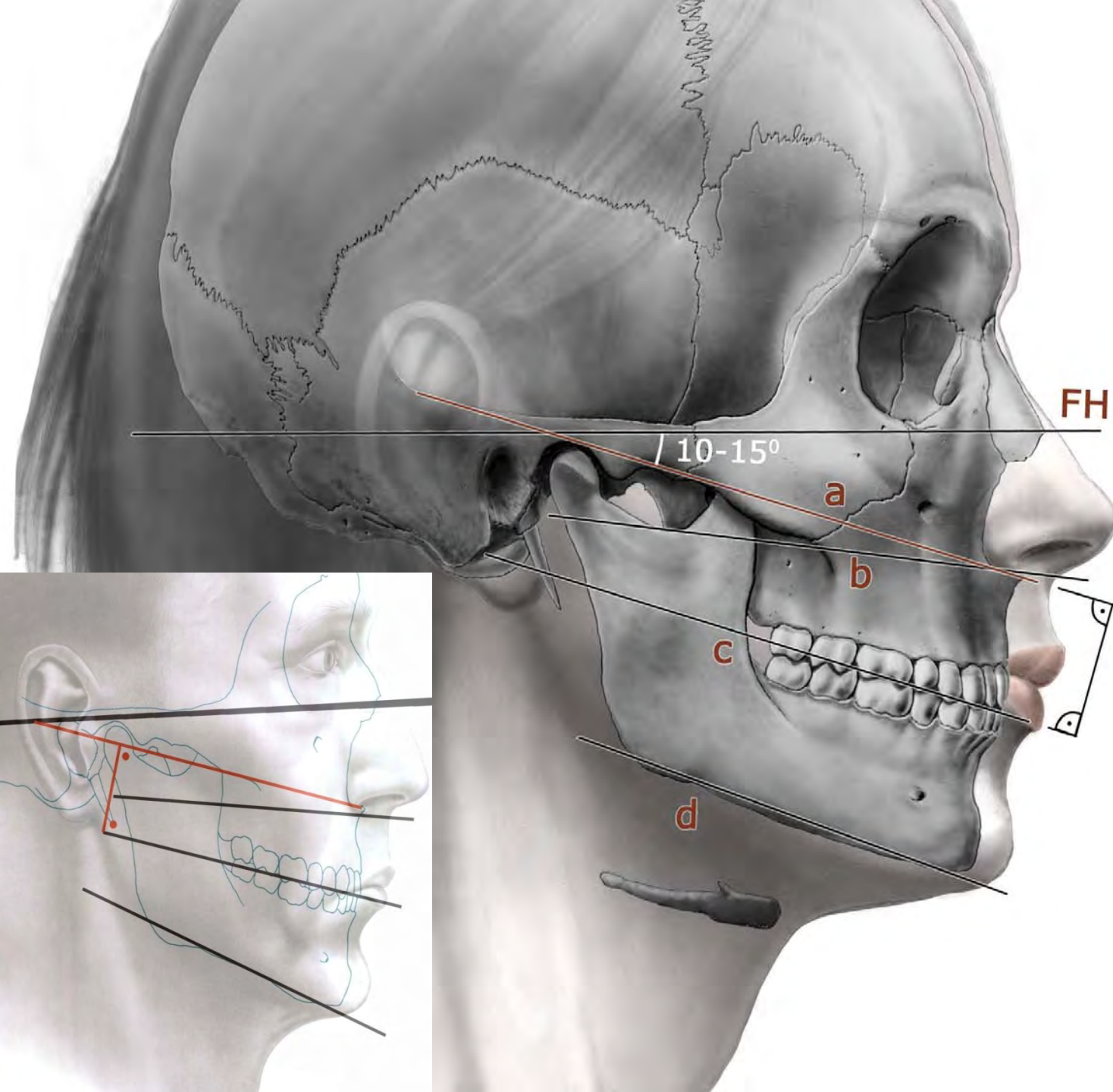
• **Frankfurter horizontale, eye ear line** (*linea horizontalis auriculoorbitalis*) German line, Reid's line (R. W. Reid, Scottish anatomist, 1851-1939)

-Line crossing the lowest point of osseous orbital margine – *punctum medioorbitale* and upper margine of external acoustic opening - *porus acusticus externus*.

It connects orbitale and porion points (or lower orbital margine and tragion).

It is parallel with zygomatic arch.

It serves for basic orientation of head or skull in space through e.g. X-ray examination. Between Reid's line and Camper prosthetic line there is  $10^{\circ}$  až  $15^{\circ}$  angle.



Determination of occlusal plane using Camper's plane; Its relation to the maxillary (b) and mandibular (d) planes

# Occlusal plane (bite plane, *planum occlusale*)

It is a plane crossing upper incisal point and tops of both the mesiobuccal tubercles of upper first molars.

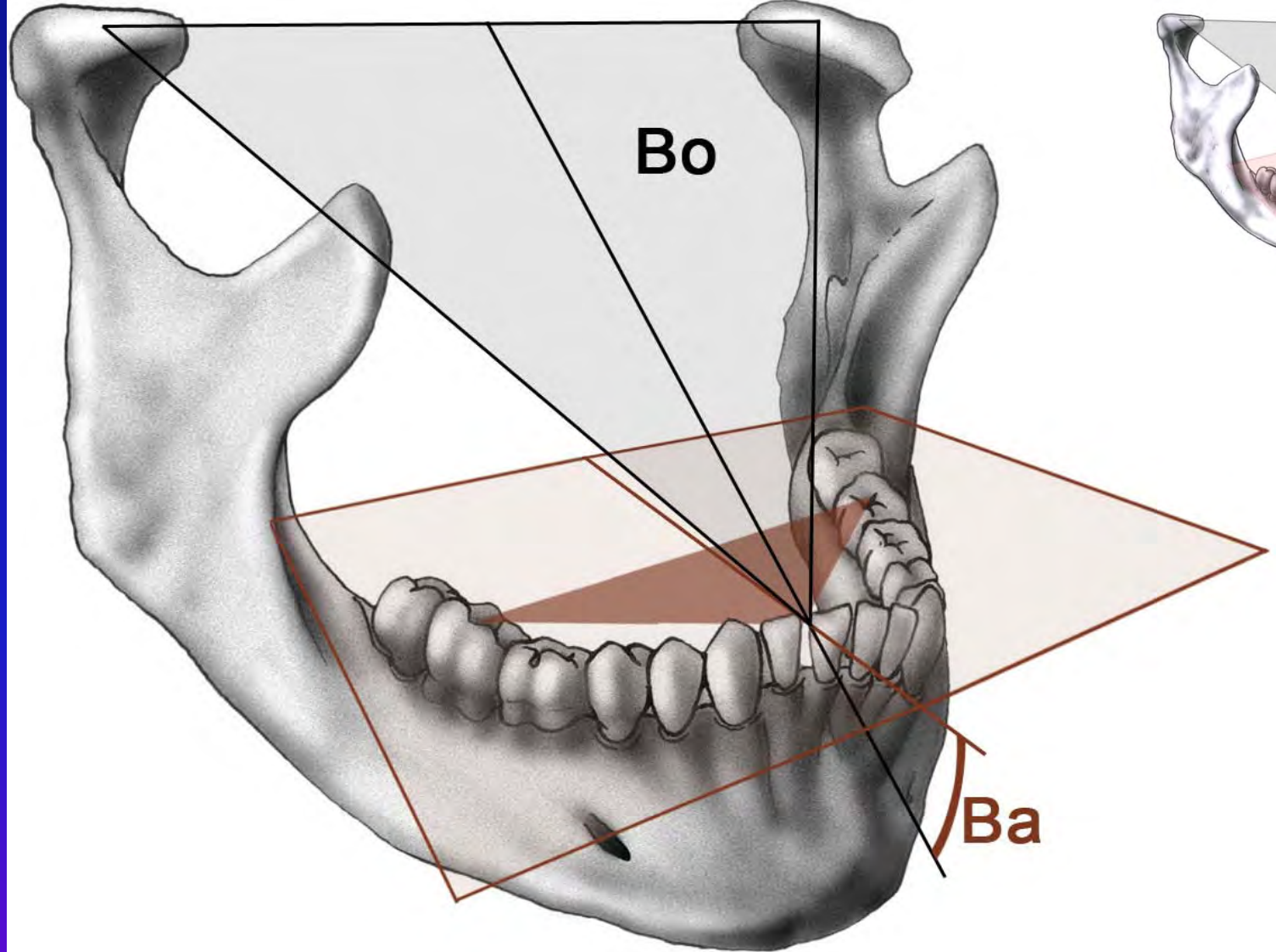
It is a plane crossing lower incisal point and tops of distobuccal tubercles of second lower molars. It is at level where upper and lower lips are touching each other.

## Other definitions -

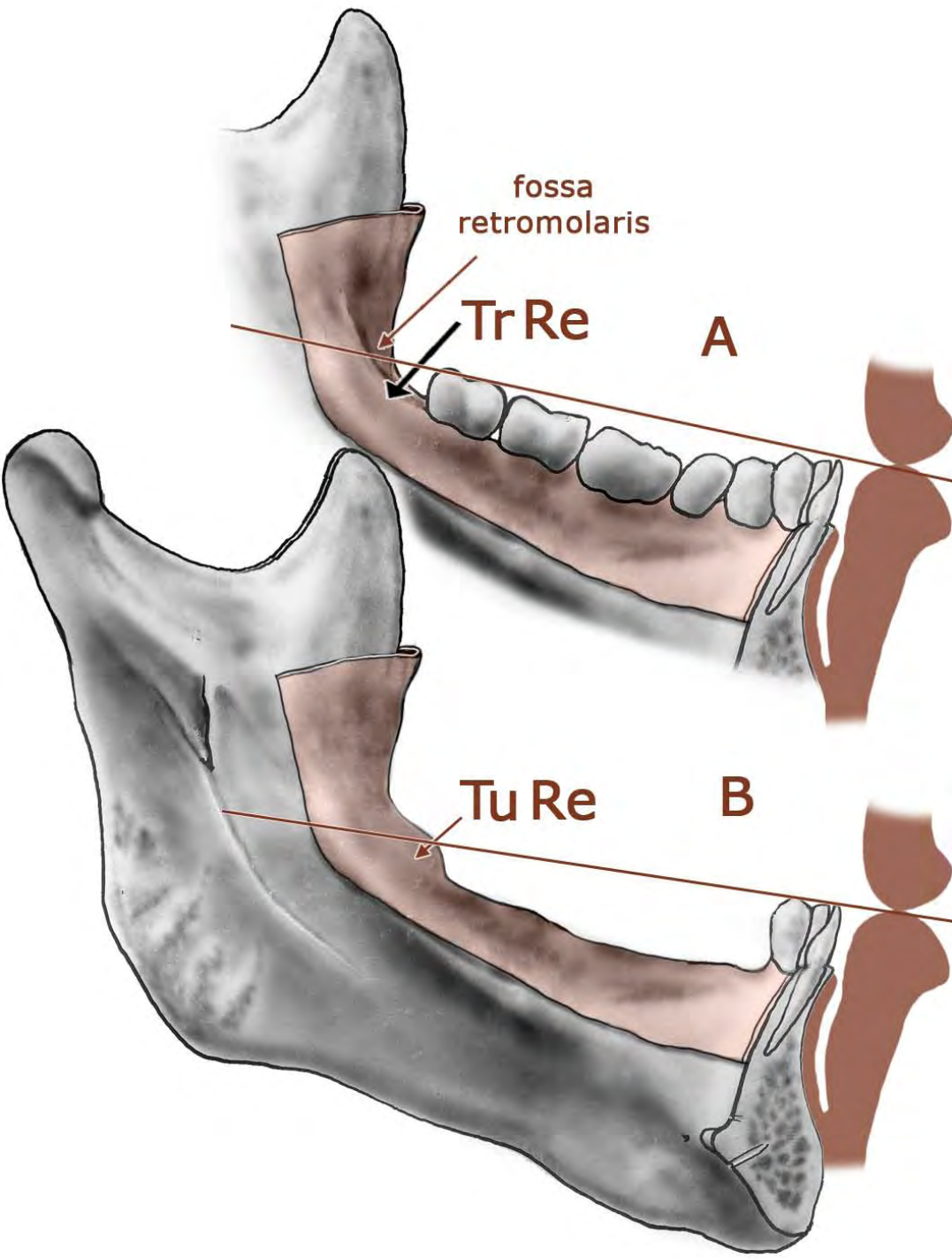
**it is a plane crossing upper incisal point and tops of distobuccal tubercles of second lower molars.**

**It is a plane crossing upper surface of lower lip, tops of canines, and retromolar triangle or tubercle on both the sides.**

It is a remnant of parodontium of wisdom tooth; alveolar bone below is not absorbed.



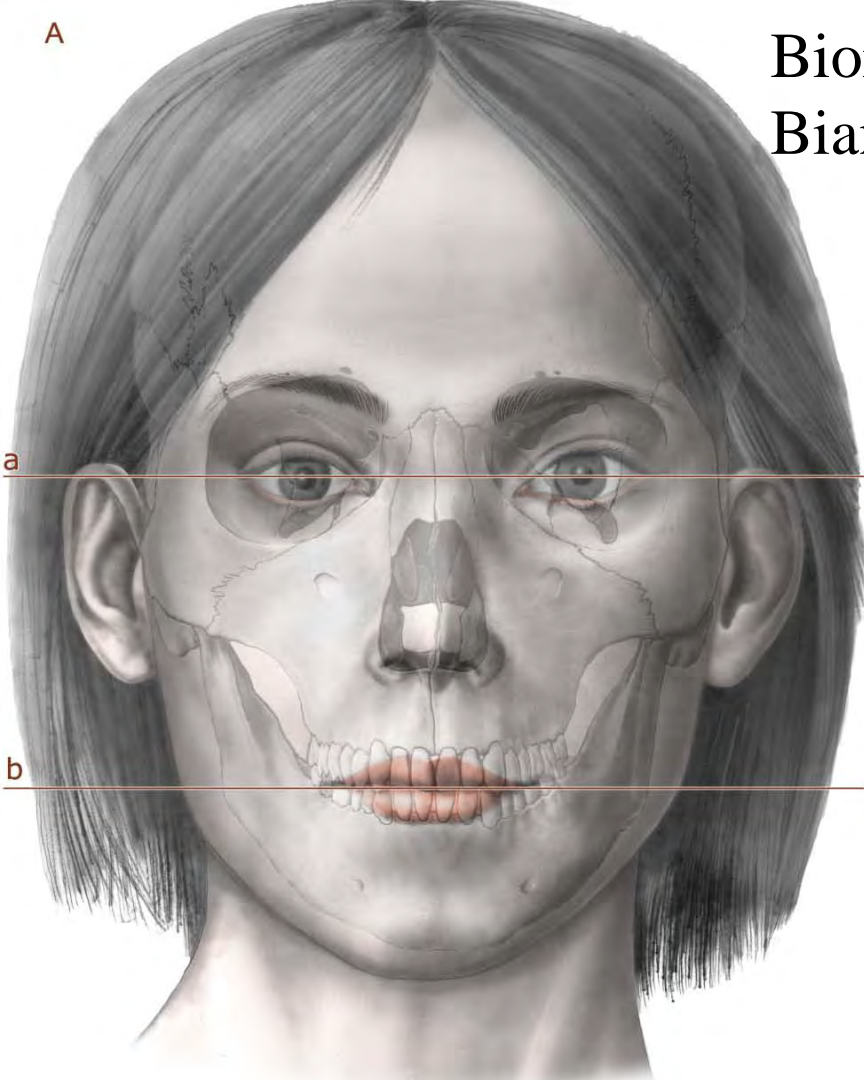
**Bonwillův trojúhelník** je rovnostranný trojúhelník, jehož vrcholy jsou dolní řezákový bod a geometrické středy kondylů mandibuly. Délka jeho jedné strany je asi 10,5 cm. Dotýkají se jej hroty dolních špičáků. Rovina trojúhelníku svírá s **okluzní rovinou** úhel 20° až 25° (**Balkwillův úhel**).



Determination  
of occlusal  
plane in the  
incomplete  
denture or after  
full teeth loose.



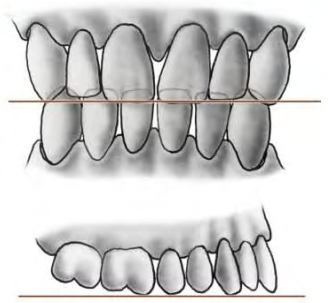
A



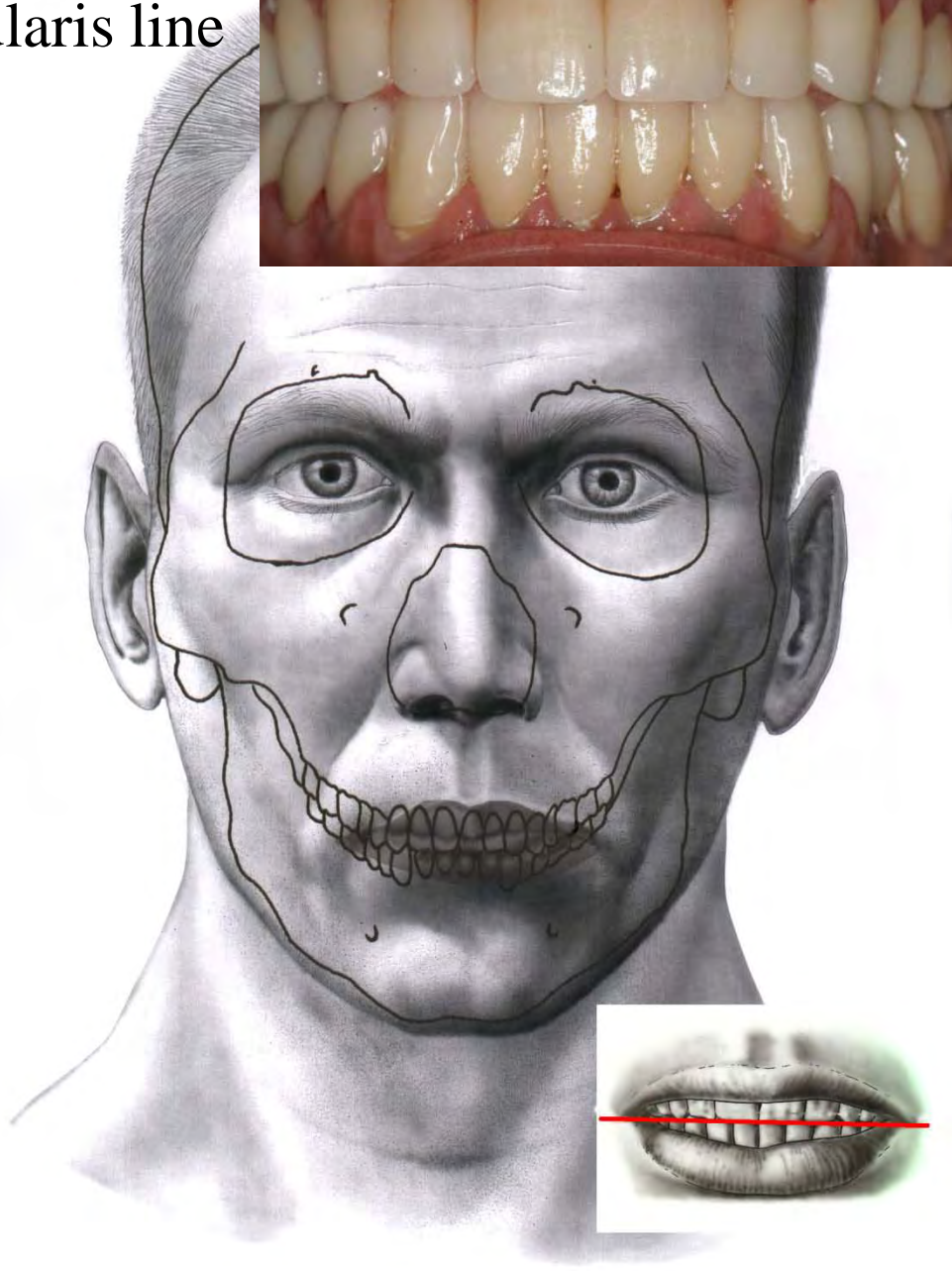
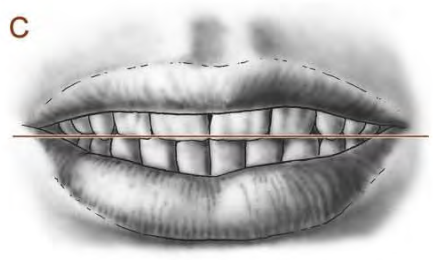
Biorbitalis line  
Biangularis line



