



HLAVA HEAD

klinicky zaměřená anatomie
clinically oriented anatomy

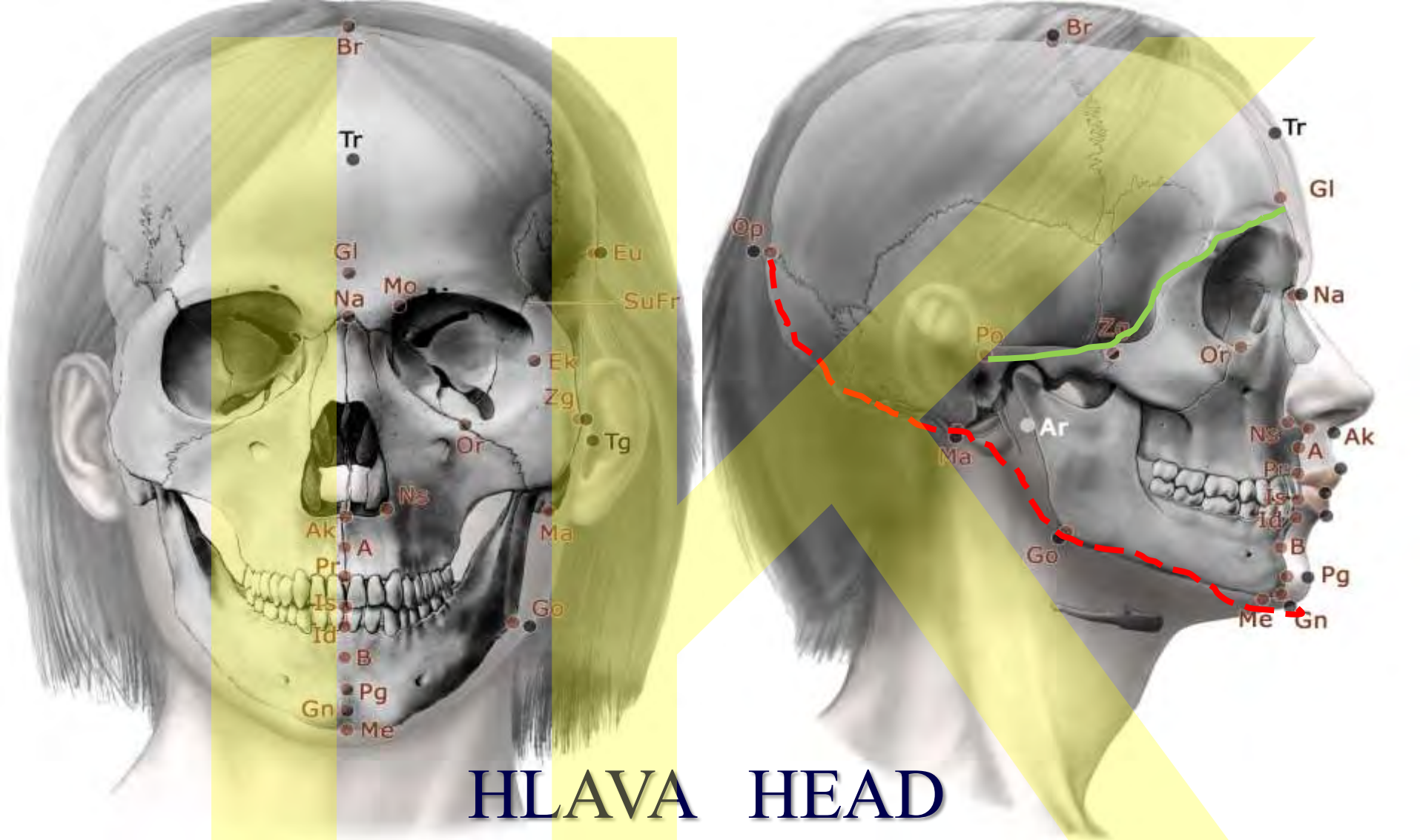
M.Grim,R.Druga et al.:Základy anatomie 5.
anatomie krajín těla

M.Schuenke et al.: Atlas of Anatomy. Head
and Neuroanatomy

V.Seichert:Anatomická pitva

V.Seichert:A little anatomical atlas

Ivo Klepáček



Linie mezi hlavou
a krkem
Line between head
and neck

Mozková část Brain part
Obličejová část Face part

Gnathion, menton,
gonion, mastoideale,
opisthokranion (inion)