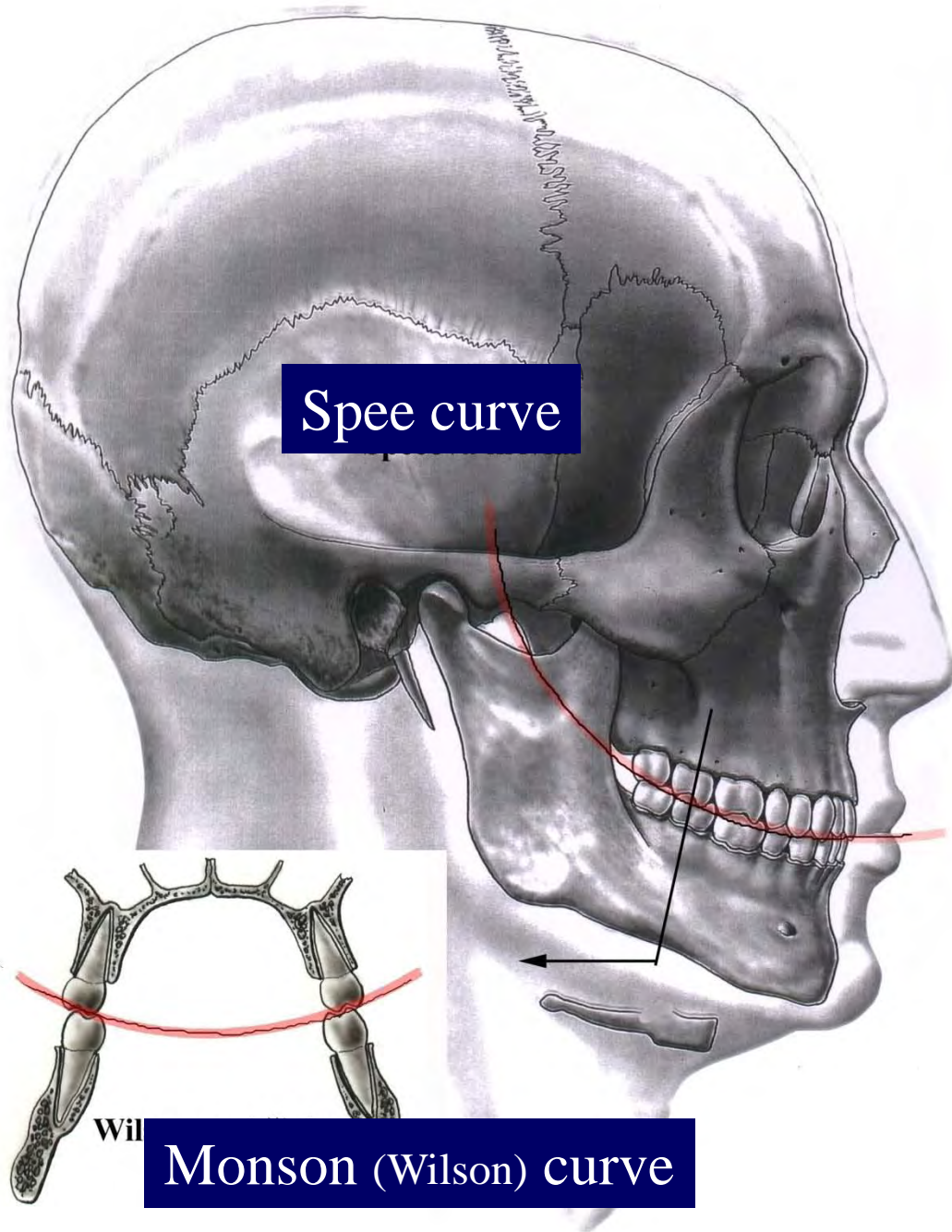
B



C



Ferdinand Graf von Spee  
(1855-1937), German embryologist



Curvatures of the occlusal plane – the curve of Spee.

George S. Monson  
(1869-1933), am. dentist

## **Skeletodental ní analýza, telerengenografie**

**Pravidelný a dobře utvářený chrup je výsledkem harmonického růstu a diferenciaci všech obličejových komponent.**

## **Skeletodental analysis, telertgenography**

**Harmonic and regular dentice – it is a result of harmonic growth and differentiation of all face components.**



Connie Culp



Defekt po  
střelném zranění a  
jeho oprava.

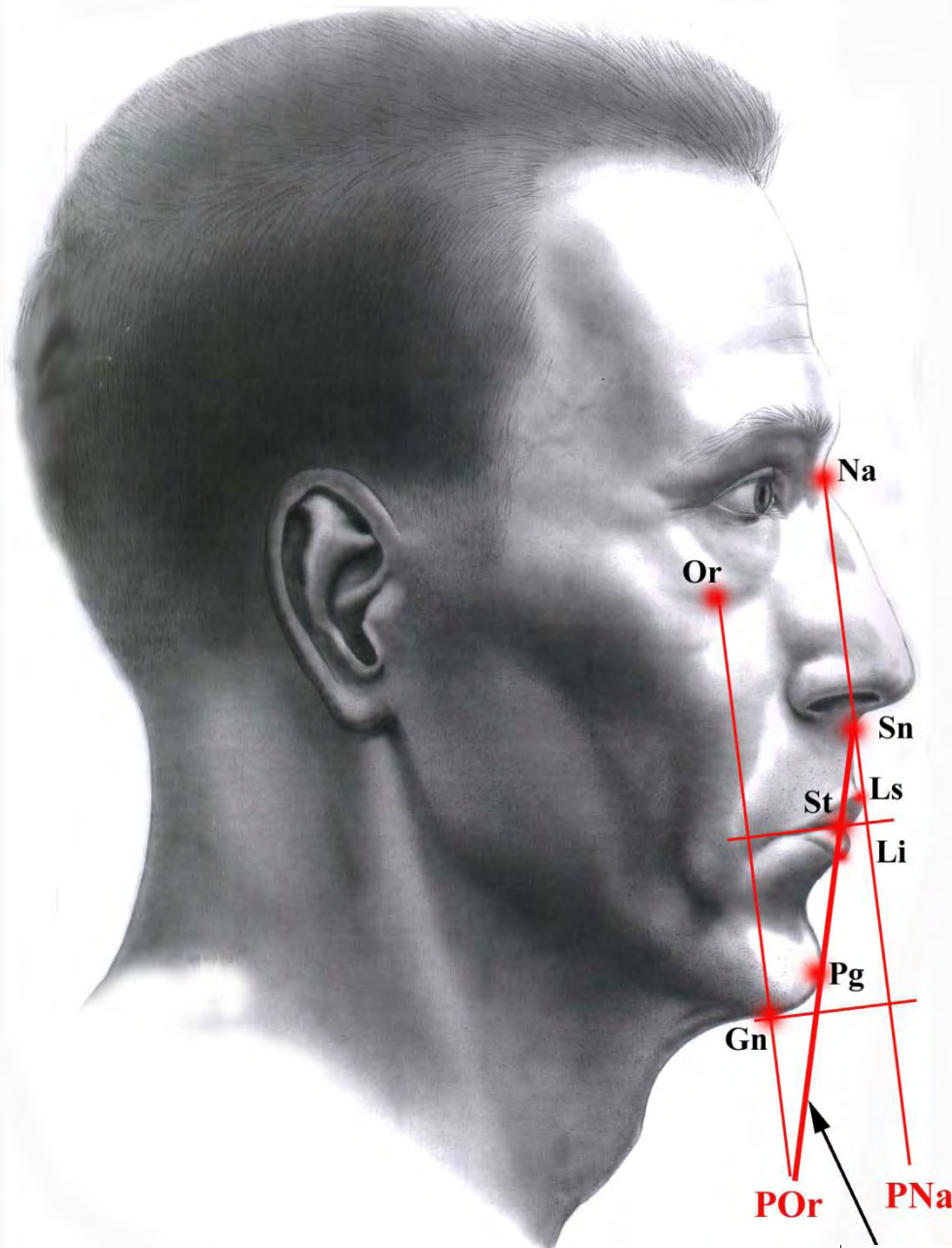
Rok 2004

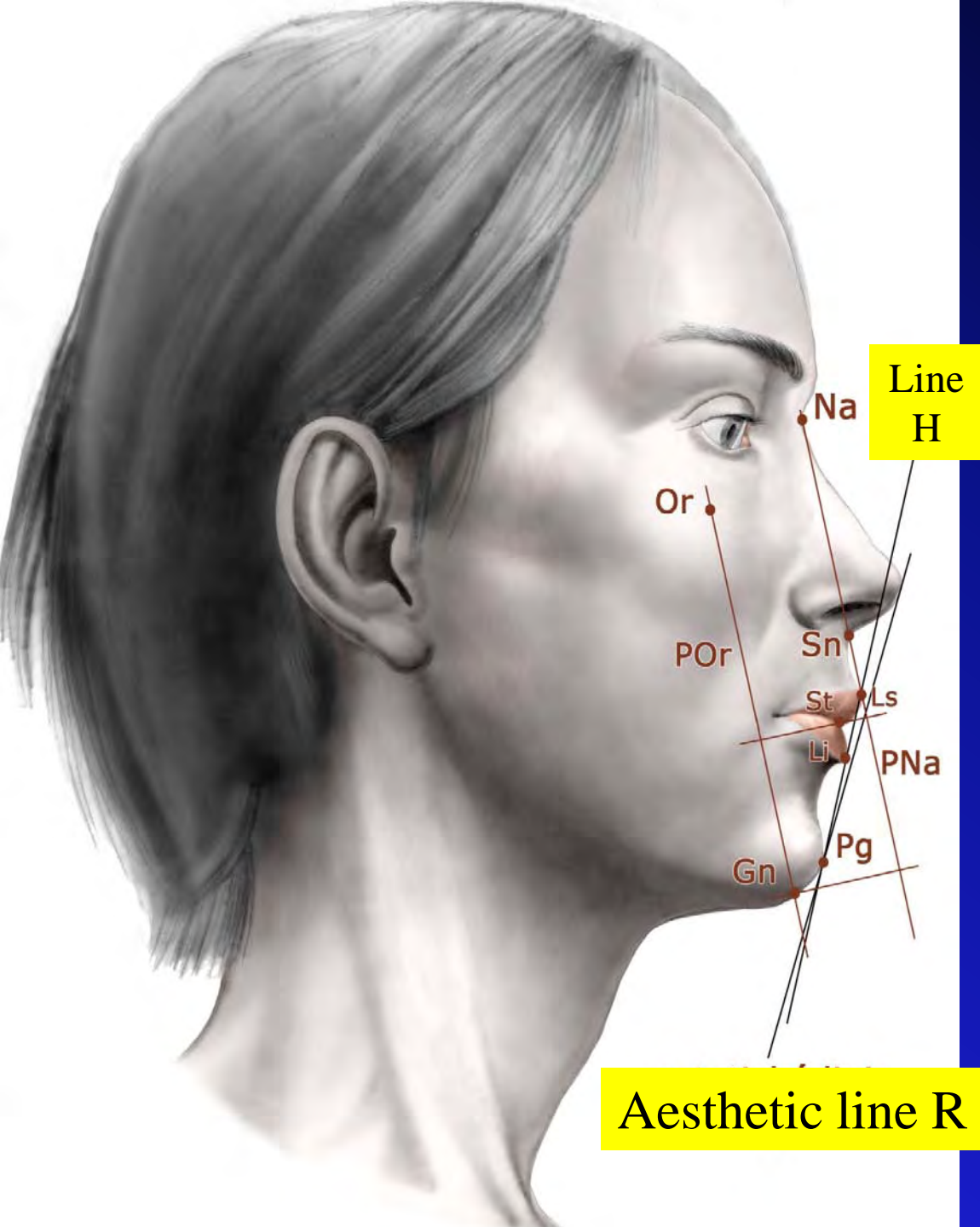
# Biometric field

**Biometric field is an imaginary area** (seen from the lateral view)

Margins:

- line crossing lower orbital margine in midline (*perpendiculare orbitale*, Simonov's orbital line),
- line crossing nasion (*perpendiculare nasion*) – frankfurter line FH and
- line crossing lower chin surface (parallel with FH).



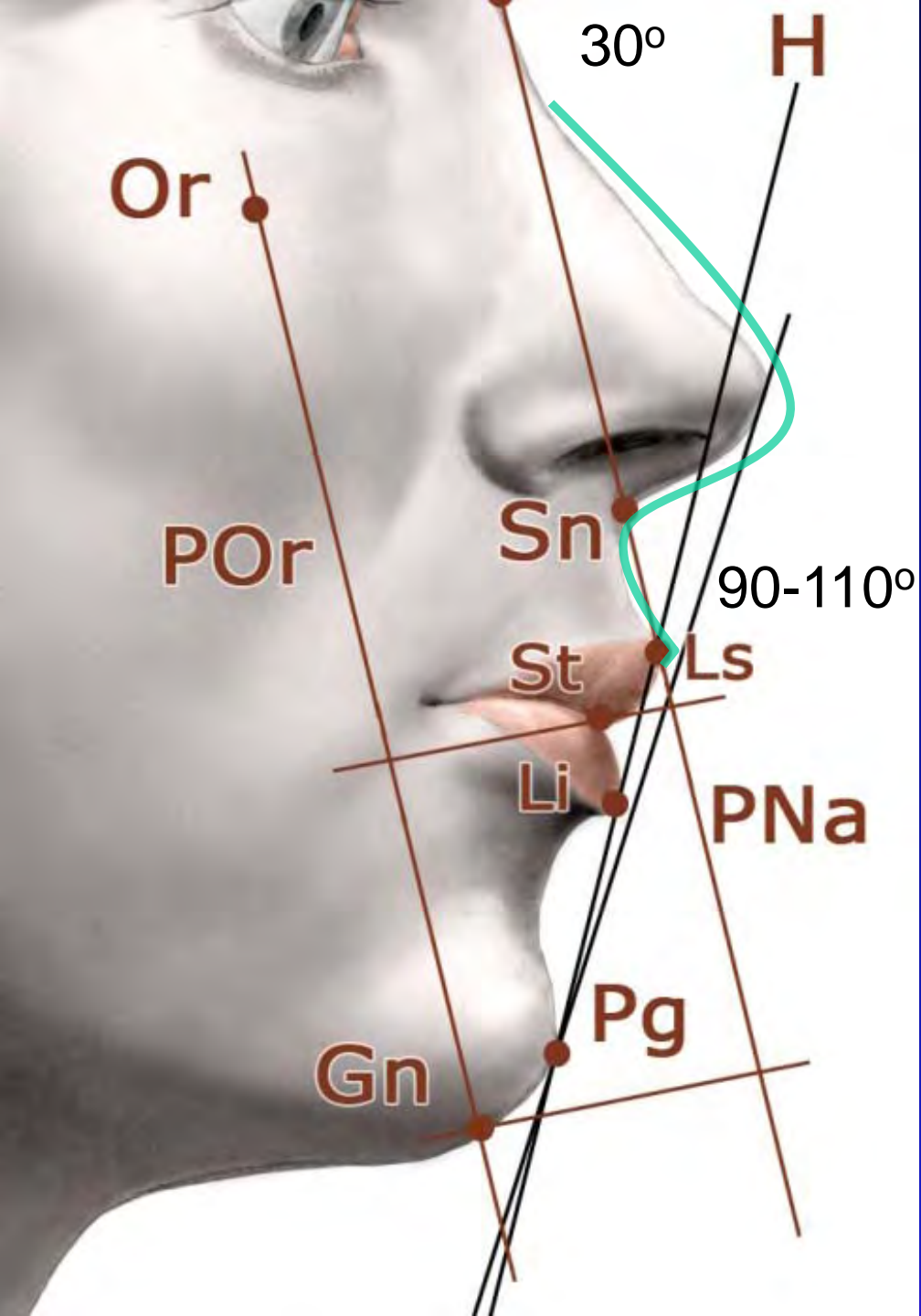


• **Simonov's line** (orbital line, *linea orbitalis*, *POr line*) crosses vertically midorbitale point on lower orbitale margin.

• **Ricketts's R line** (aesthetic line) connects nose tip and skin pogonion. Distances from R line: labiale (labrale) superius: -1 to 2 mm; labiale (labrale) inferius: 0 to 2 mm.

• **Aesthetic plane** (*planum esteticum*) crosses nose tip and skin pogonion.

• **Holdaway's H line** connects skin pogonion, labiale (labrale) superius and ventral margine of nostril. Nose profile and lip are giving symetric "S" curve line. The most dorsal point of this line is optimally found  $5 \pm 2$  mm dorsally of H line.



Nose profile and lip are giving symmetric “S” curve line.

The most dorsal point of this line is optimally found  $5 \pm 2$  mm dorsally of H line.

# Aesthetic requests

Arrangement of mm. of facial expression relates to forms of skull bones.

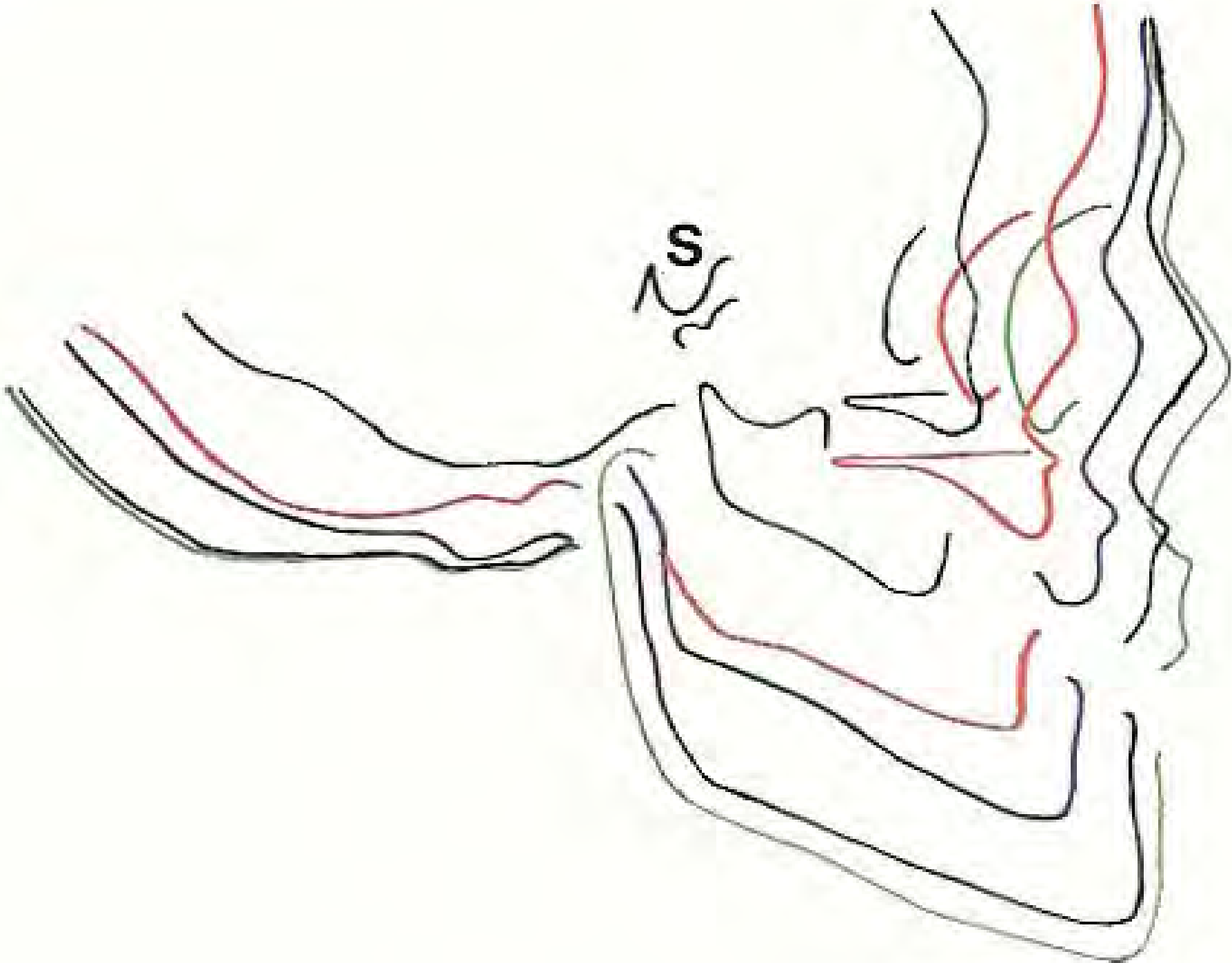
What can be accepted: face with small protrusion of lower jaw (**dental protrusion**).

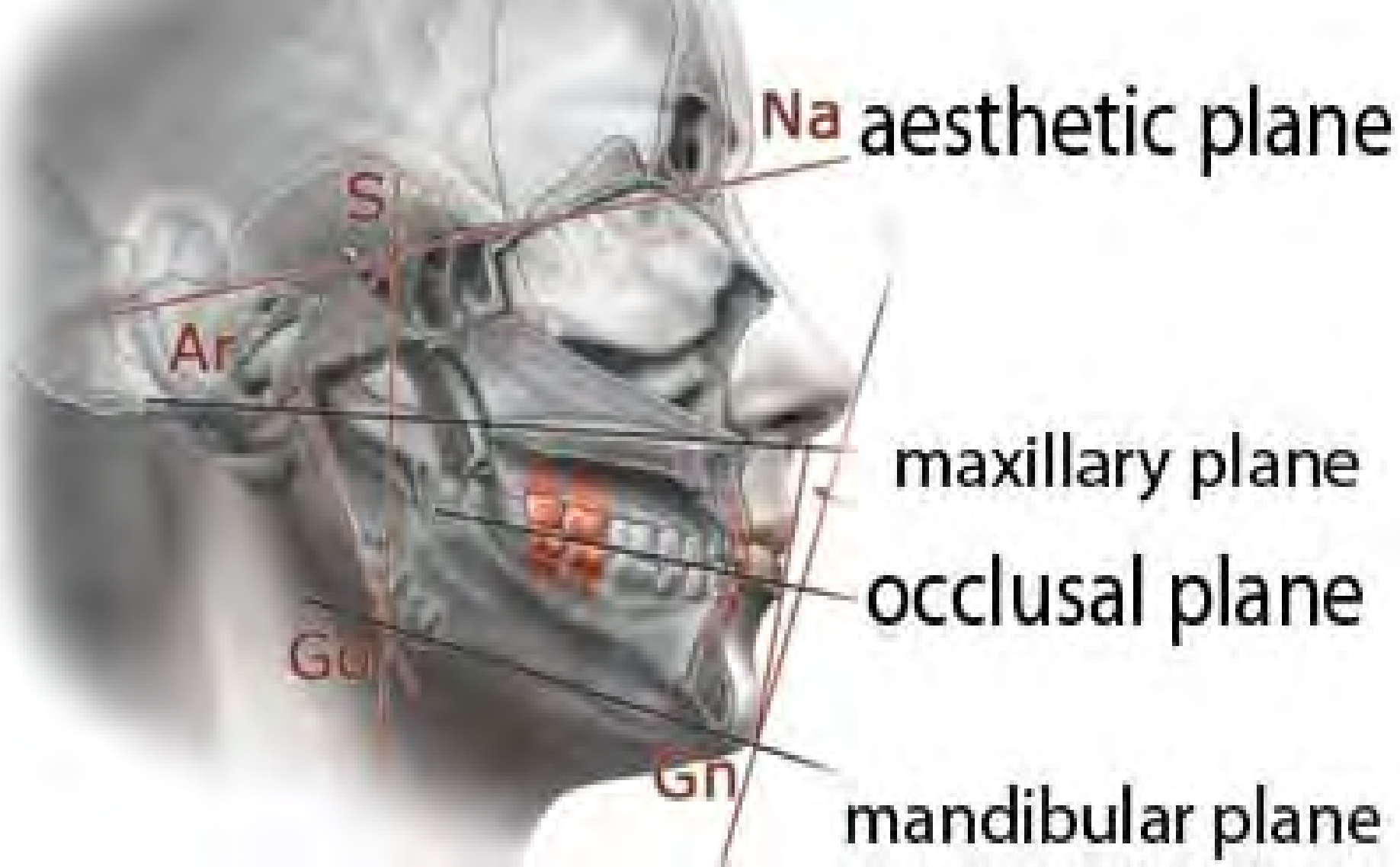
Lower one third of face can be longer about 5-10 mm than middle one third of face.

**WRONG:** short lower one third of face in comparison with middle one third of face (deep bite).







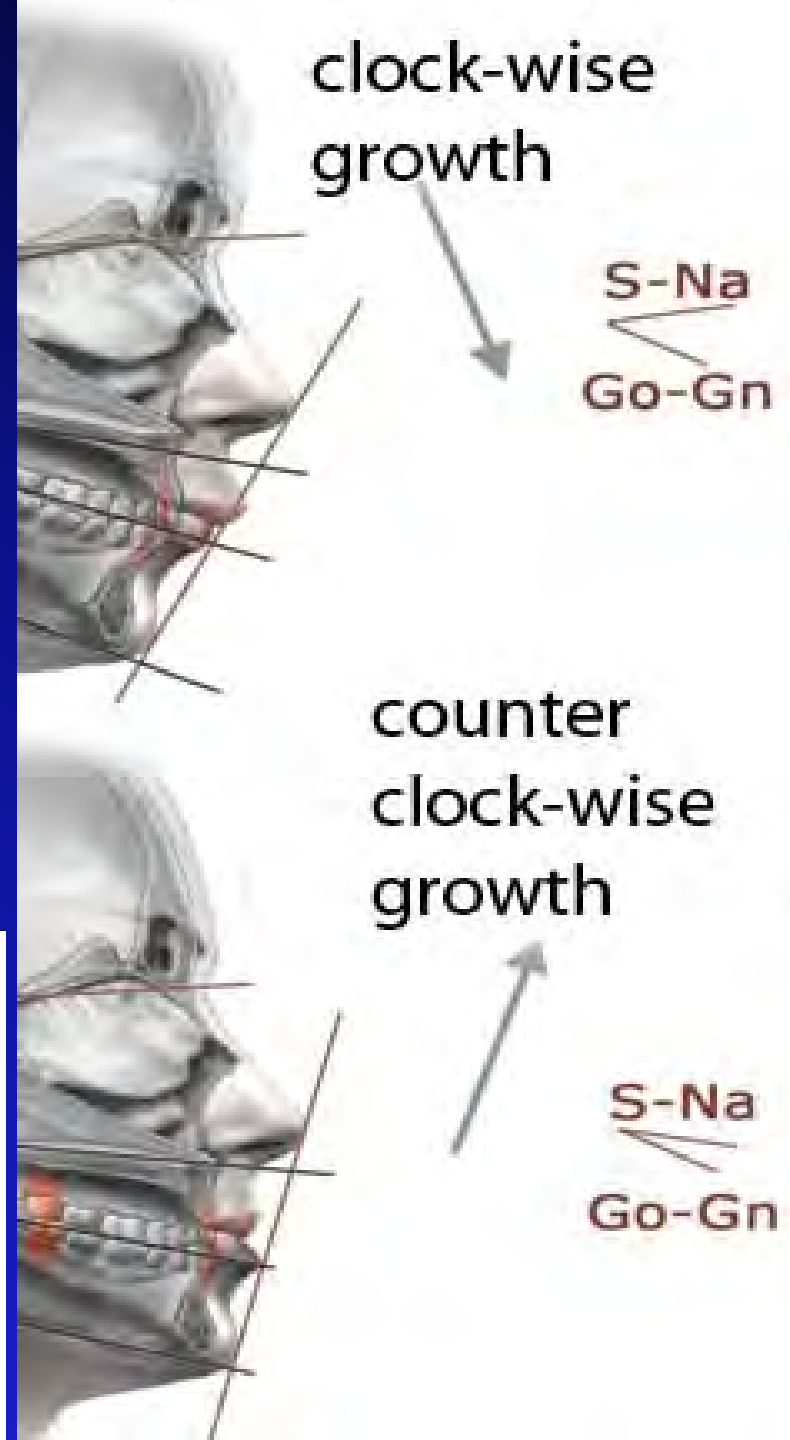
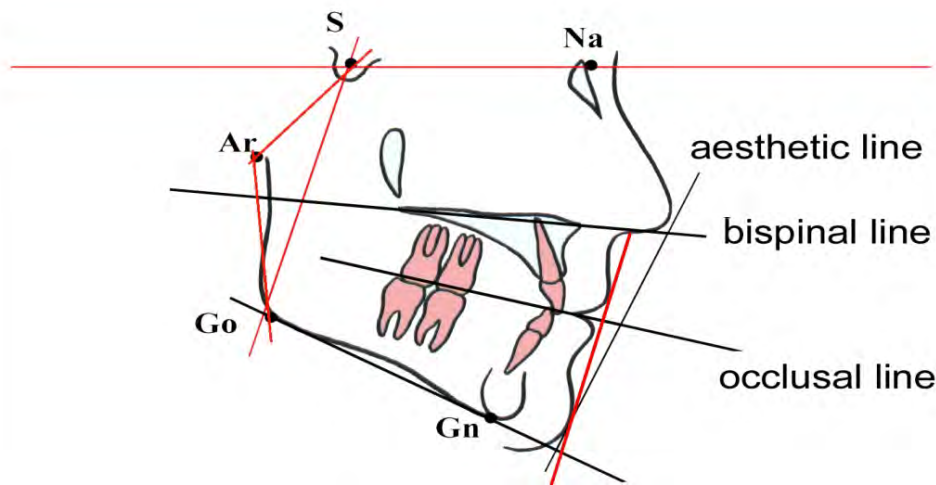


Relation between face lines during face growth  
(after Jarabak 1975)

# Relation between face lines during face growth (after Jarabak 1975)

## Profile face line

It helps to determine sagittal relations between jaws and chin position due to amount of soft tissues in face.

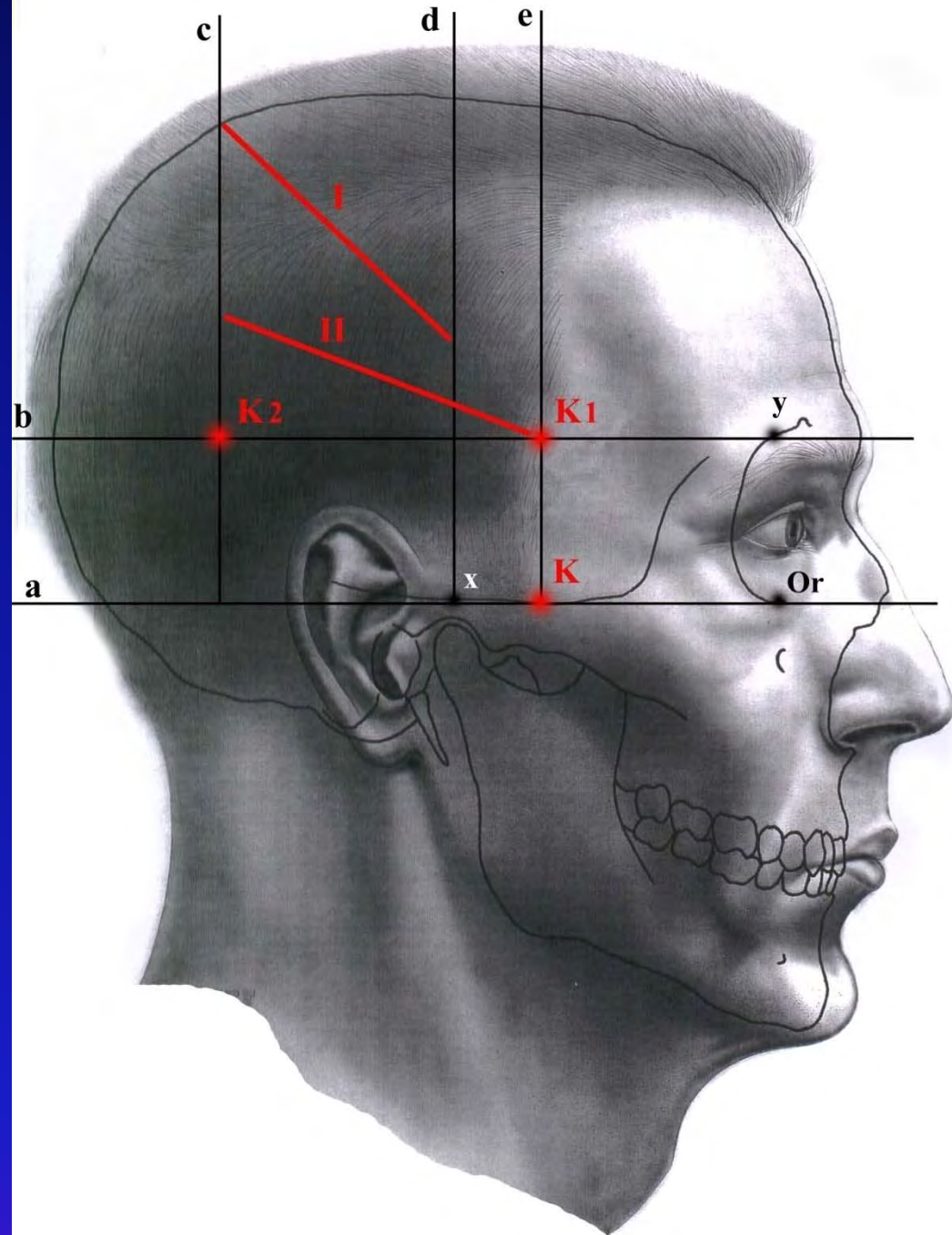


# Kroenlein lines for detection of arteries

**Point K** (for compression of facial artery). Two lines are crossed – line crossing middle of zygoma (*linea verticalis zygomatica*) and frankfurter line.

**Point K<sub>1</sub>** serves for compression of frontal branch of temporal artery

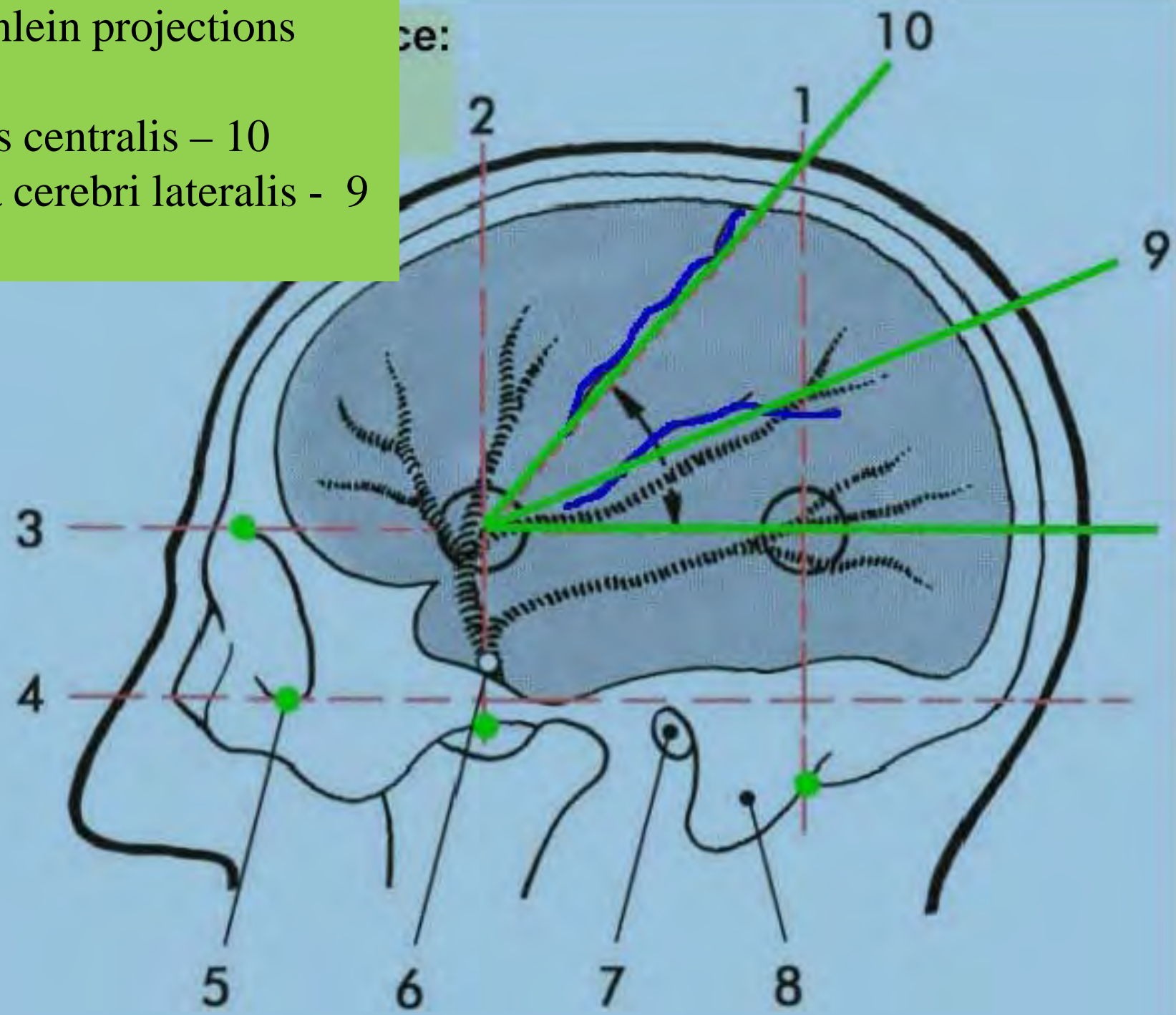
**Point K<sub>2</sub>** serves for compression of parietal branch from the same artery.



# Kroenlein projections

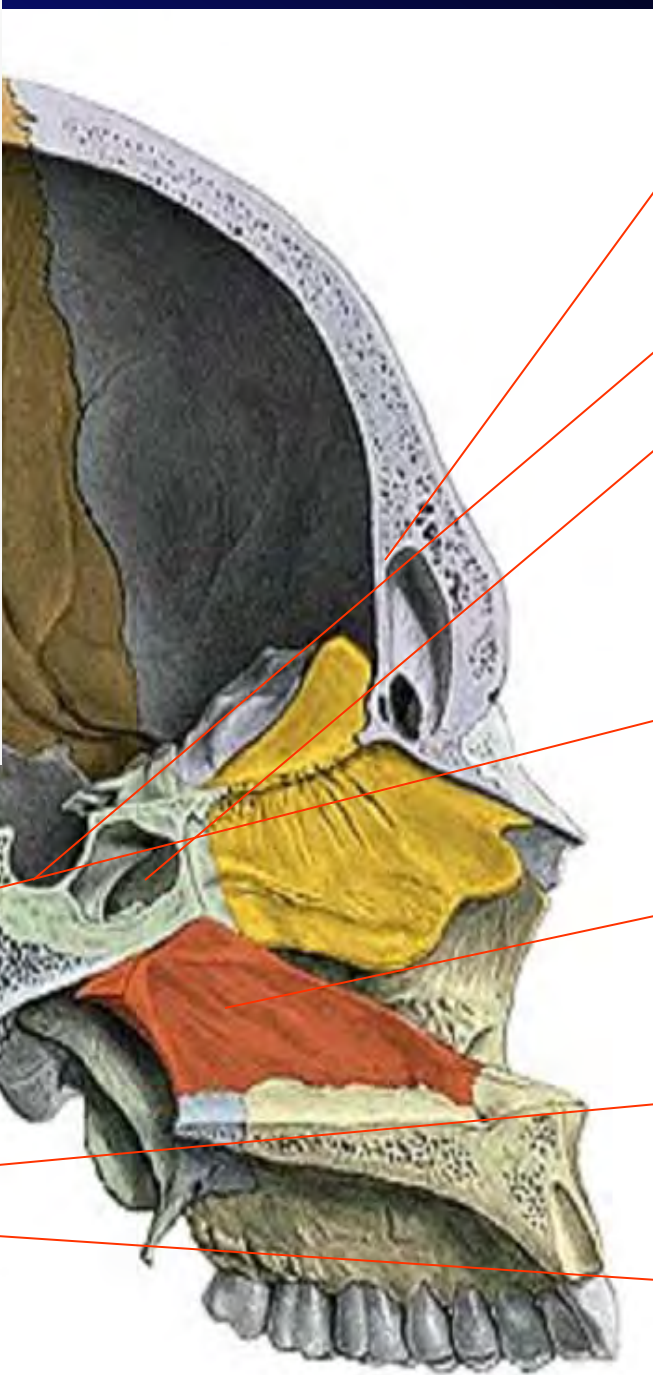
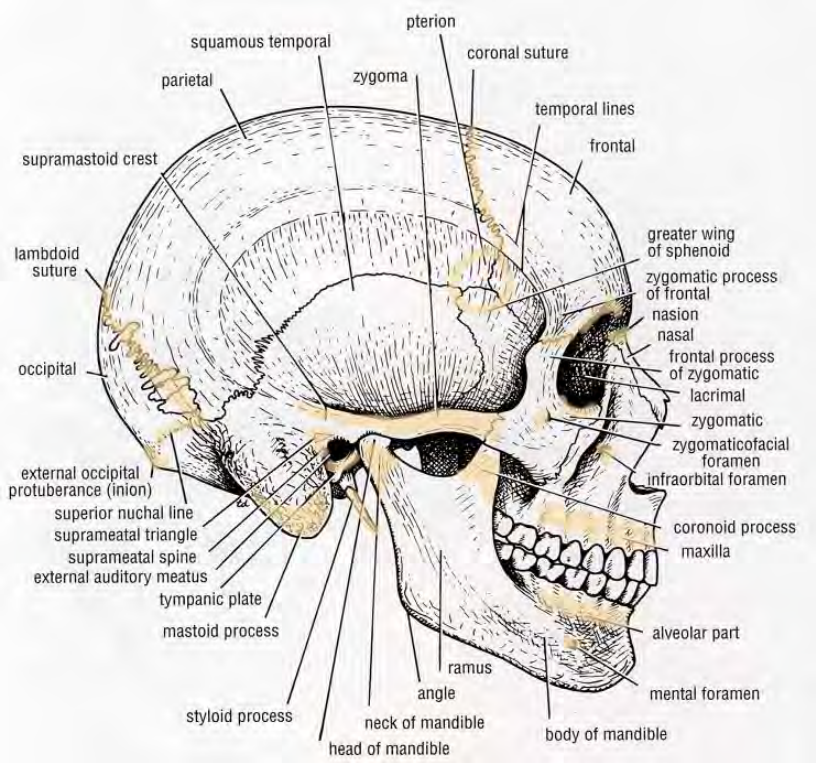
sulcus centralis – 10