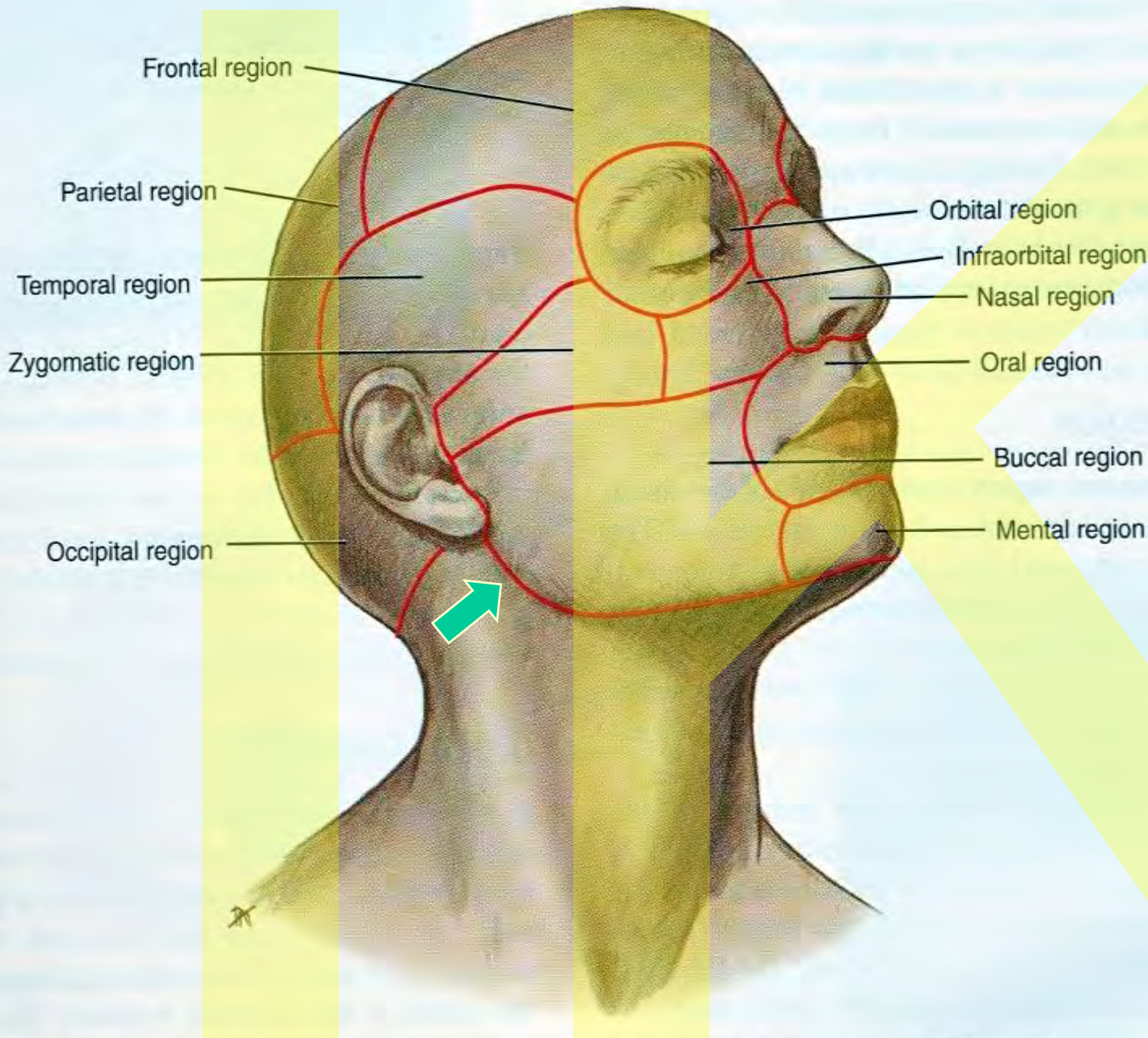
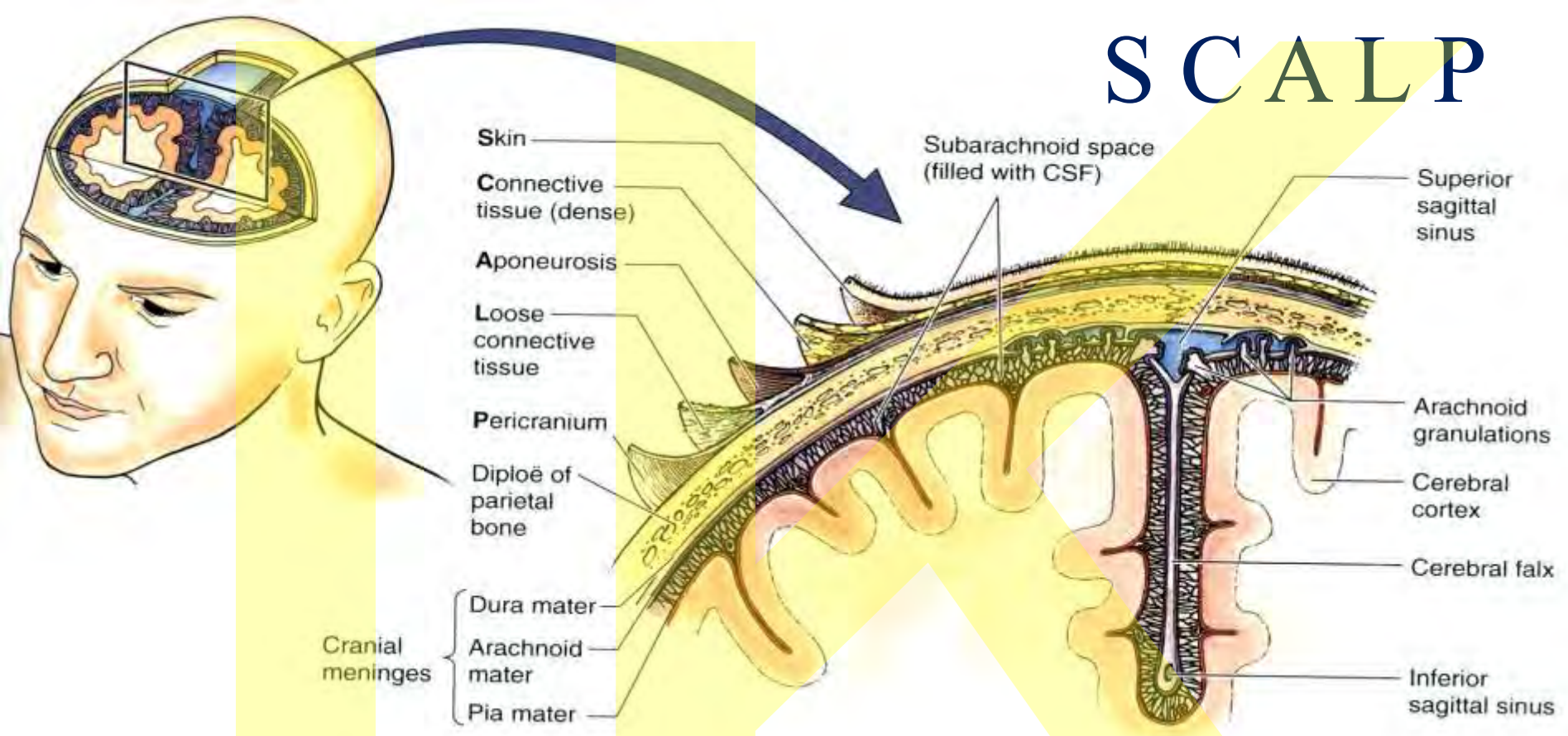


FIGURE 2-1 Regions of the head: frontal, parietal, occipital, temporal, orbital, nasal, infraorbital, zygomatic, buccal, oral, and mental.