Fossa cerebri lateralis - 9



Palpable skull  
structures and  
internal bone  
structures seen on X  
– ray photos

Main X – ray  
projections and views



Sinus frontalis

Sella turcica

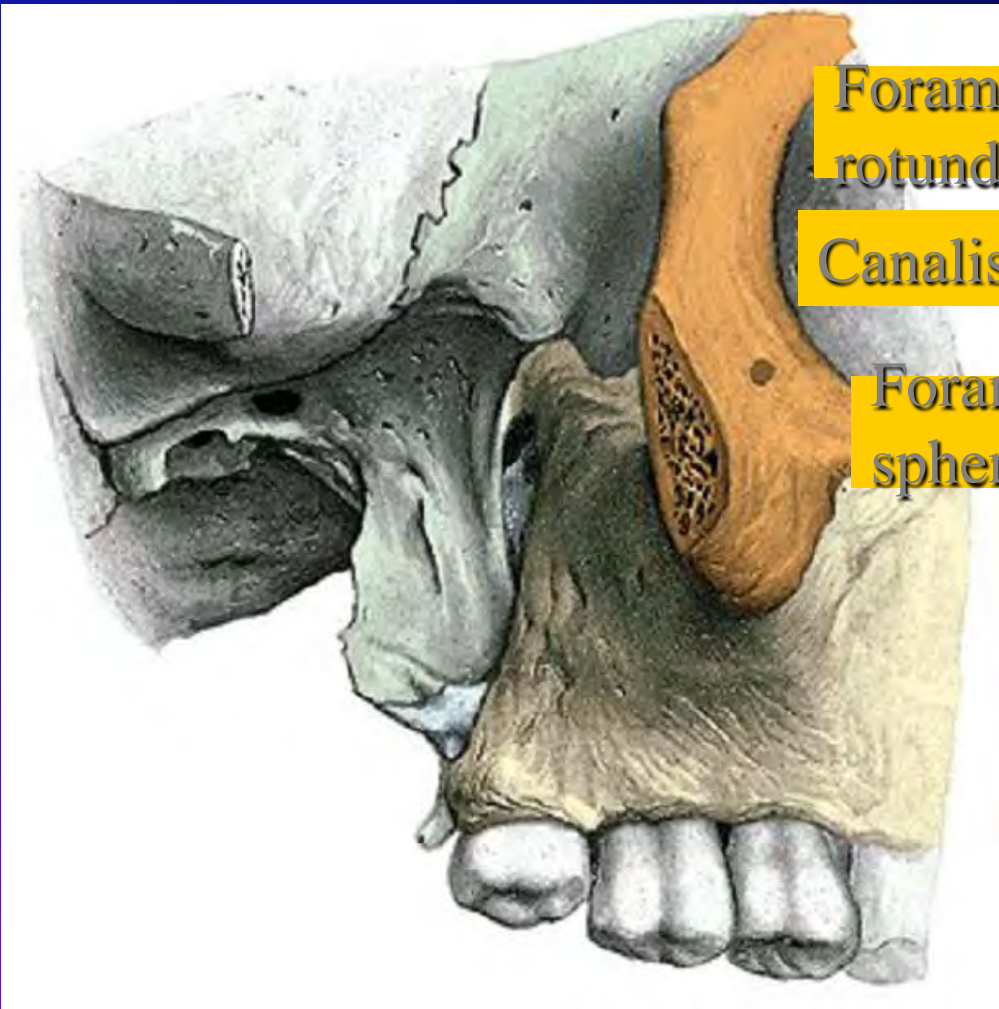
Sinus sphenoidalis

Meatus ac. ext.

Vomer

Processus mastoideus

Proc. styloideus

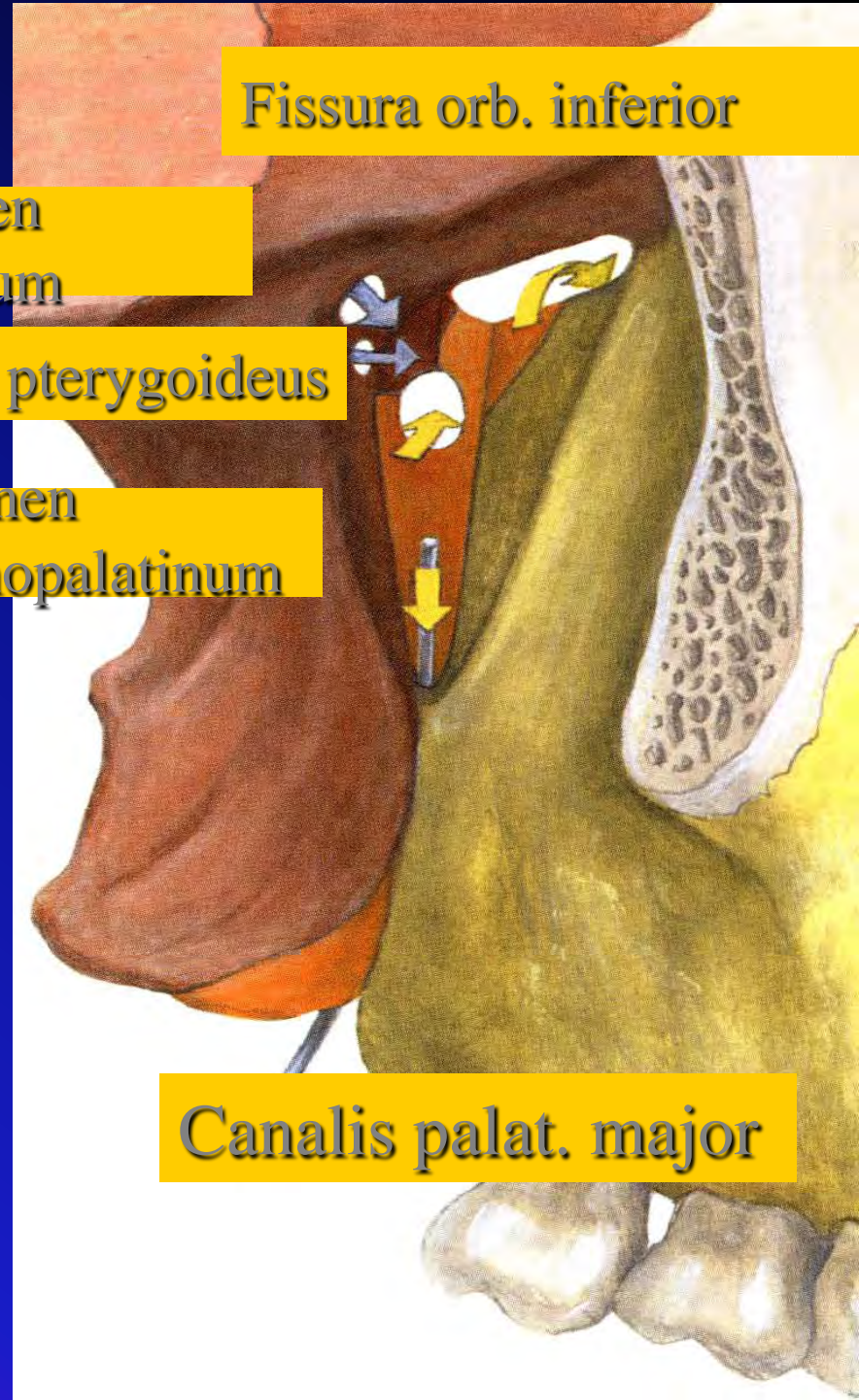


Foramen  
rotundum

Canalis pterygoideus

Foramen  
sphenopalatinum

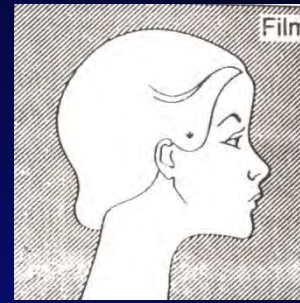
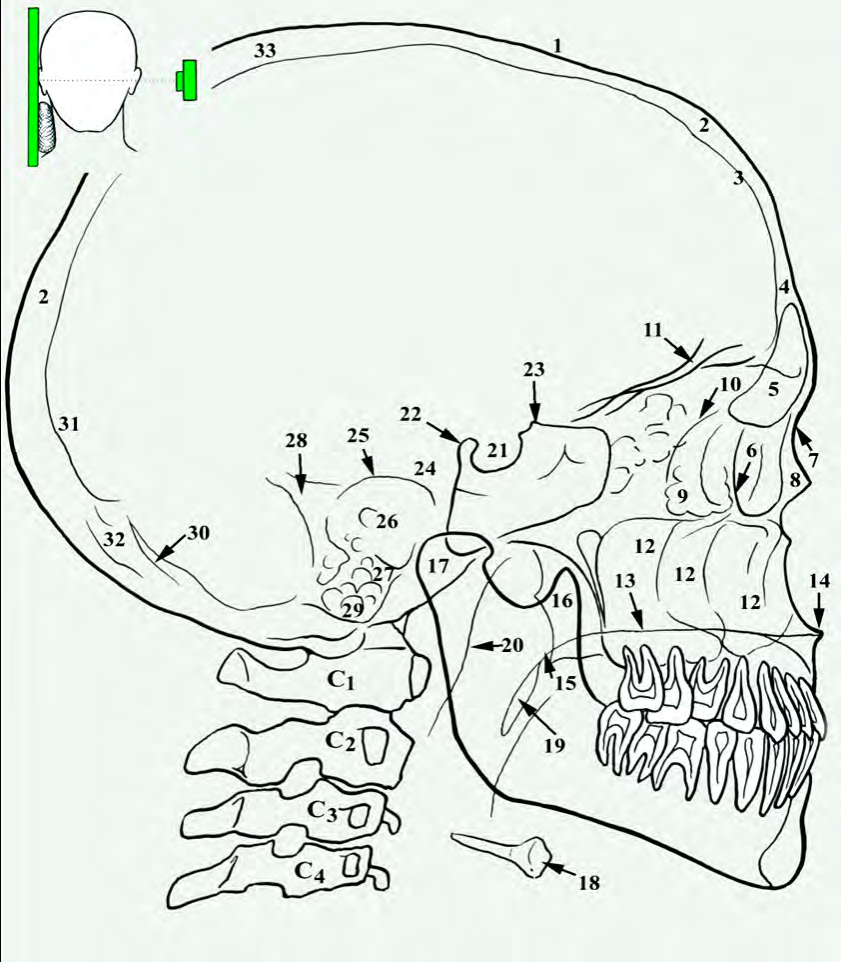
Fossa pterygopalatina  
(sphenopalatina)



Fissura orb. inferior

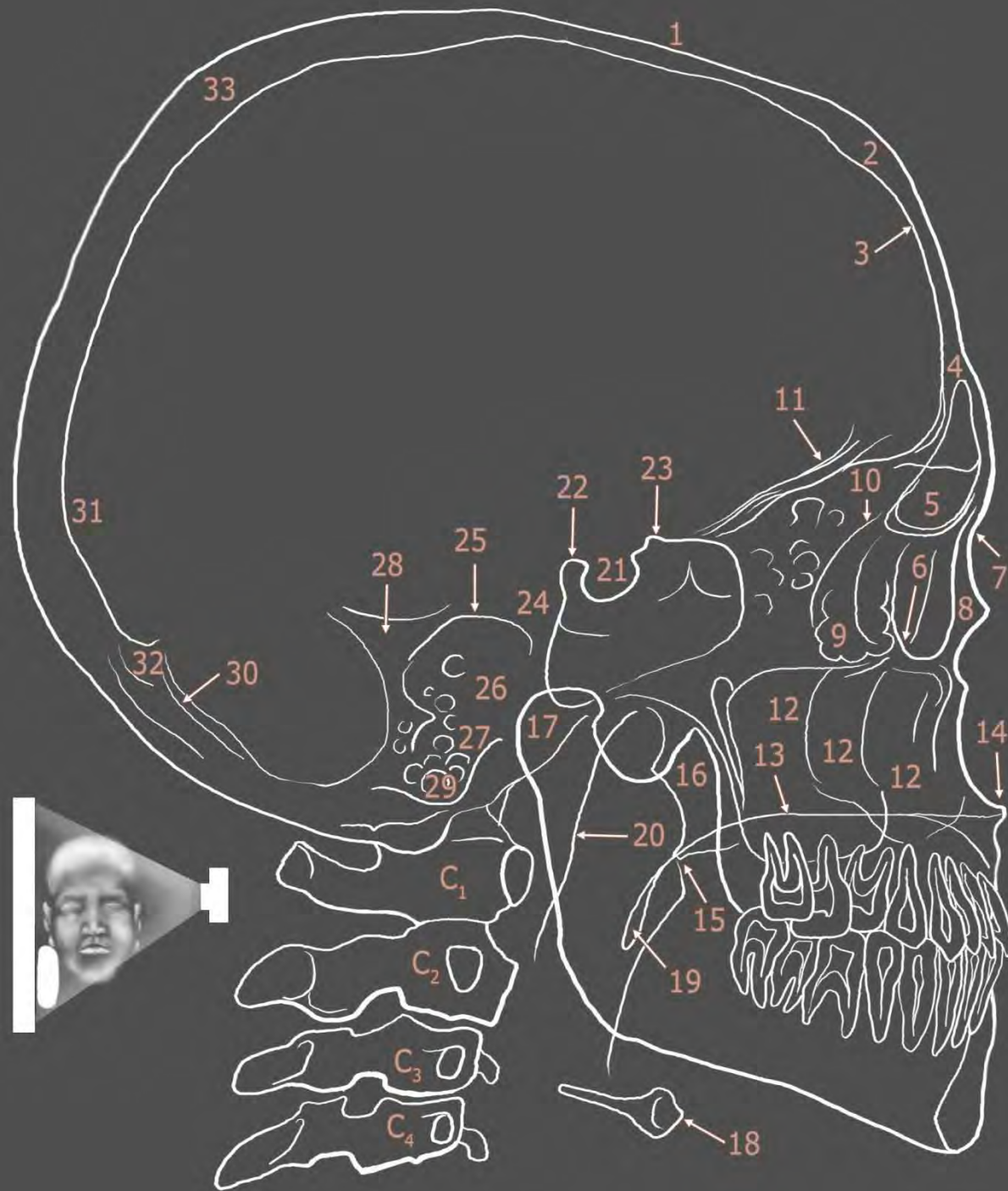
Canalis palat. major





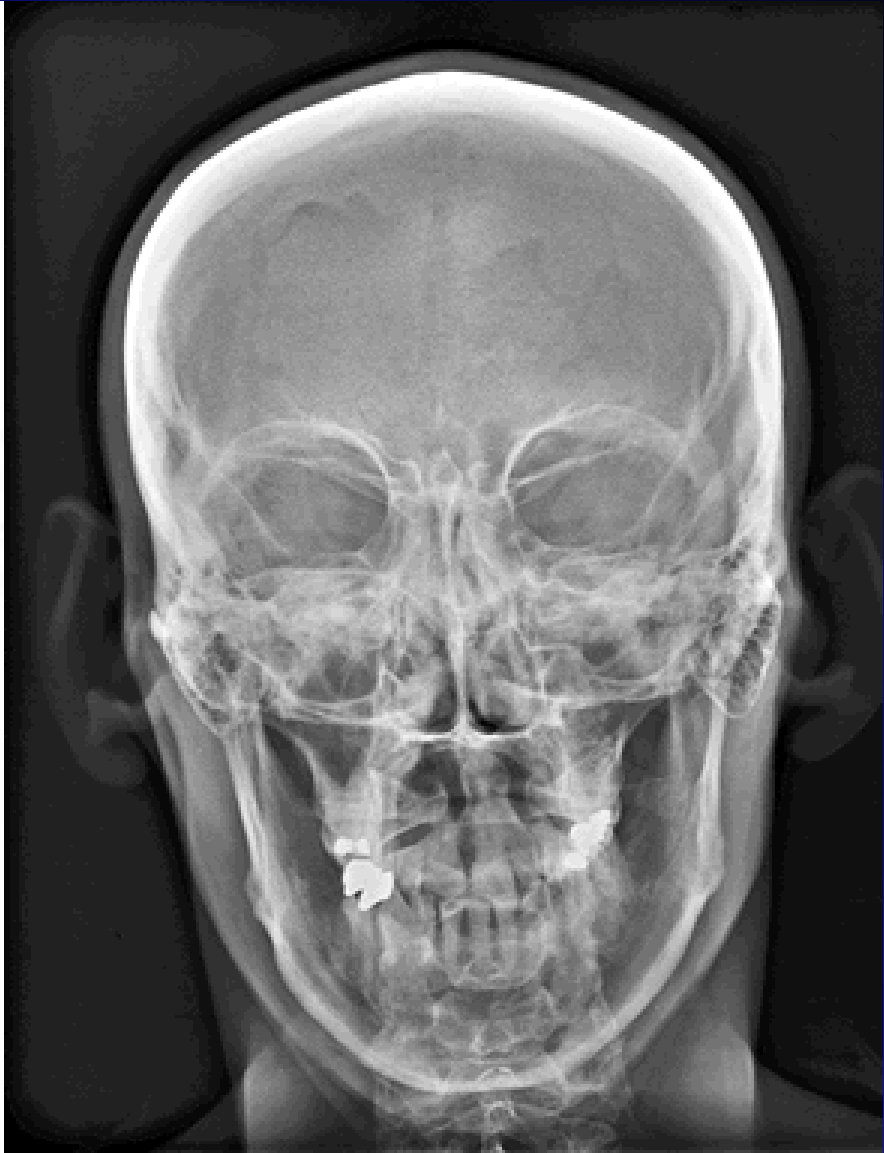
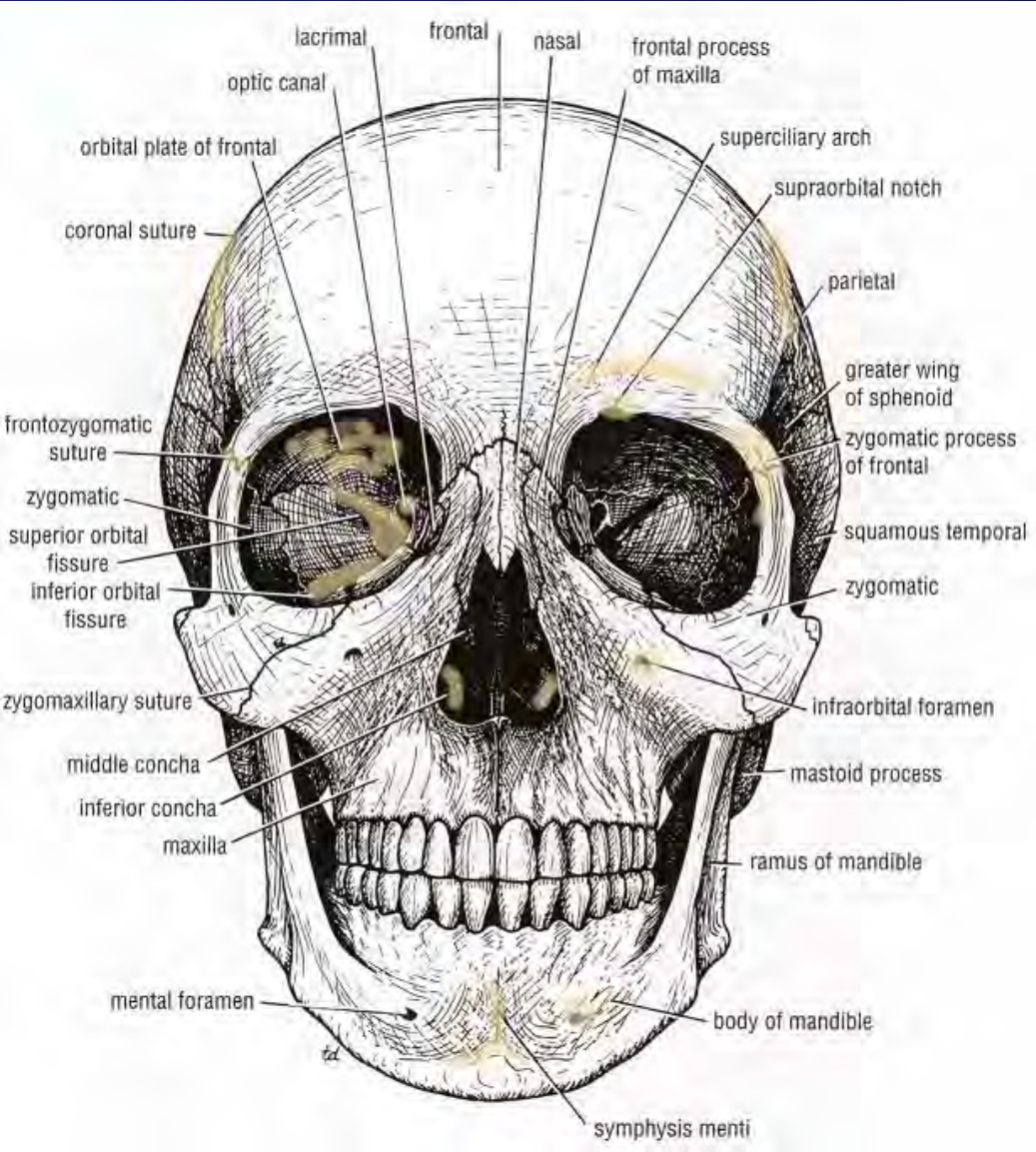
Lateral view