Krajiny
vymezuje
povrchová
projekce
kostí
a svalů

Regiones are
selected
following
bone and
muscular
structures

SCALP



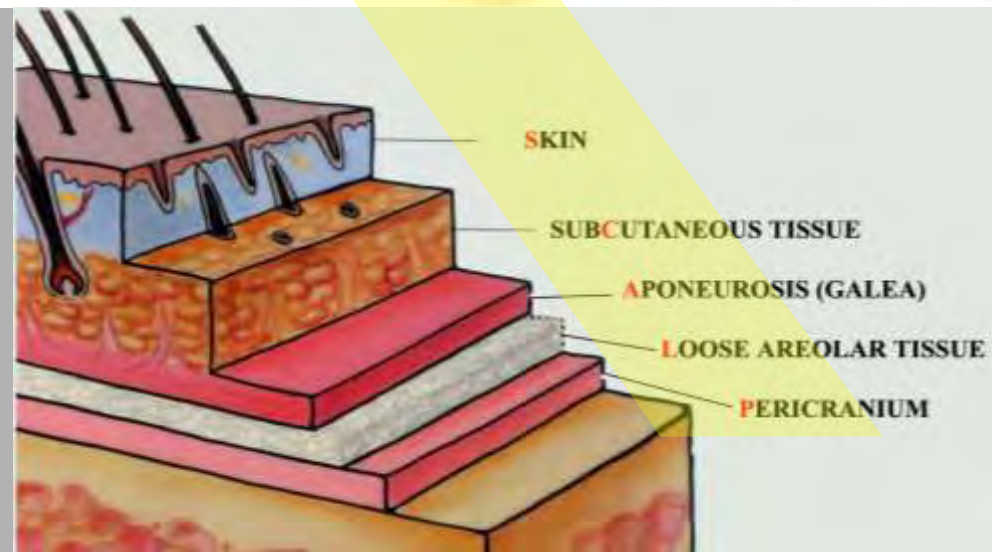
Kůže

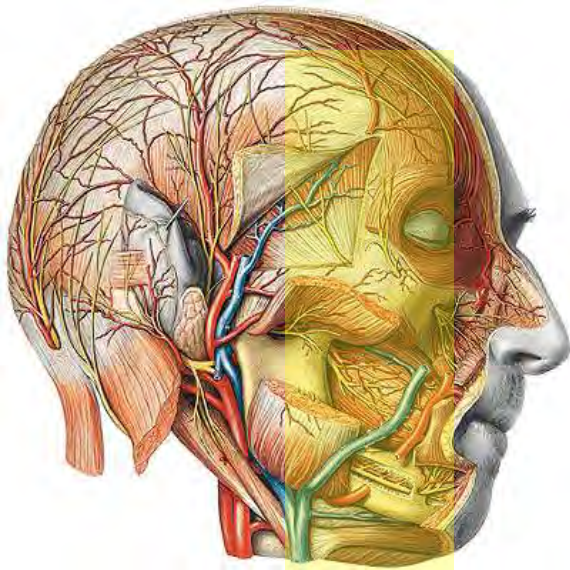
Podkožní vazivo s hustými svazky kolagenu

Aponeurosis (galea aponeurotica)

Řídké vazivo

Periost perikranium

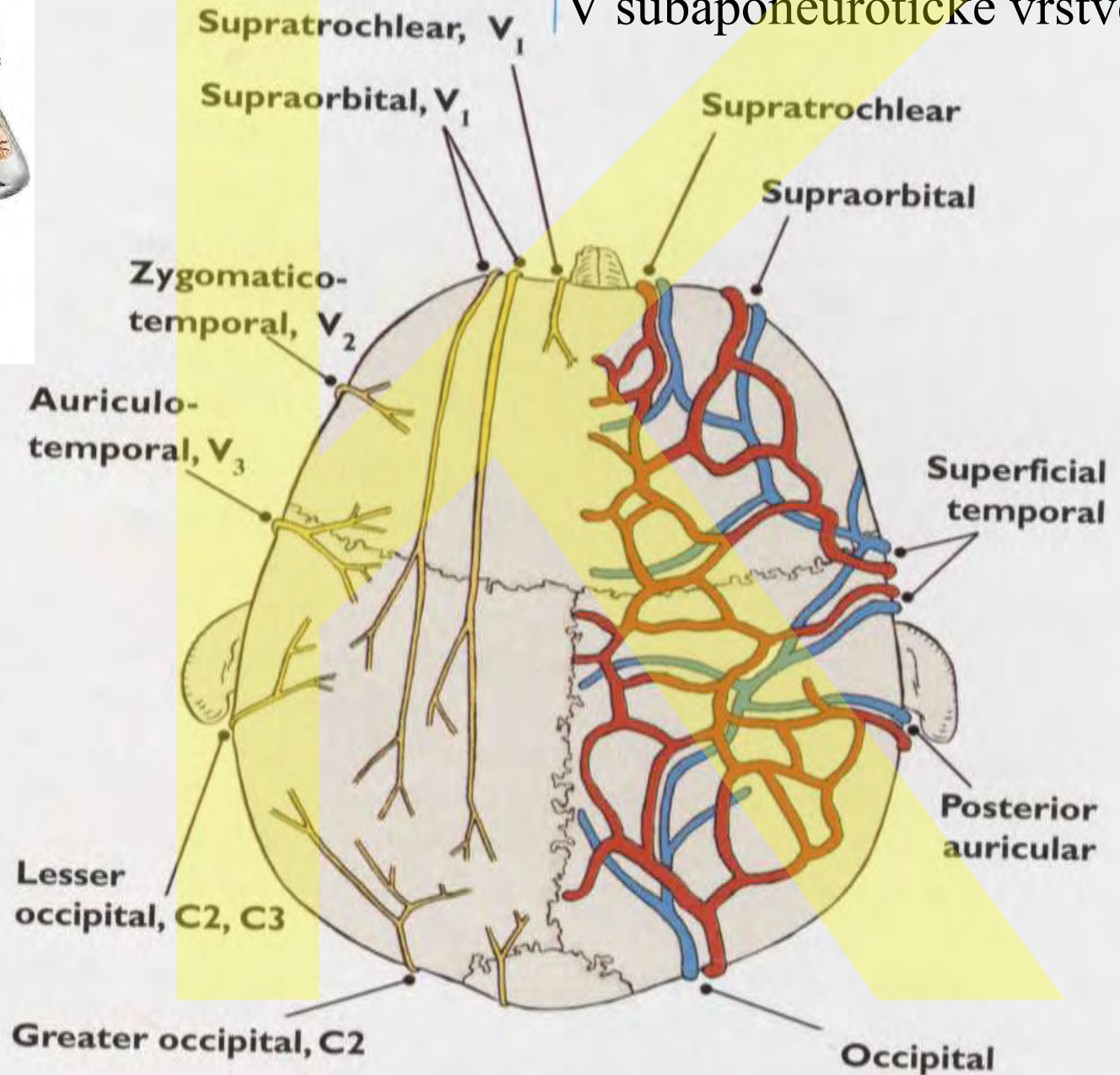




SENSORY NERVES

VESSELS

V subaponeurotické vrstvě

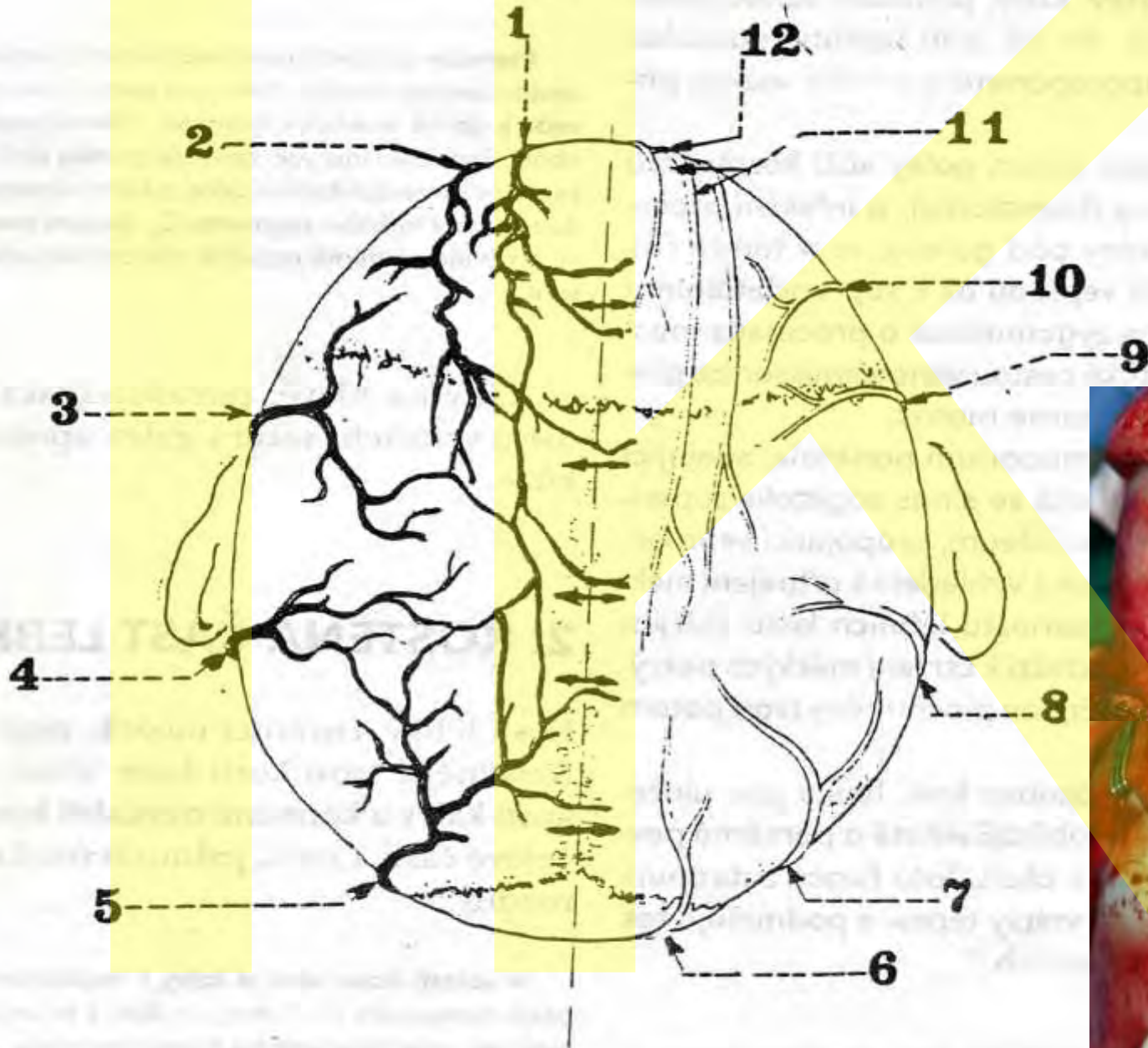


Venae ústí do
v.jugularis ext., v.
supraorbitalis, v.
occipitalis

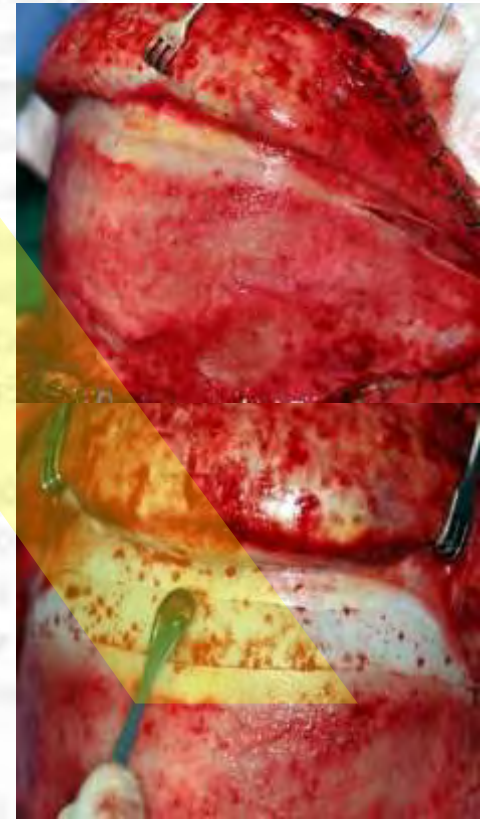
Arteriae jsou z aa.
supraorbitales,