# Testing picture



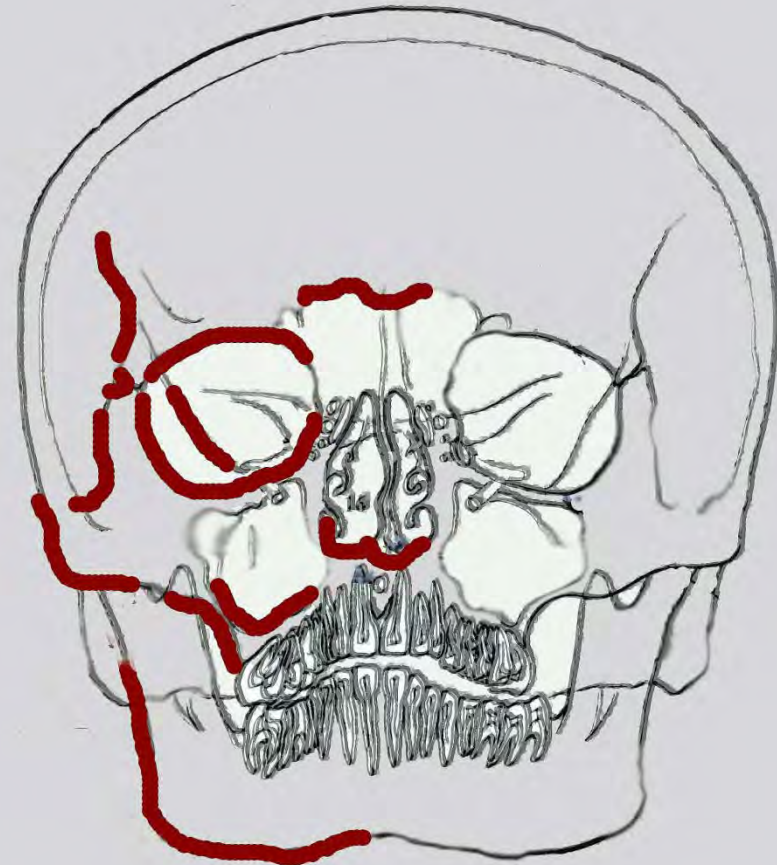
# Posteroanterior projection

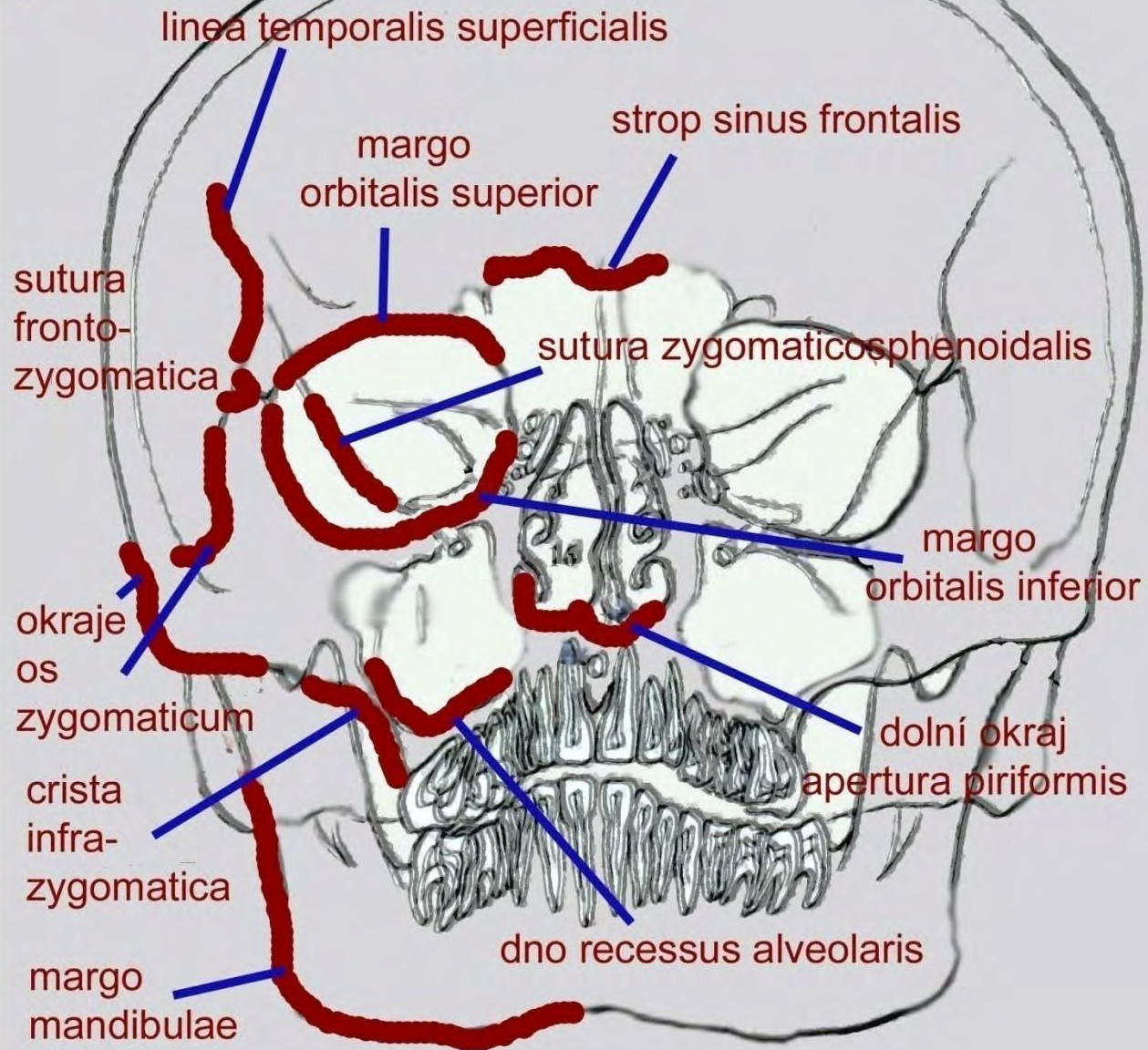
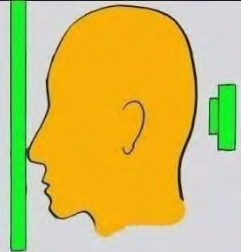
– for details of facial skeleton



Posteroanterior projection

Compare palpable  
structures with  
x-ray contours





linea temporalis superficialis

strop sinus frontalis

margo orbitalis superior

sutura fronto-zygomata

sutura zygomaticosphenoidalis

margo orbitalis inferior

okraje os zygomaticum

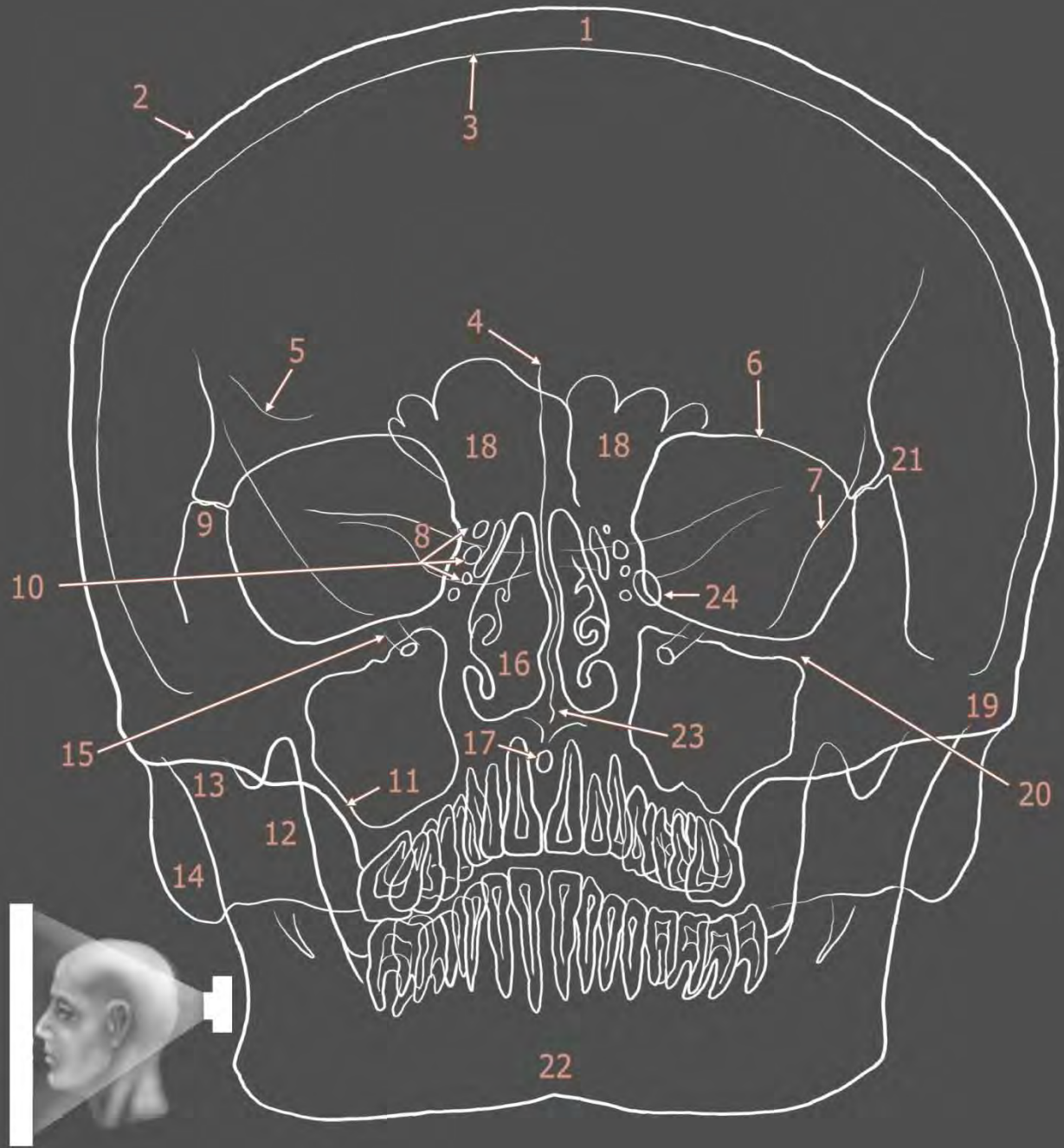
dolní okraj apertura piriformis

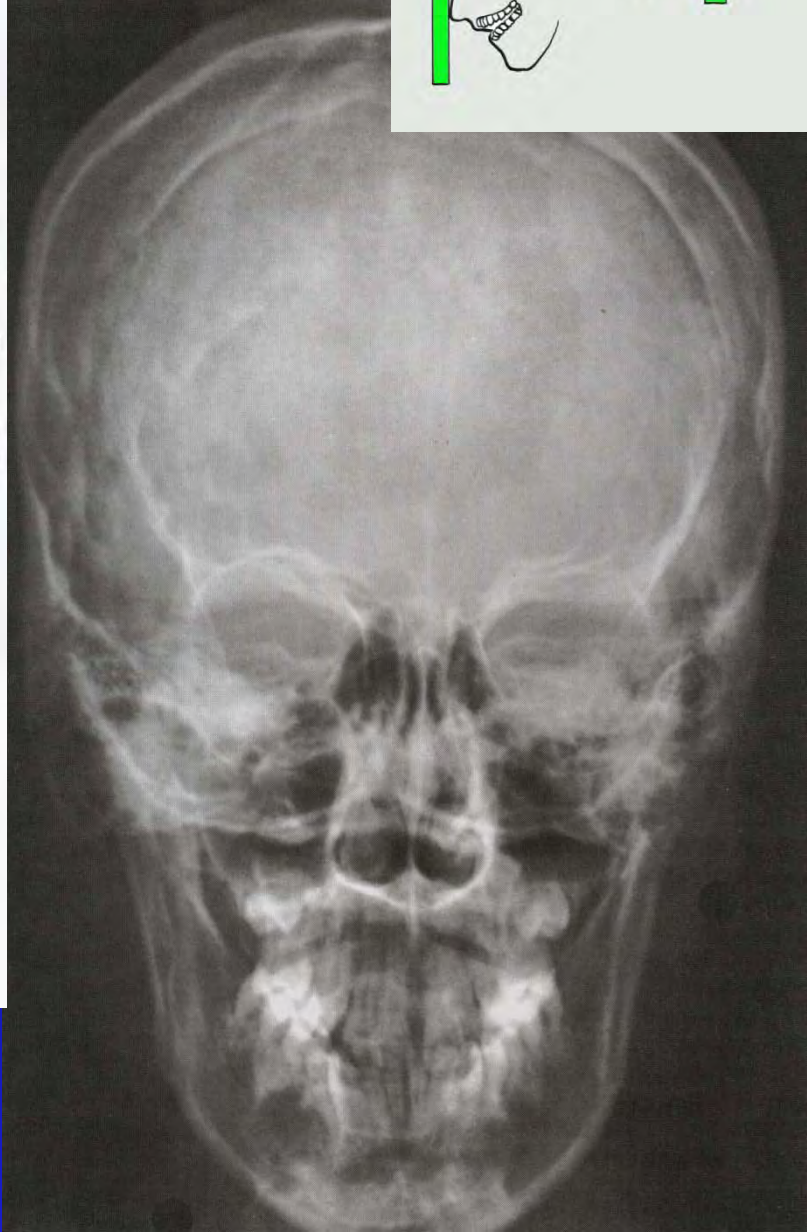
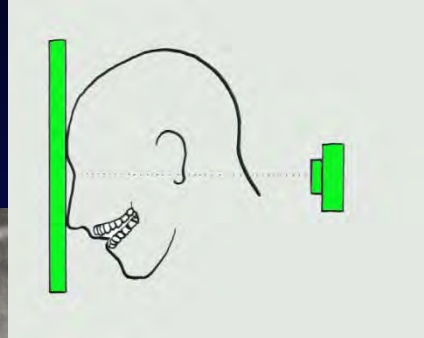
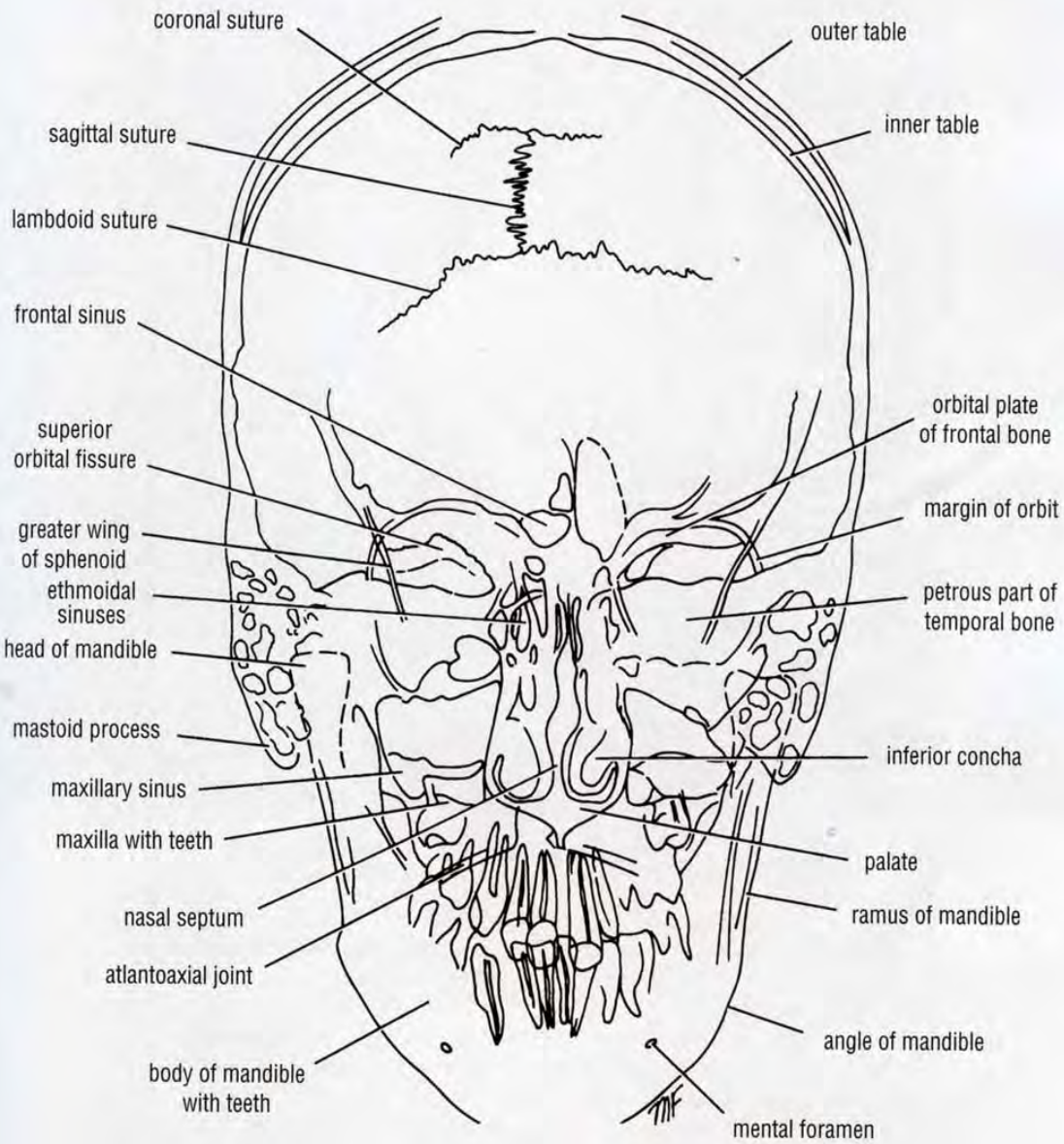
crista infra-zygomata