superficiales
temporales,
auriculares

posteriores, occipitales
Nervi jsou z
cervikálních segmentů
 V_1, V_2

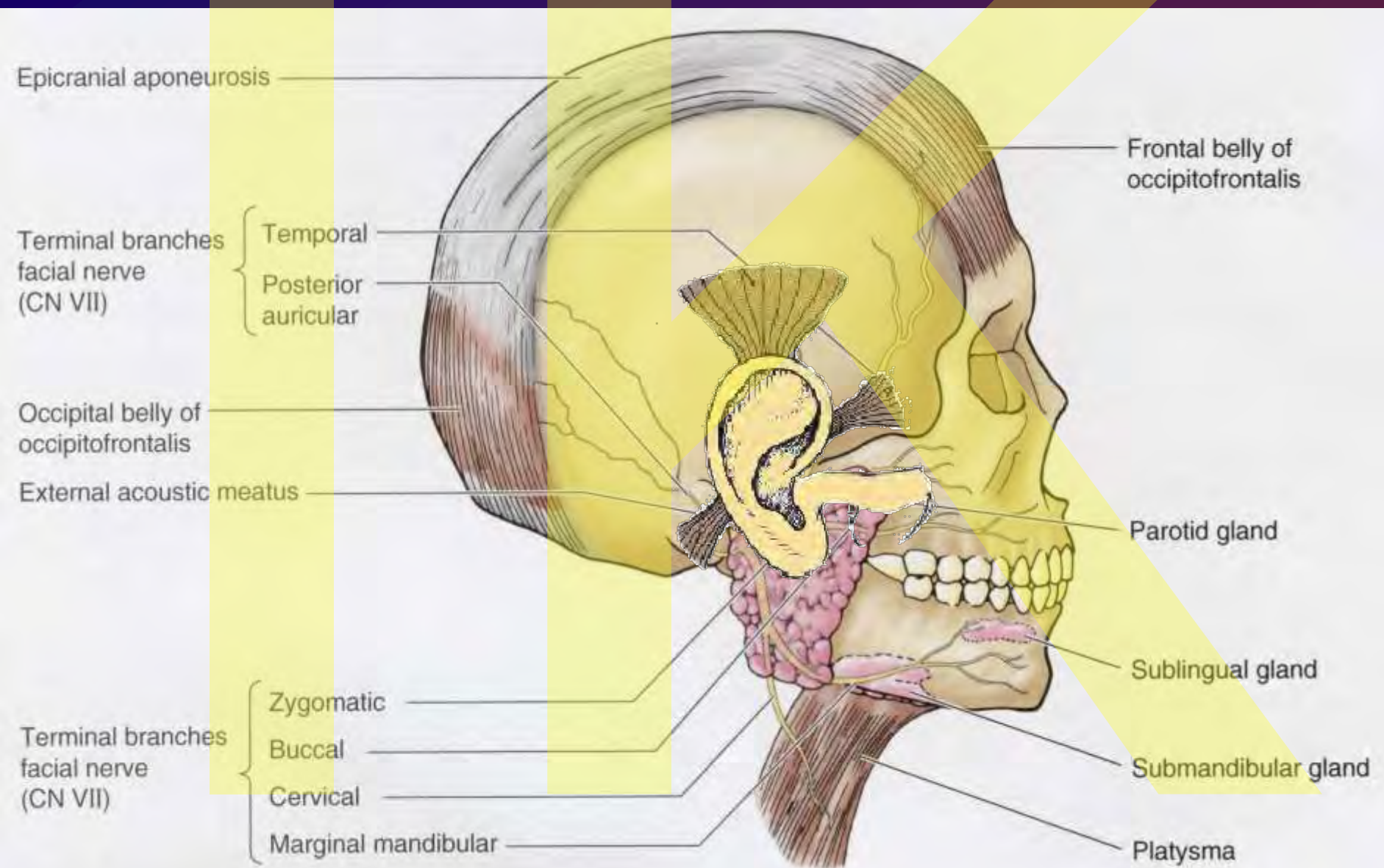
Vaskularisace a inervace měkkých pokrývek lebních (skalpu). Spolu s tepnami probíhají stejnojmenné větvy. Šipky naznačují anastomozy s druhostrannými tepnami.