dno recessus alveolaris

margo mandibulae

# Testing picture



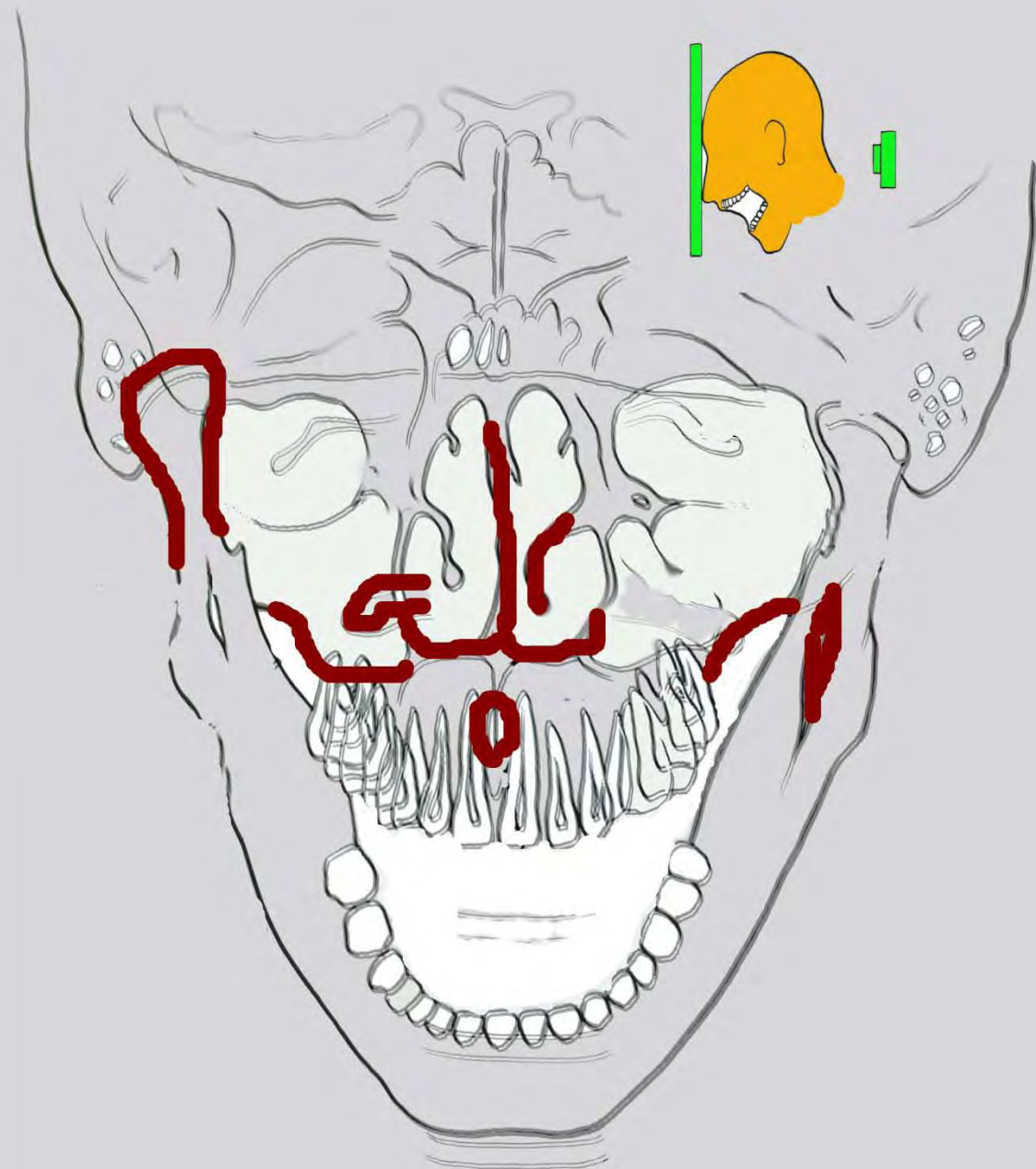


Lower oblique posteroanterior projection lower view

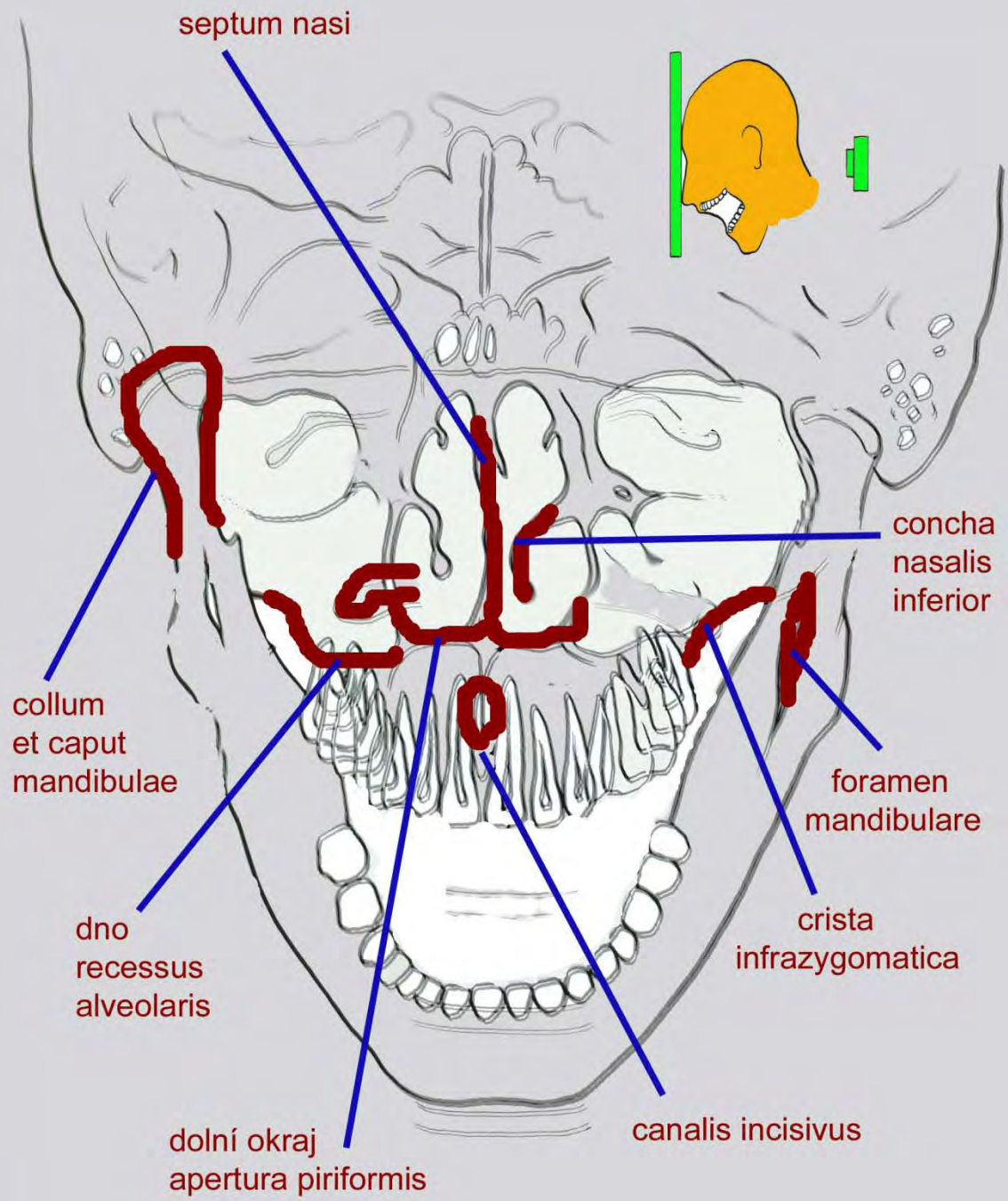
Modified posteroanterior  
lower oblique projection



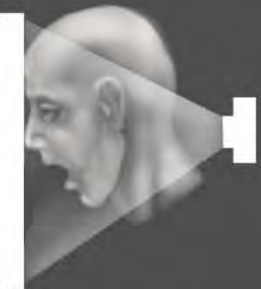
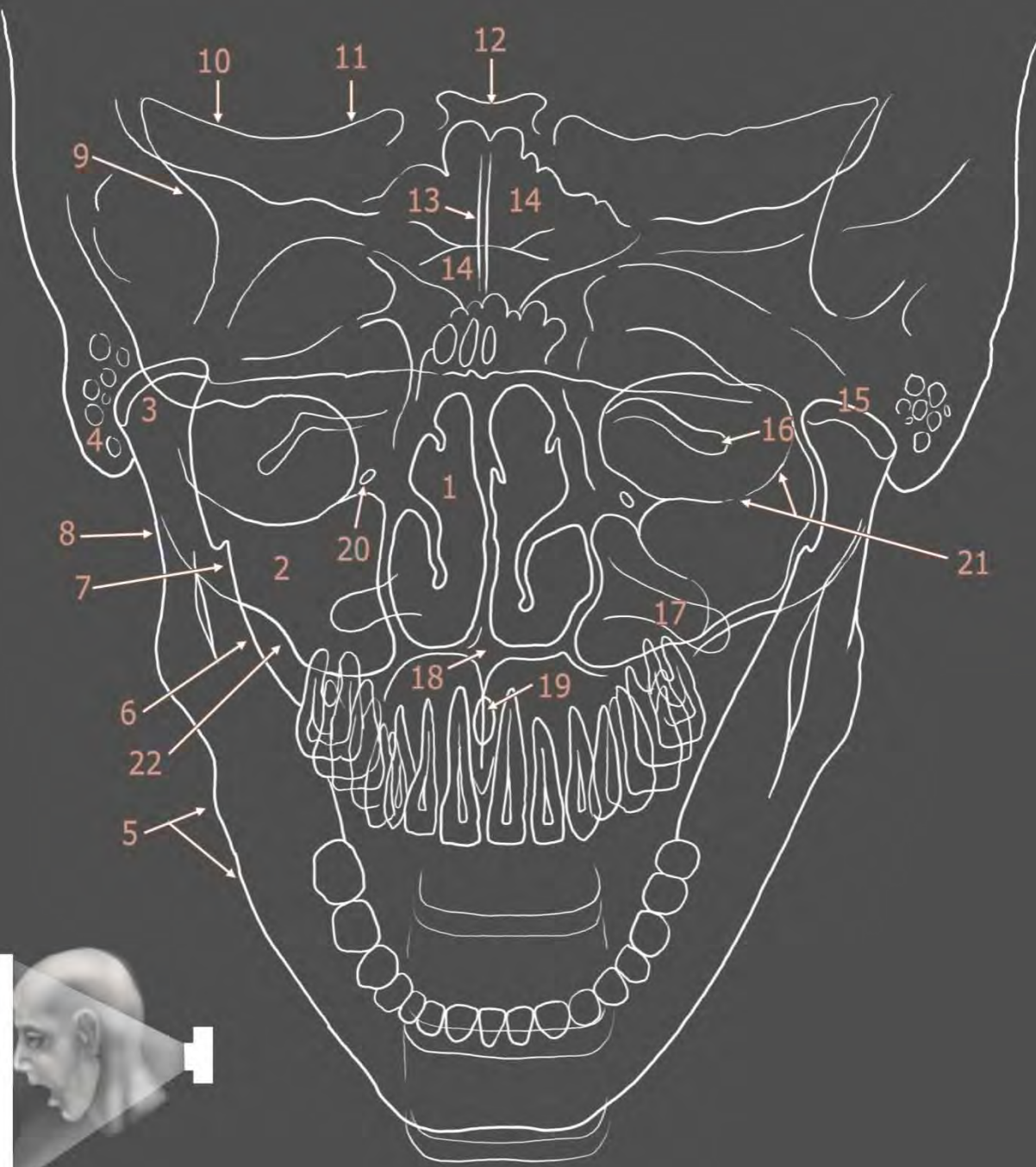
Clementschi's view



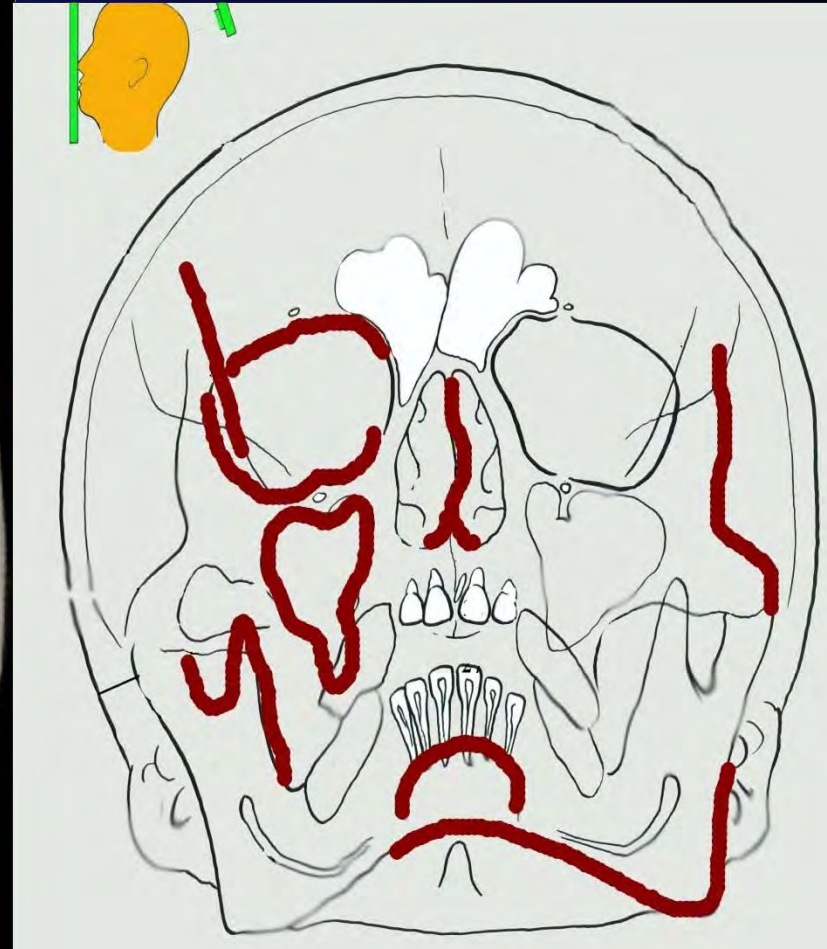
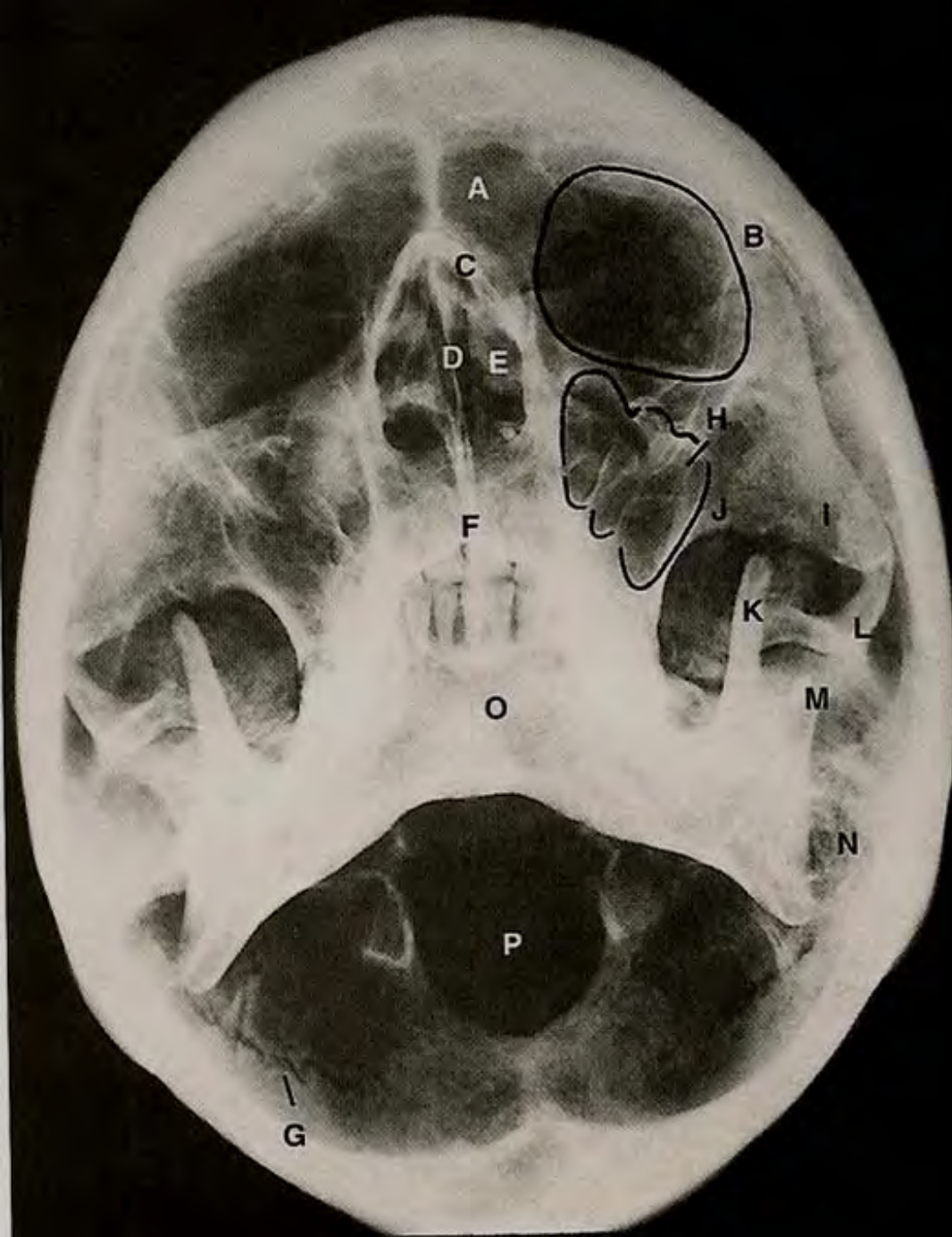




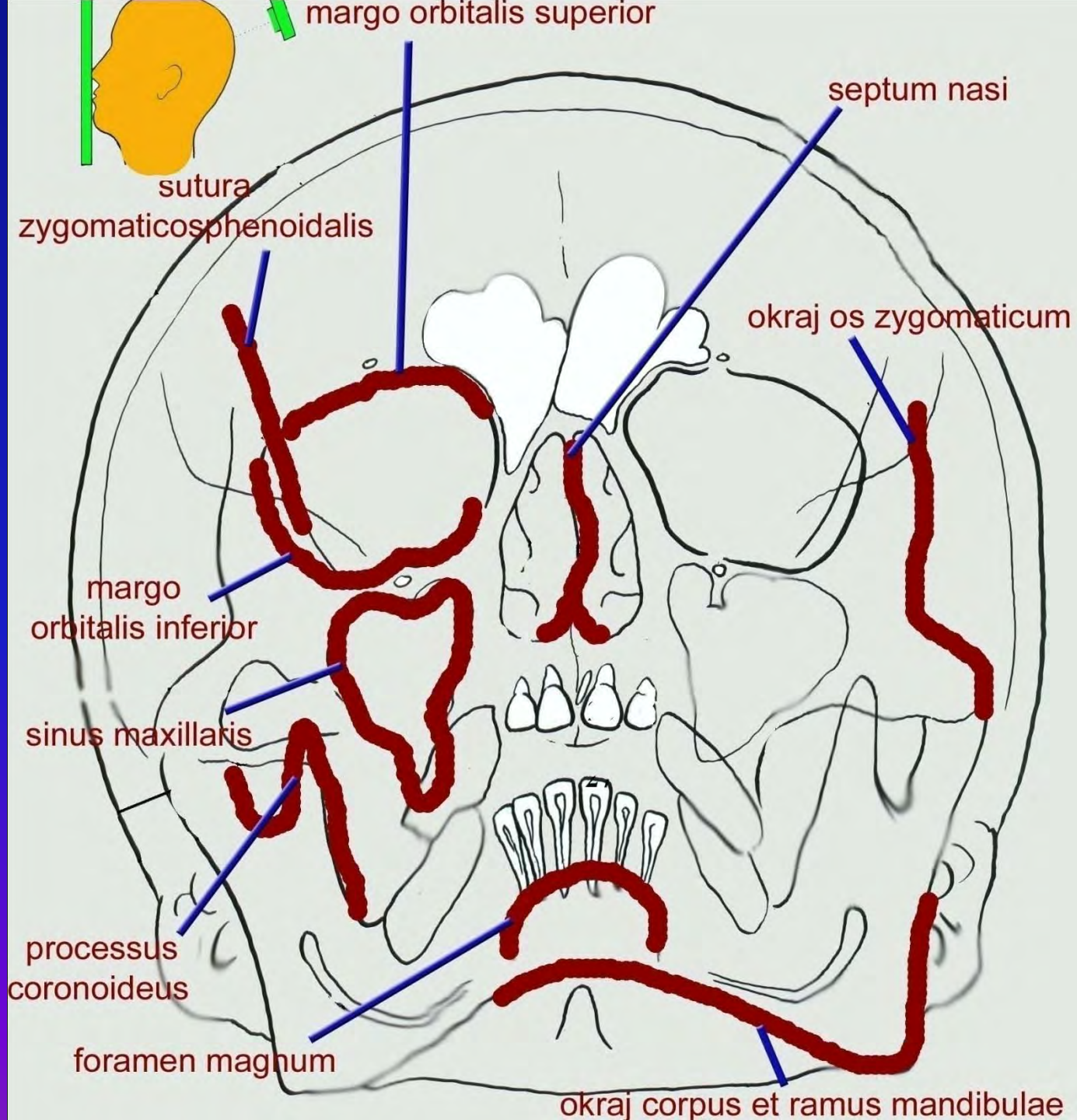
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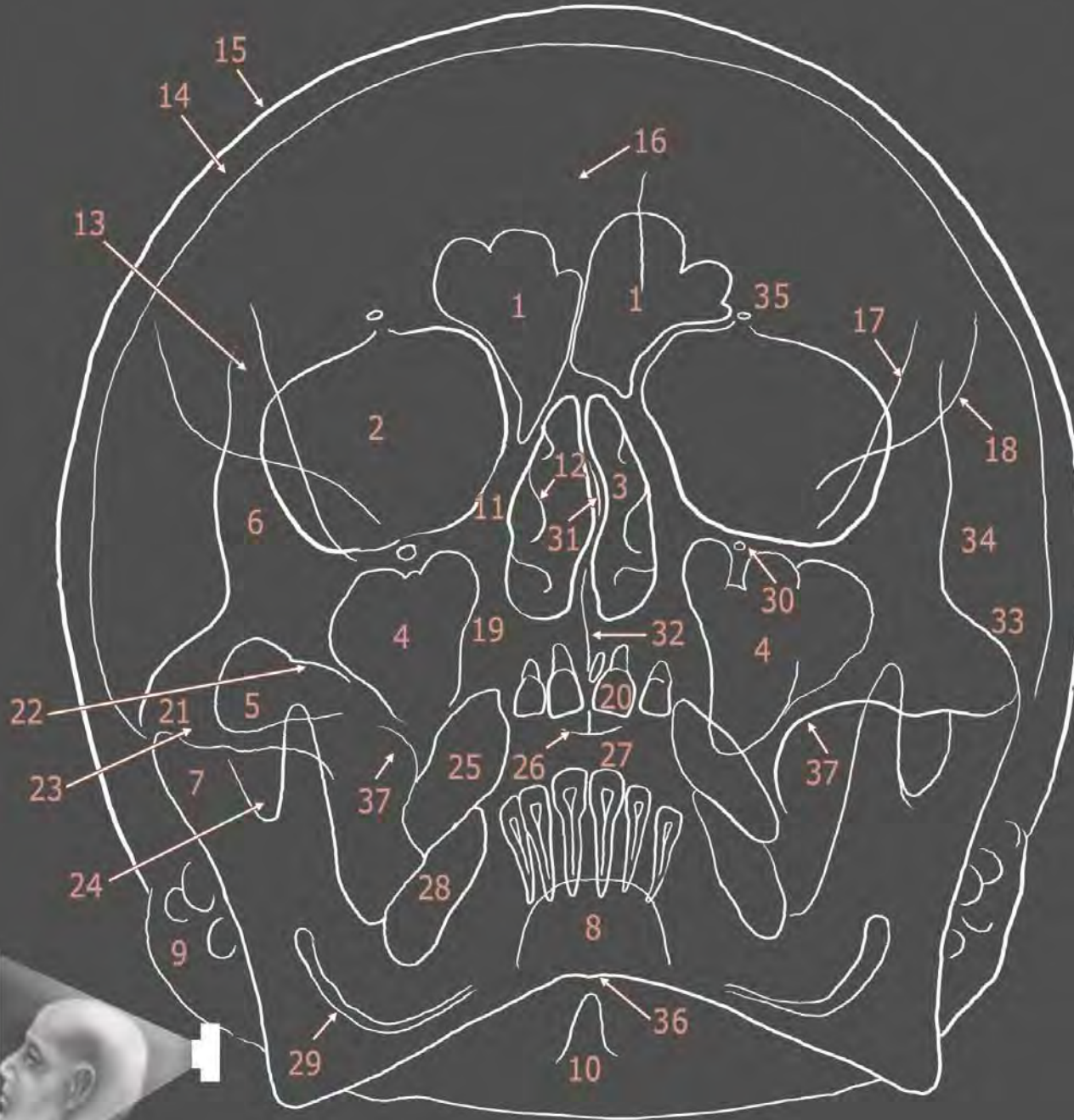
Upper oblique posteroanterior projection