- 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



Musculus epicranii (epicranial muscle: frontal, angular and occipital bellies)



kožní linie hlavy a krku skin lines of the head and neck



Line of Langer /
Relaxed skin
tension lines



Line of Kraissl /
Tension lines

- **1861 Langer's line**
 - ❑ mapped out pattern of parallel lines on cadaver
 - ❑ which indicate the direction of elastic tension of skin in particular areas
- **1951 Kraissl's line**
 - ❑ Lines of greatest tension
 - ❑ Which coincide with wrinkle line
 - ❑ are more appropriate lines for surgical incision
- **1962 Borges & Alexander**
 - ❑ termed lines of greatest tension as '*relaxed skin tension lines*'

SMAS

superficial musculoaponeurotic system

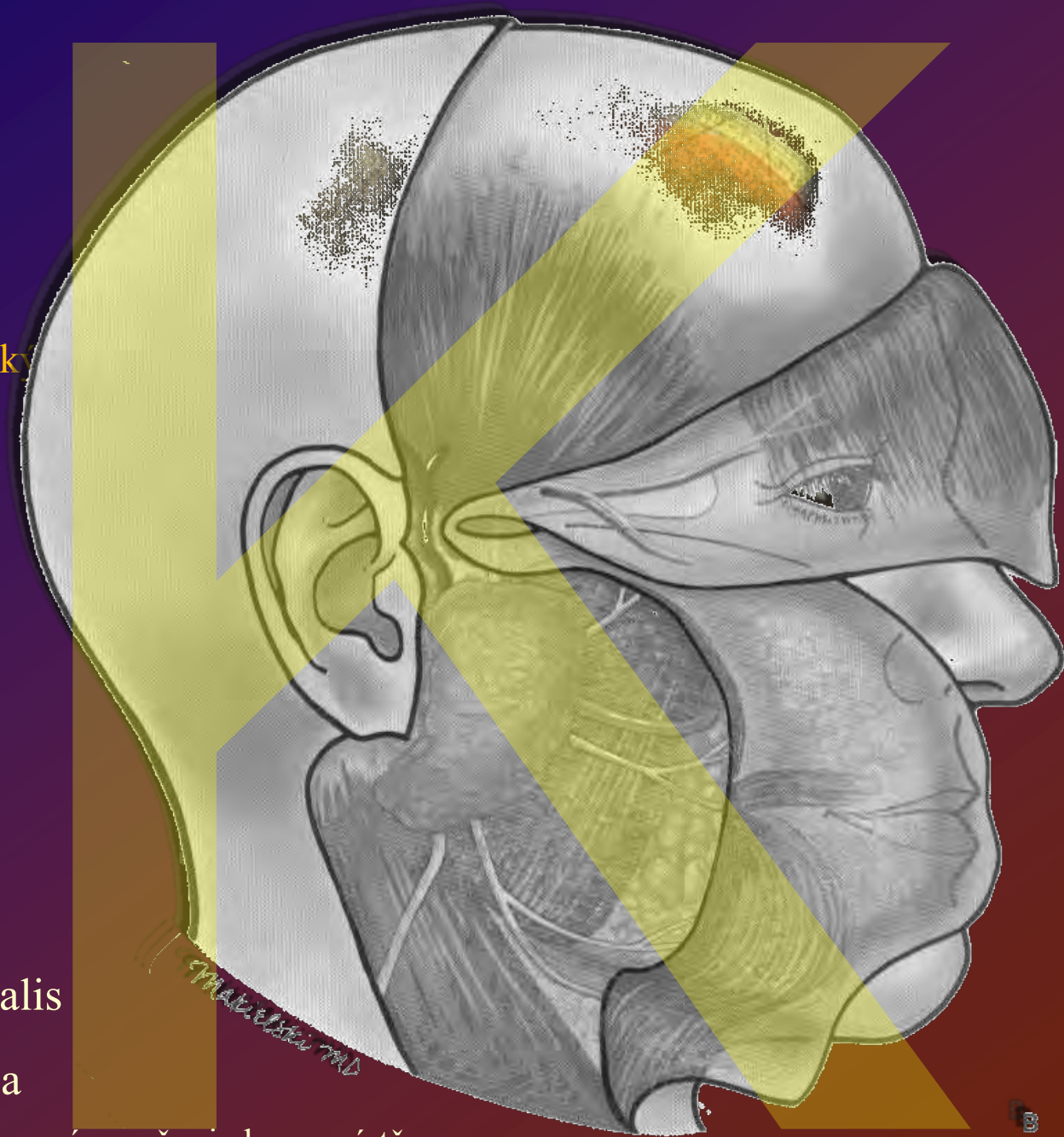
povrchový svalově-aponeurotický systém

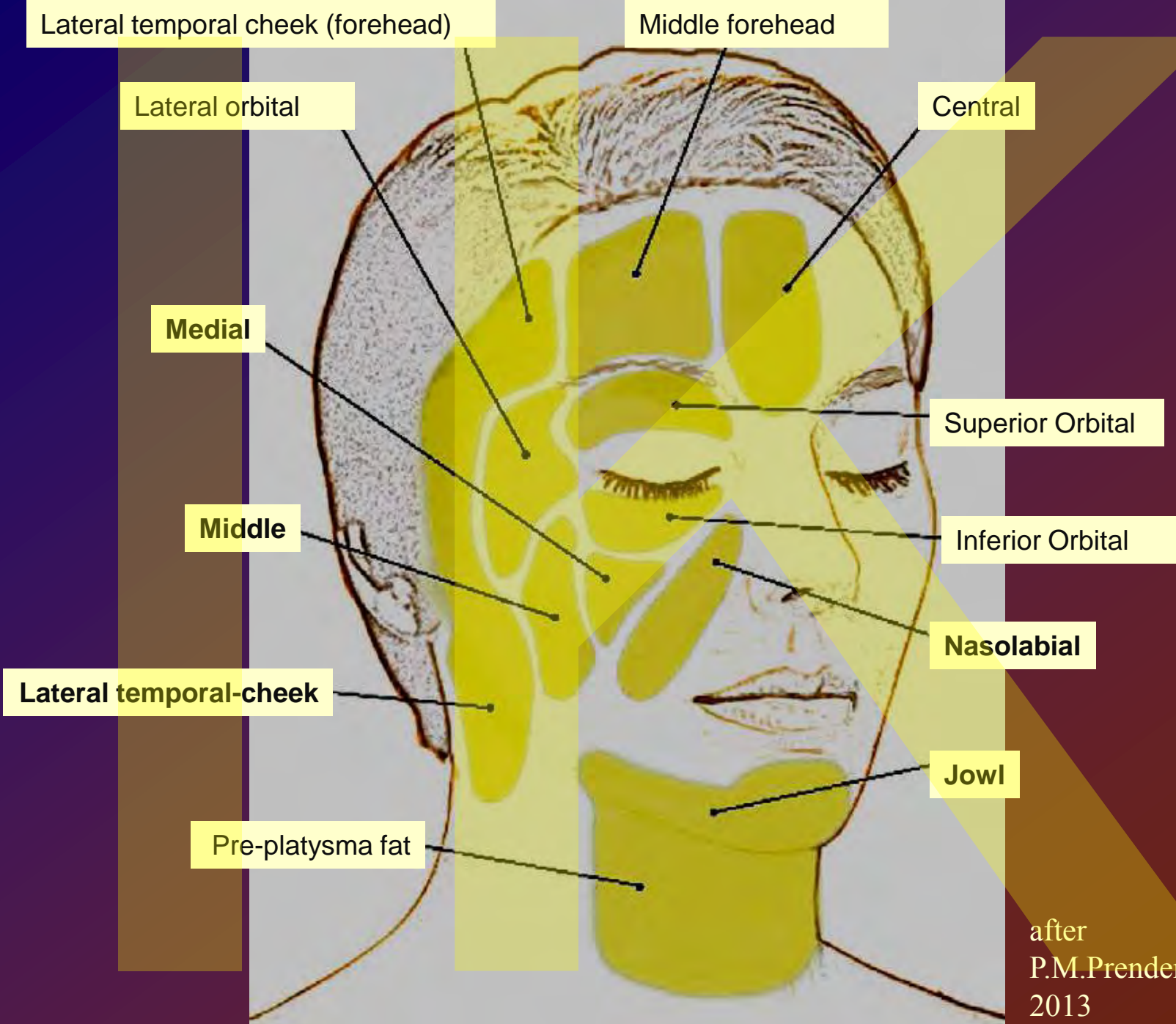
Přibližný rozsah:

Relative extent:

- musculus frontalis et orbicularis oculi
- platysma
- fascia temporalis superficialis
- fascia parotideomasseterica

Nervová vlákna vstupují do svalů ve více než v jednom místě
Nervous fibers enter mimic muscles in more than one point





Lateral temporal cheek (forehead)

Middle forehead

Lateral orbital

Central

Medial

Superior Orbital

Middle

Inferior Orbital

Lateral temporal-cheek

Nasolabial

Pre-platysma fat

Jowl

after
P.M.Prendergast
2013

Superior temporal septum

Interior temporal septum

Orbicularis retaining ligament

Medial canthus

Lateral canthus

Zygomatic ligament
(McGregor patch)

Lateral cheek septum

Superior cheek septum

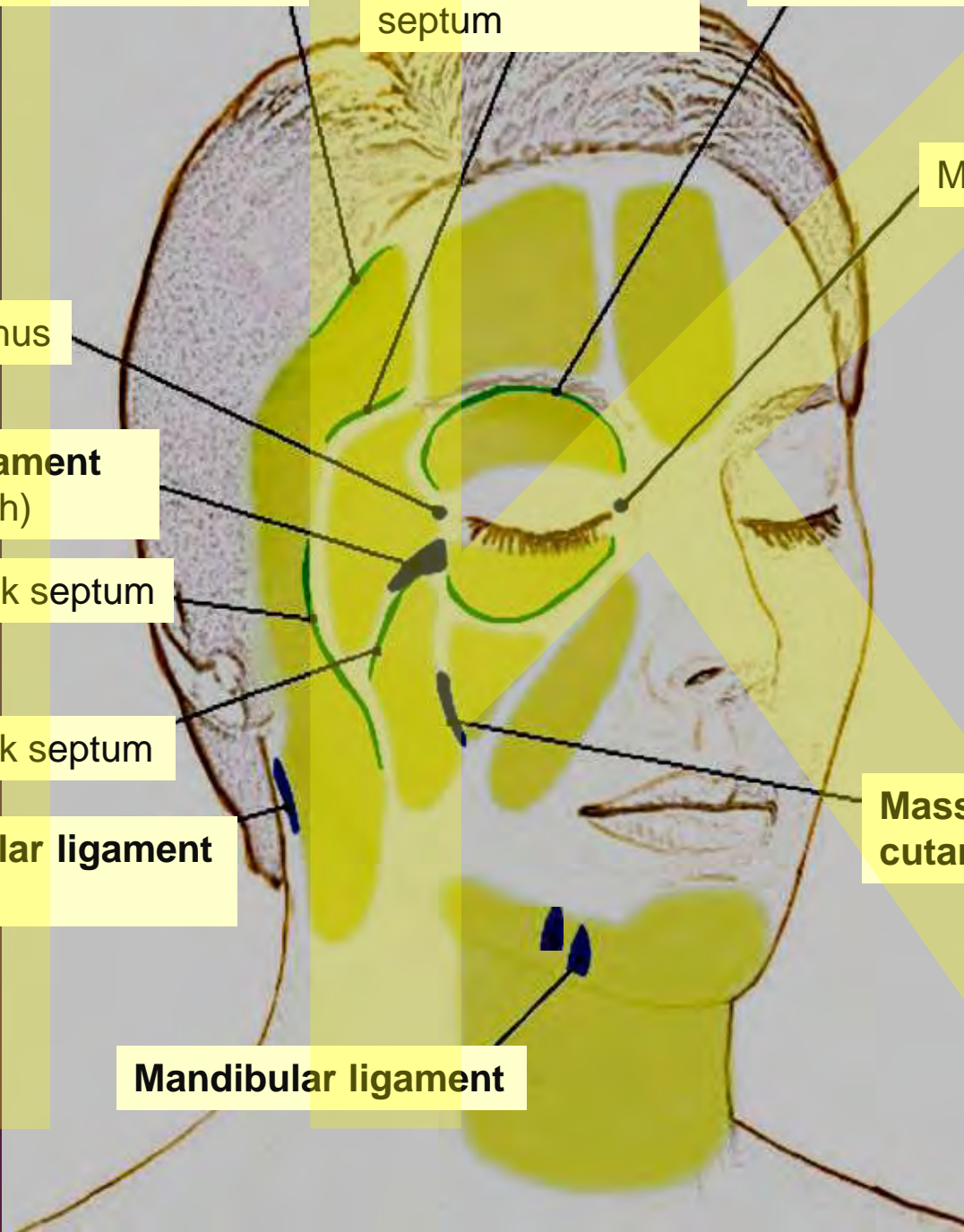
Platysma-auricular ligament
(Lore's lig.)