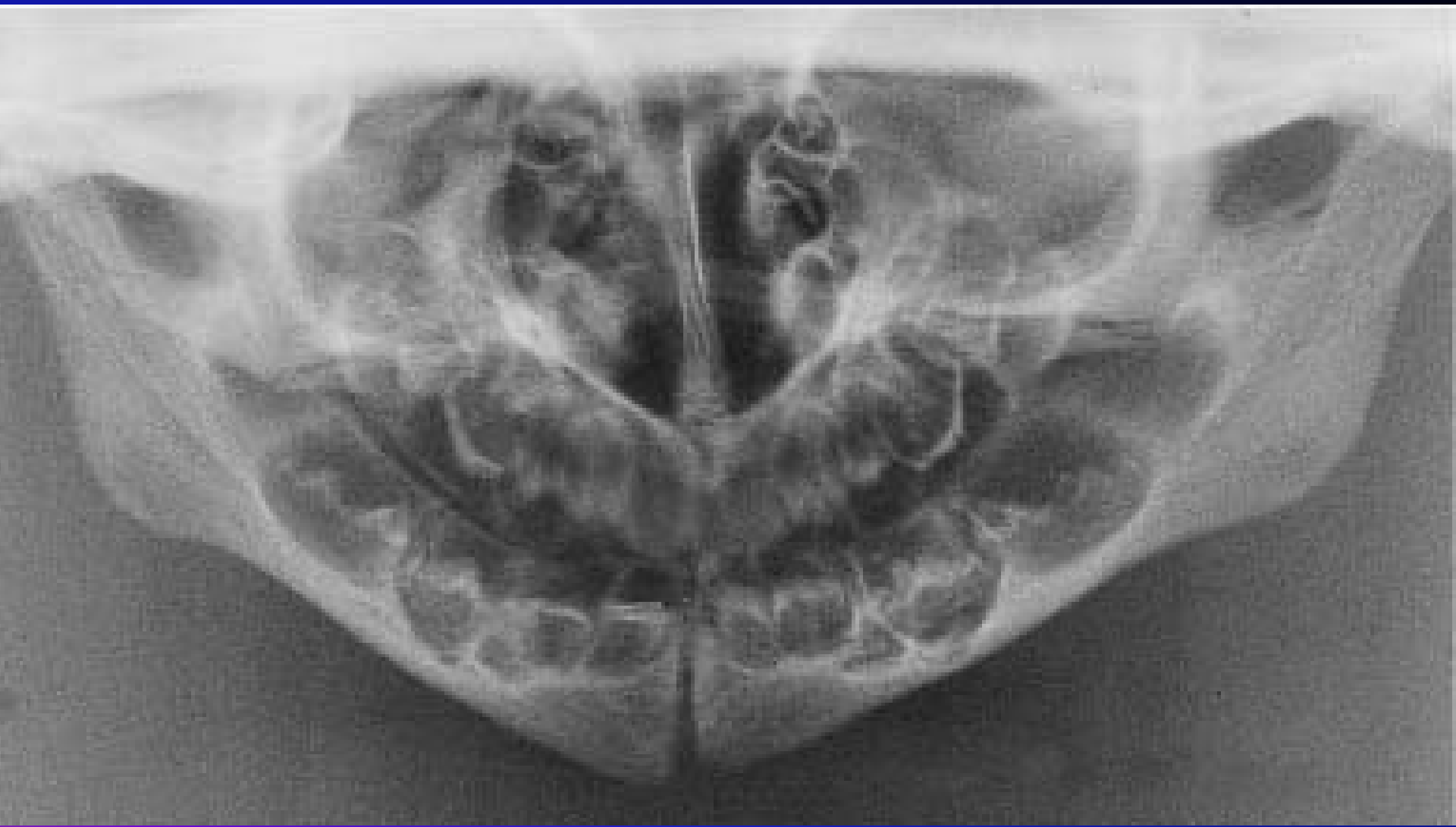


Waters view



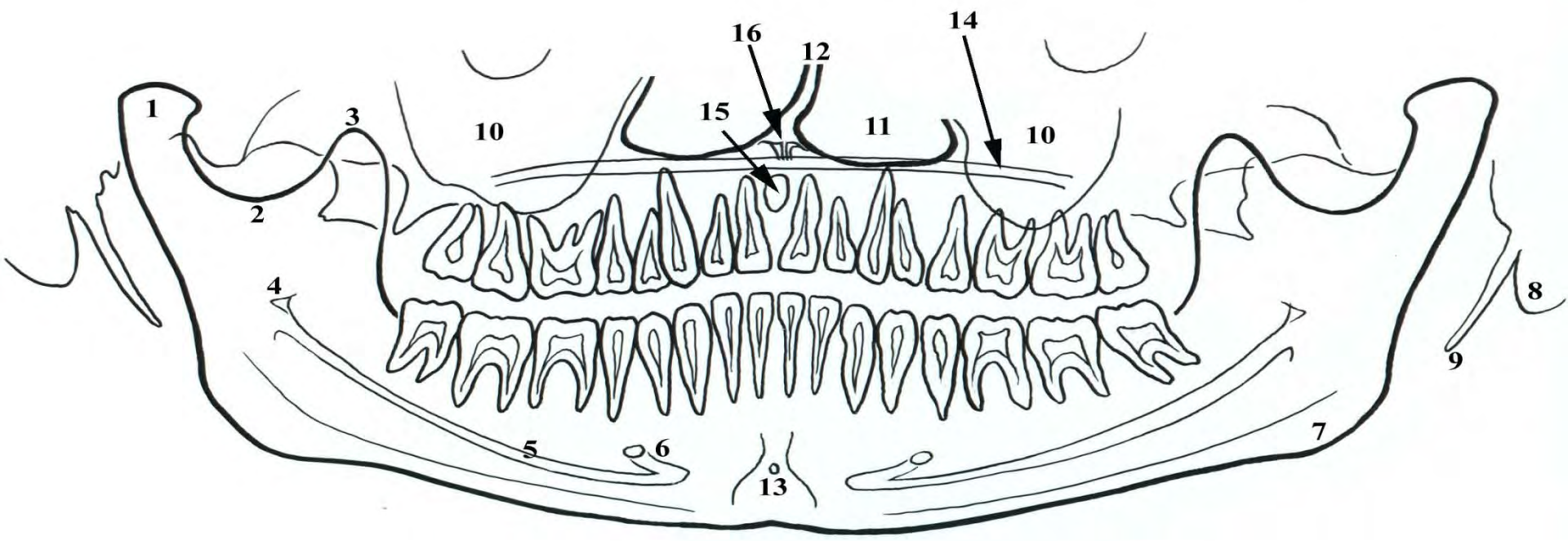
# Testing picture



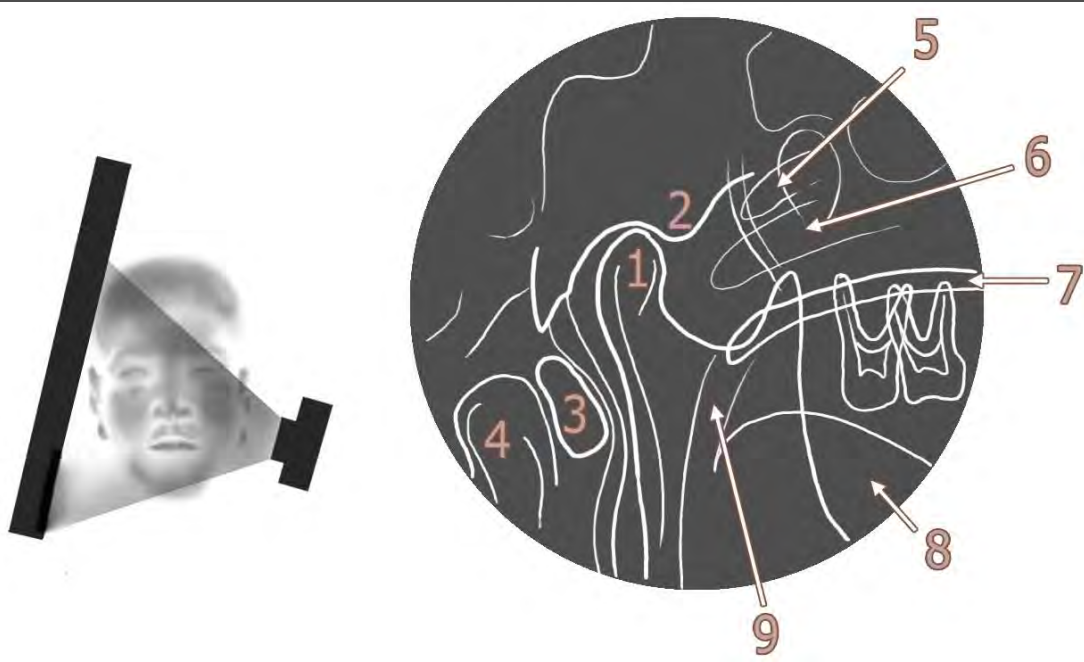
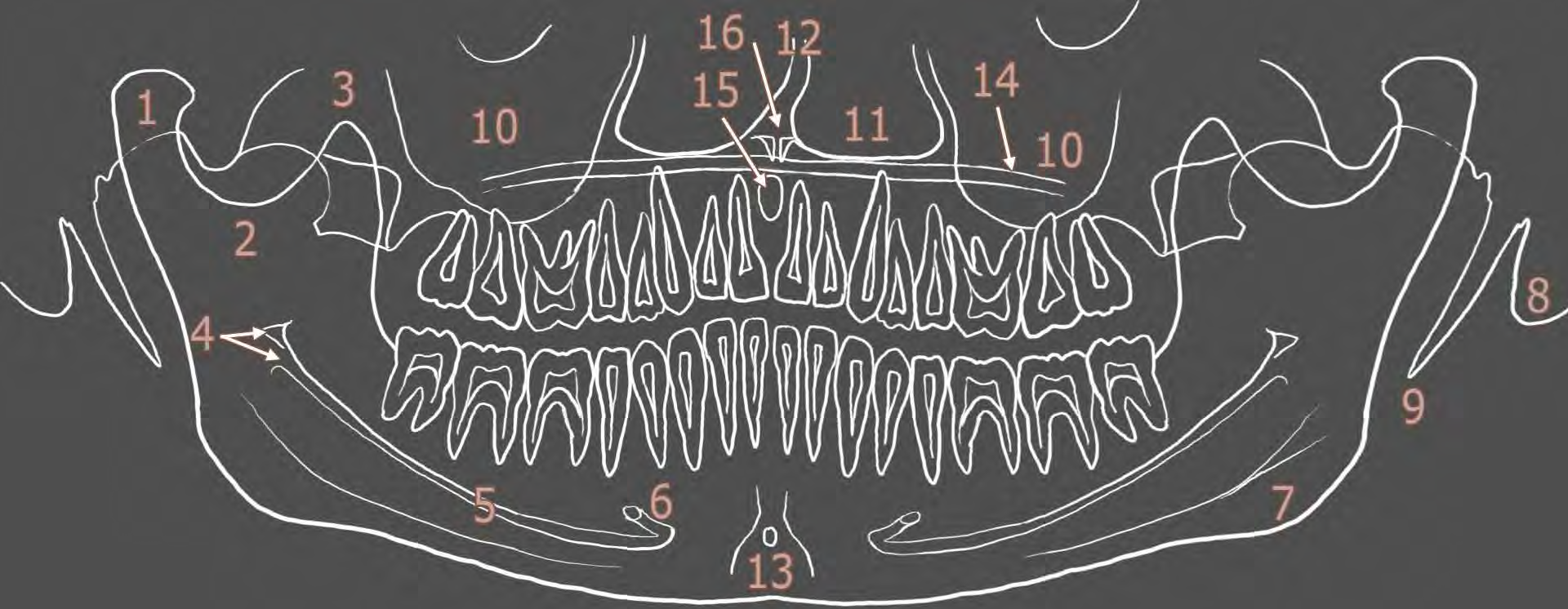




Pillar teeth of permanent dentice







Testing  
picture

# Clinical remarks

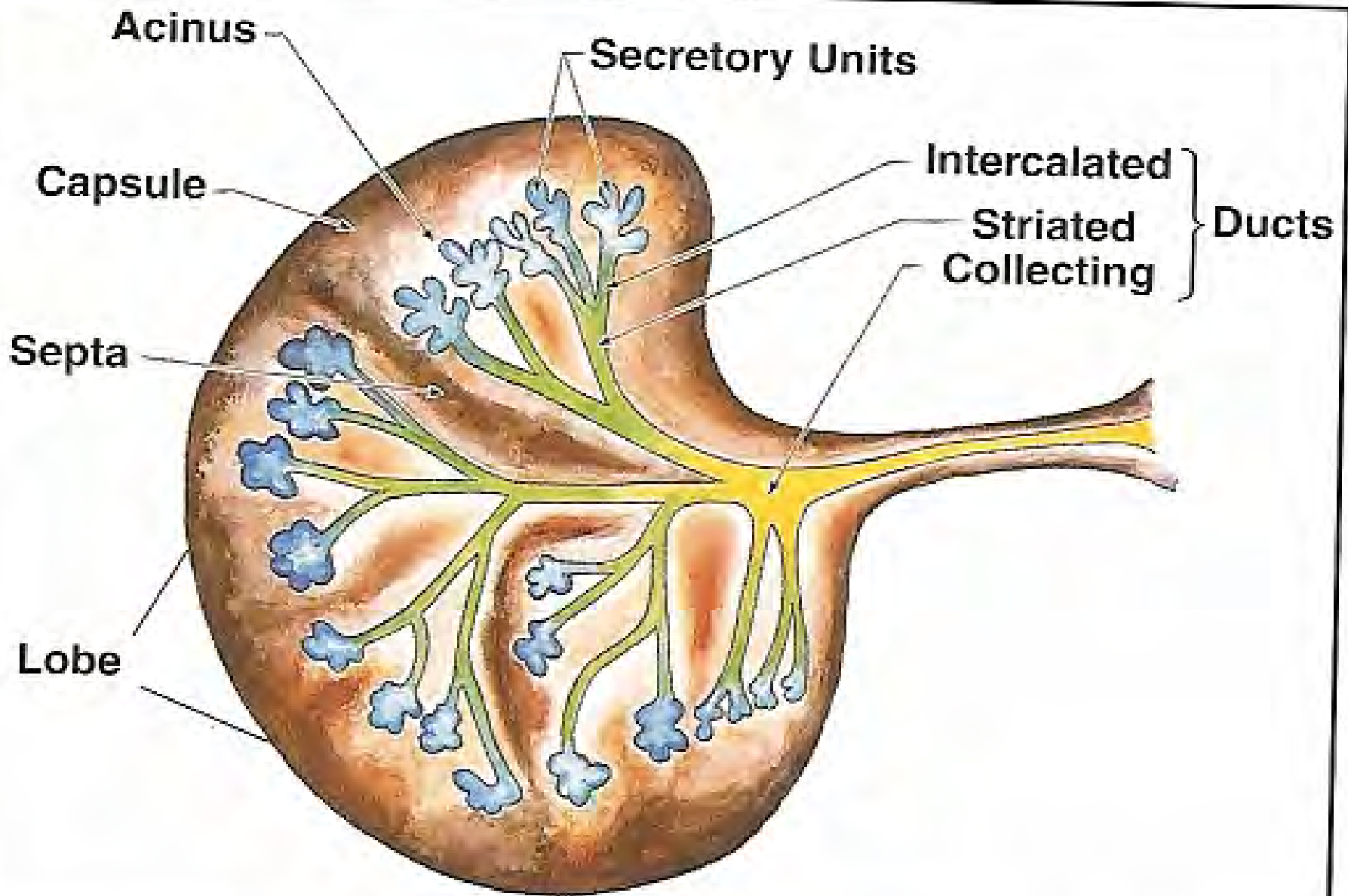


Mucocele – labial small gland is enlarged Ranula (frog) – relates to sublingual gland

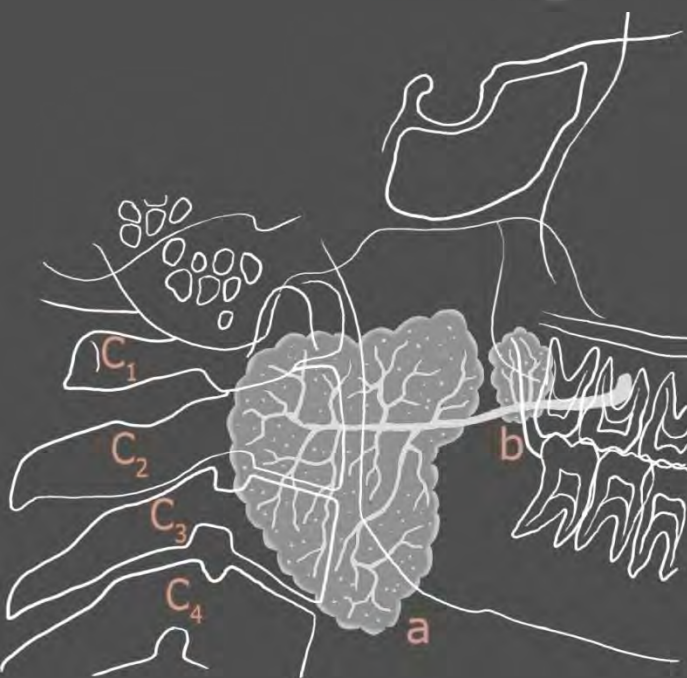
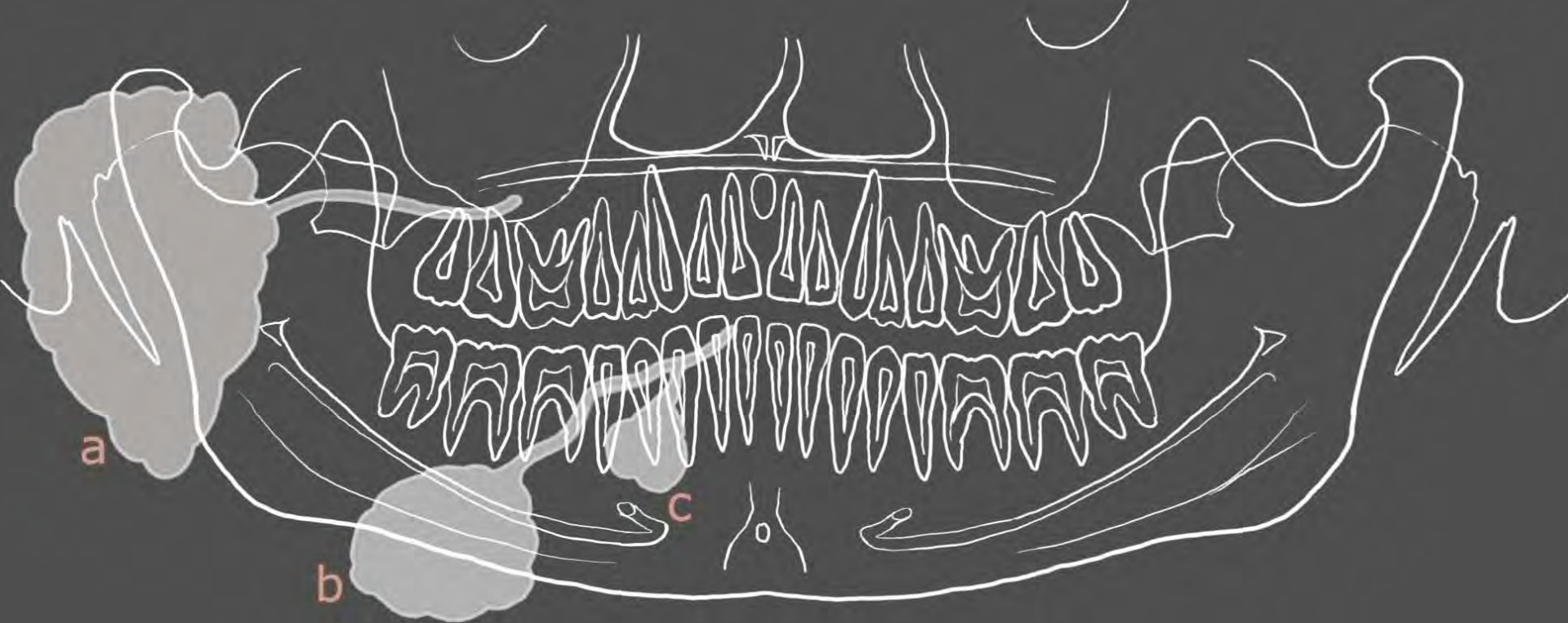


Sialolite (calculus) inside  
submandibular duct

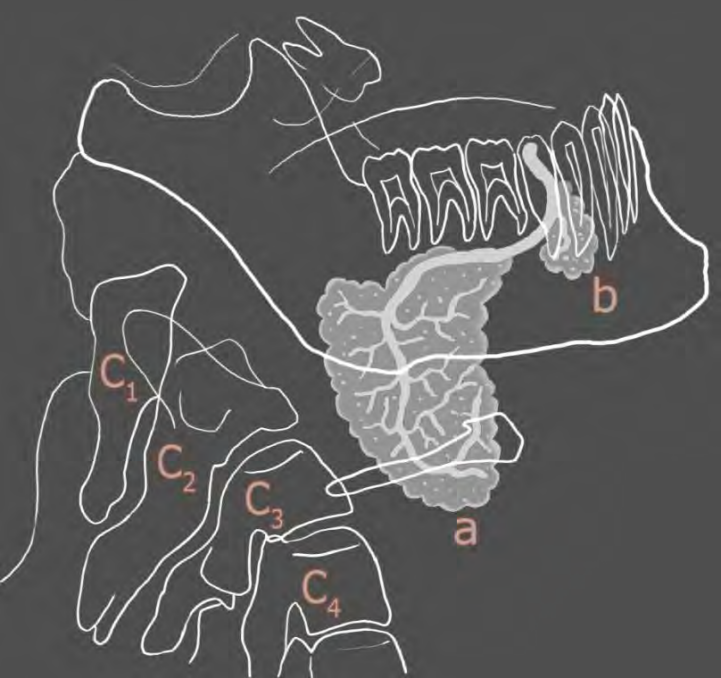
# Salivary glands

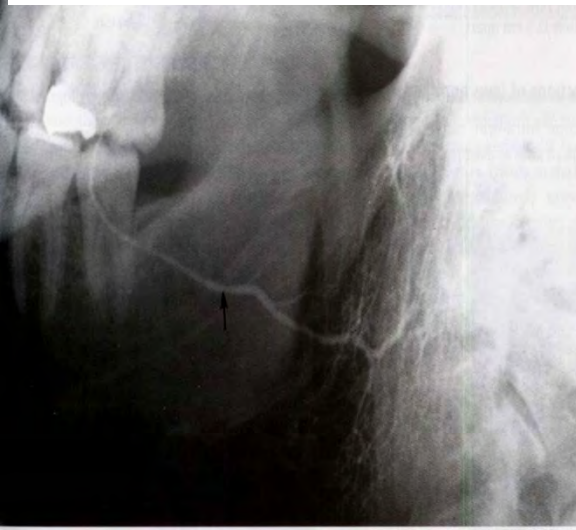
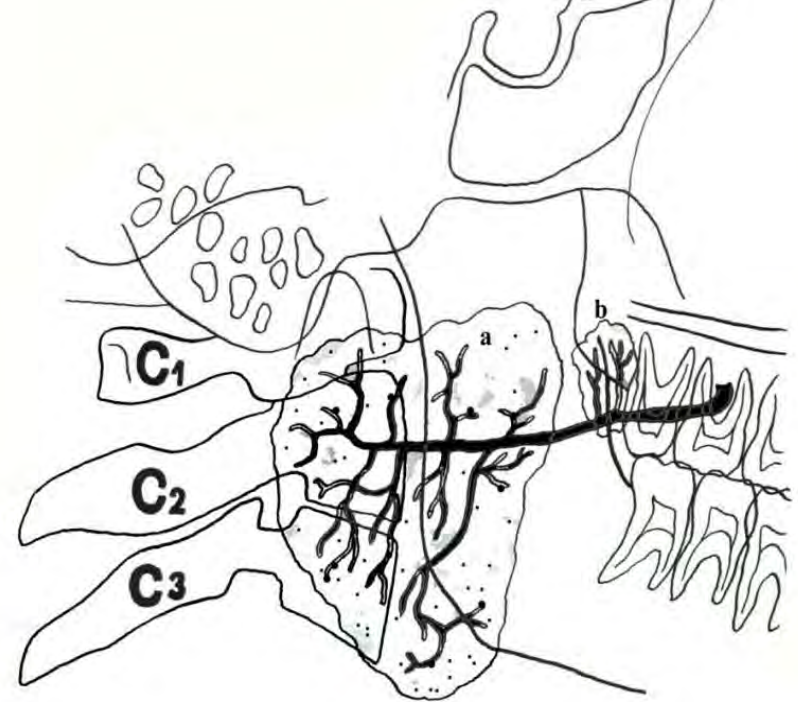
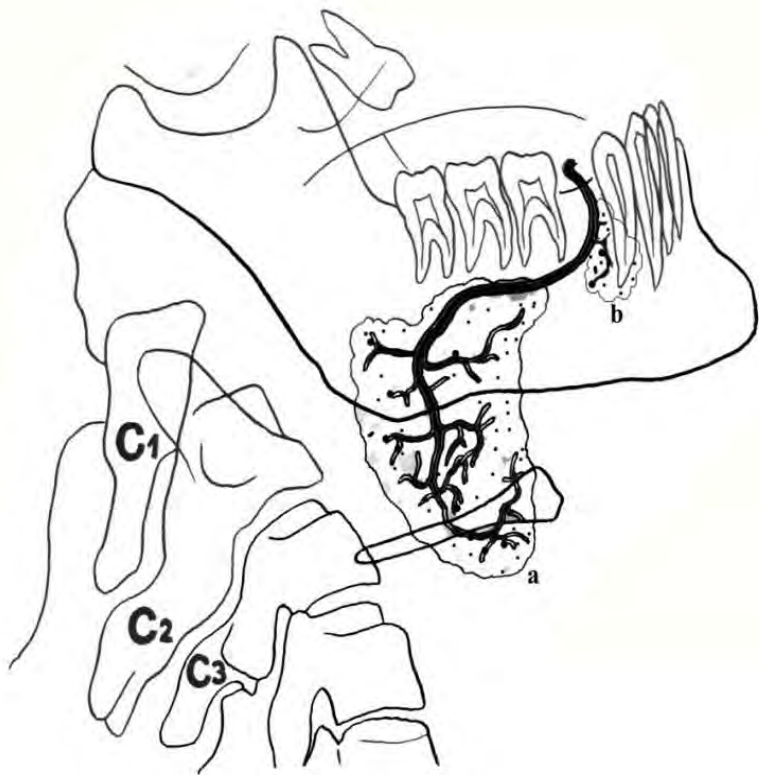


**Gland parts: Acini, grouped to lobes, septae, capsule**

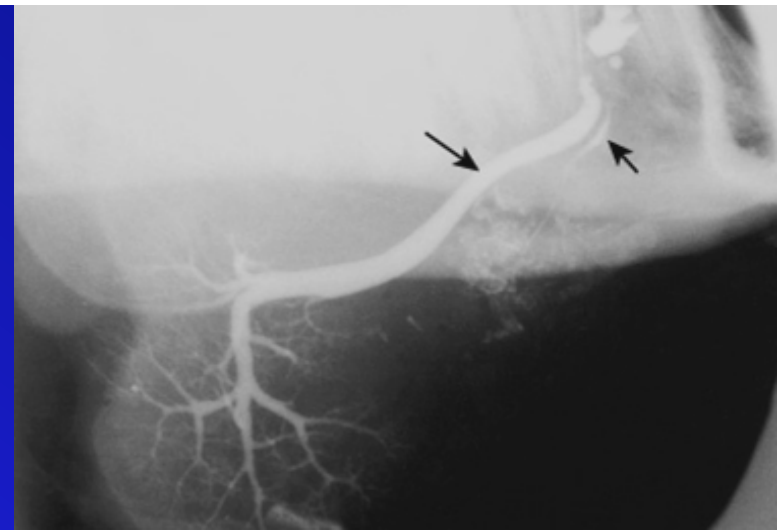


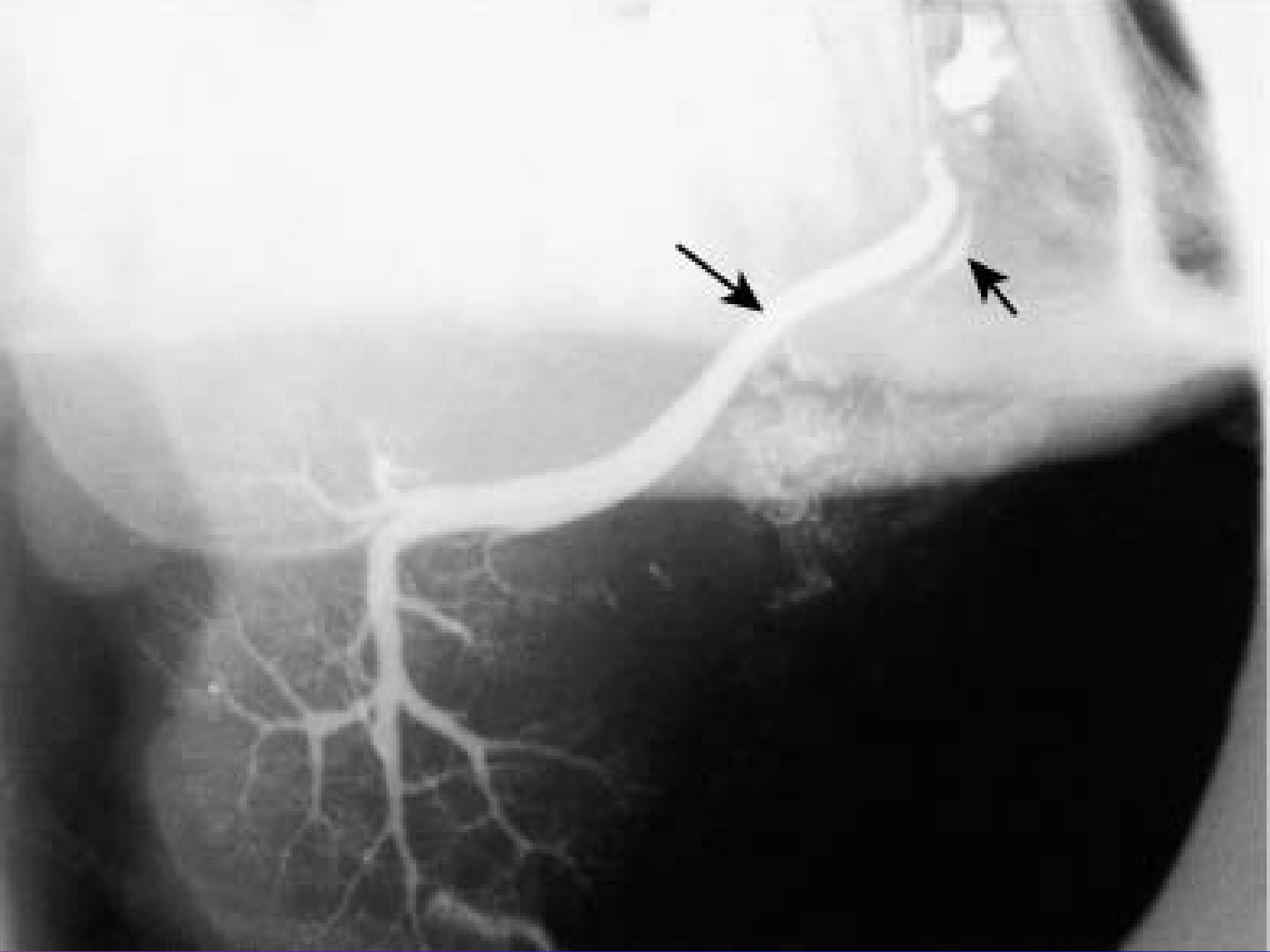
X- ray pictures:  
Parotic  
sublingual  
and  
submadibular  
Glands with  
ducts

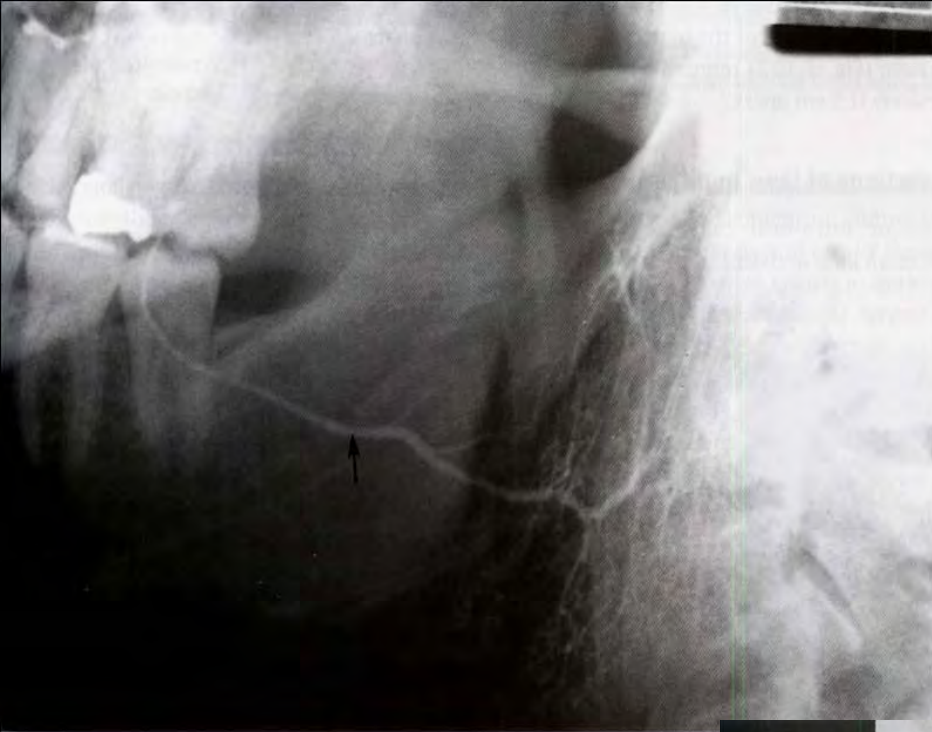




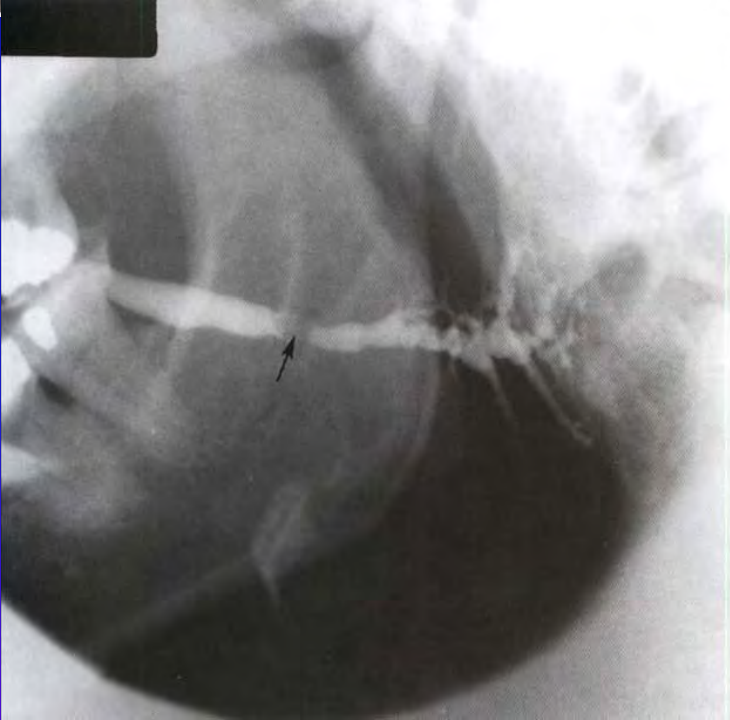
Panoramatický  
snímek  
panoramic X – ray  
photo





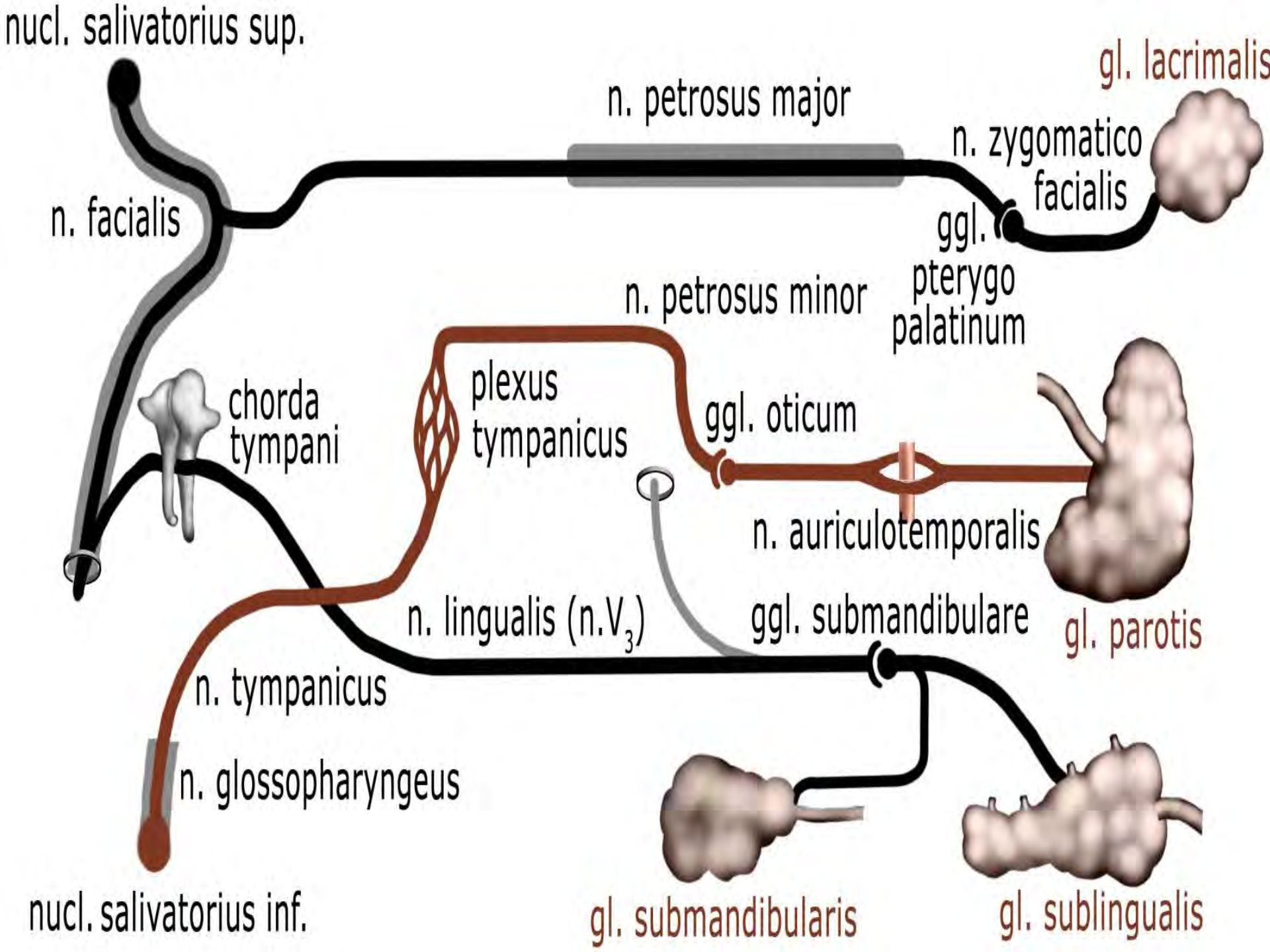


**Fig. 2.120** Sialogram showing a normal parotid gland (arrow). Courtesy of Dr N. Drage.



**Fig. 2.121** Sialogram showing an obstruction in a dilated parotid duct (arrow). Courtesy of Dr N. Drage.





# Sources

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- Own archive

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