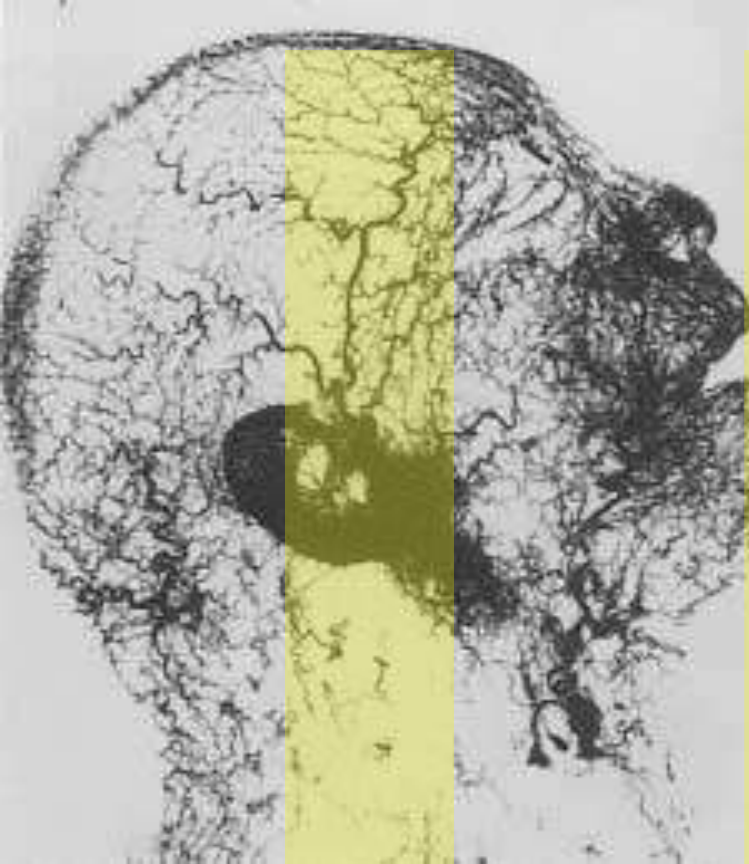
Masseteric
cutaneous ligaments

Mandibular ligament

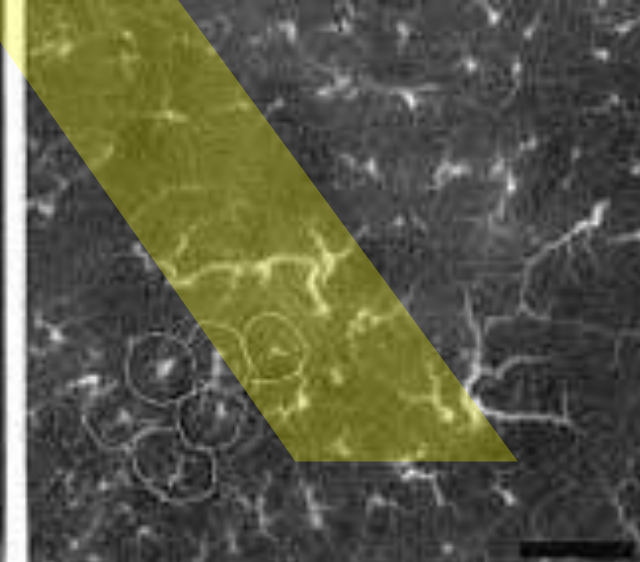
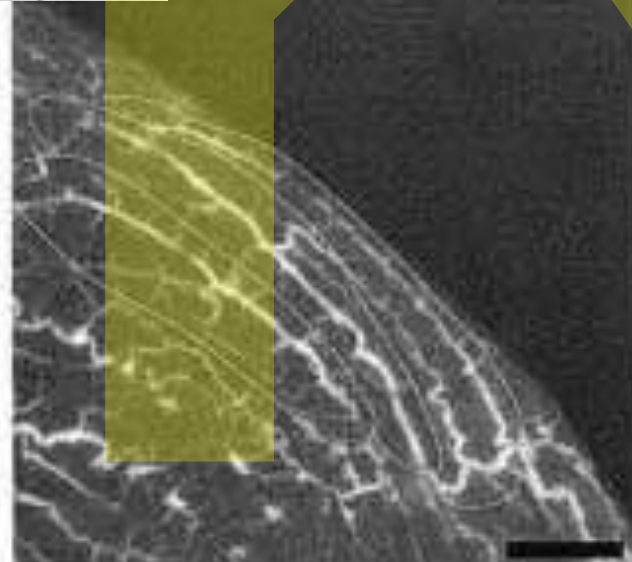
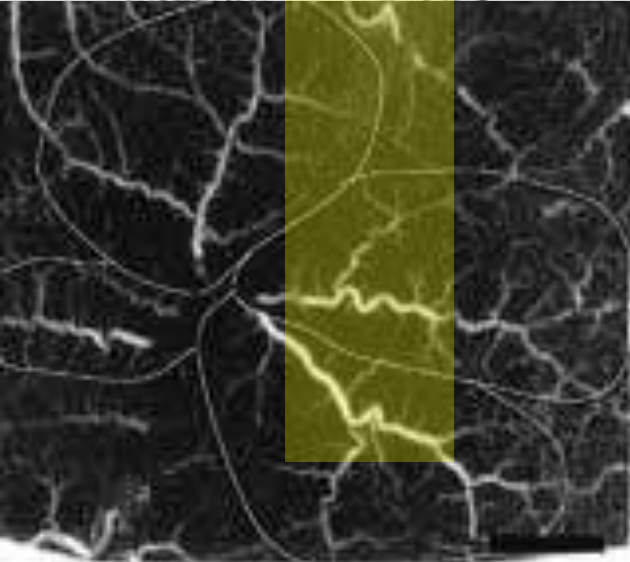
Retinacula cutis

after
P.M. Prendergast
2013





H.Chang:Arterial
anatomy of
subdermal plexus
of the face. Keio J
Med 50: (1)31-34



Povrchové tvaru vřetene nebo pásku nebo kruhové

Hluboké ploché částečně překryté vazivově-tukovou tkání



Superficial spindle-like or strip-like or round

Deep flat, partially overlapped by fibrous and fat tissue

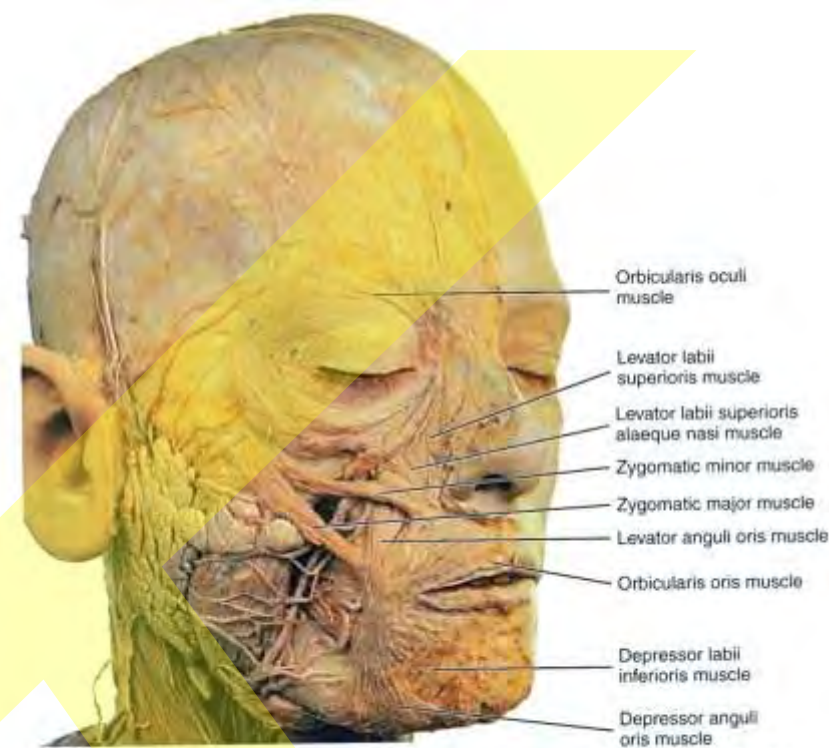


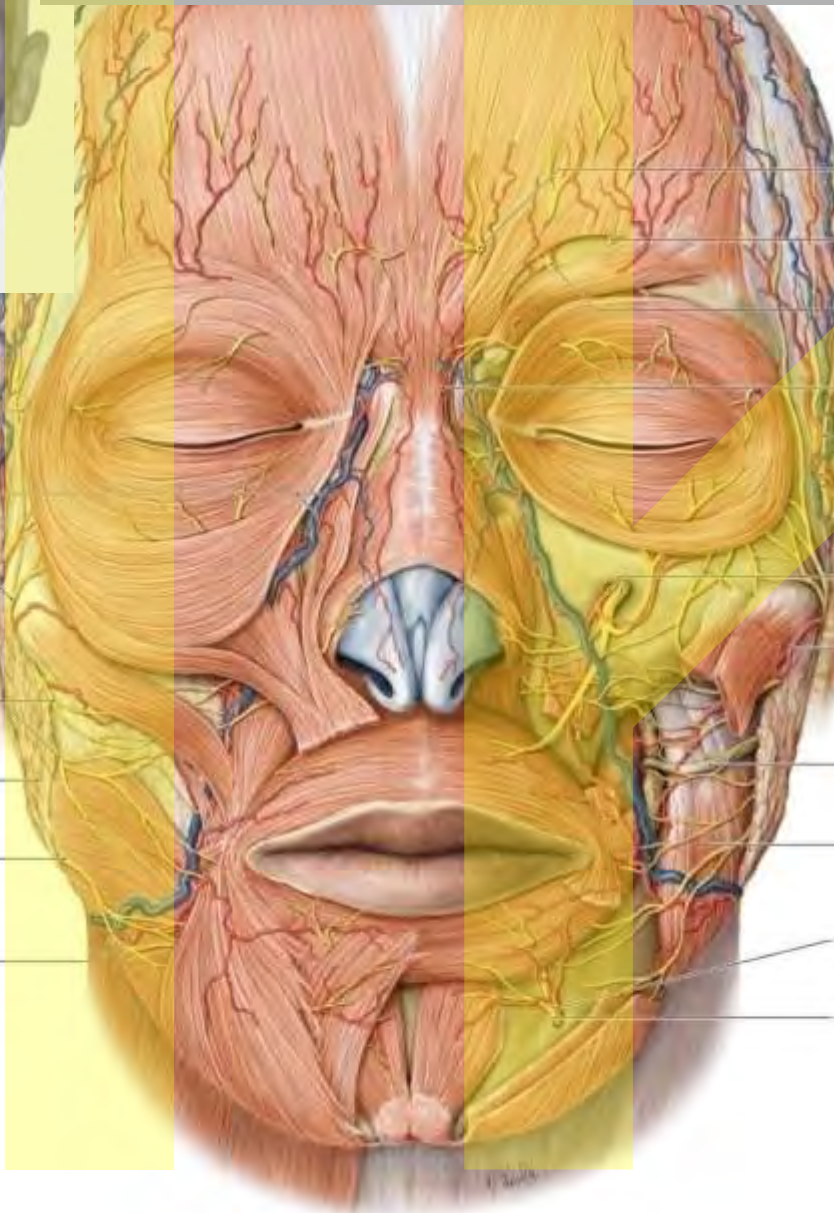
FIGURE 4-5 Superficial dissection of the face showing many of the muscles of facial expression. (From Reynolds PA, Abrahams PH: *McMinn's interactive clinical anatomy: head and neck*, ed 2, London, 2001, Mosby Ltd.)

Kožní reliéf je přibližně určen tvarem kostí a svalů a utvářením podkožní tkáně

Skin relief is roughly determined by muscles and bones and formation of the subcutaneous tissue

Mimické svaly cévy obličeje

Mimic muscles face vessels



- A. dorsalis nasi
- Aa. palpebrales laterales
- A. angularis

A. facialis

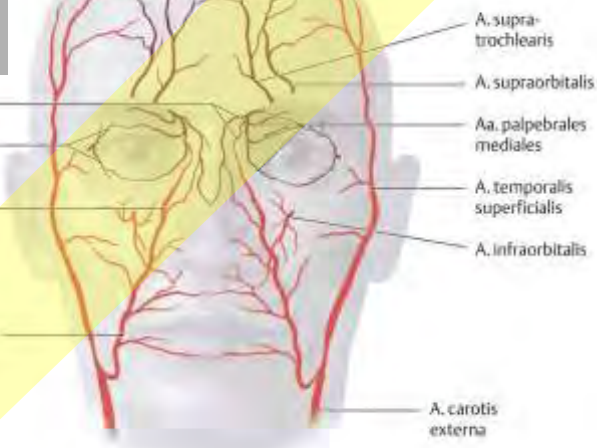
- N. auriculotemporalis
- A. u. V. temporalis superficialis
- A. u. N. infraorbitalis
- A. transversa faciei

Ductus parotídeus

M. masseter

R. mentalis, A. alveolaris inferior

N. mentalis

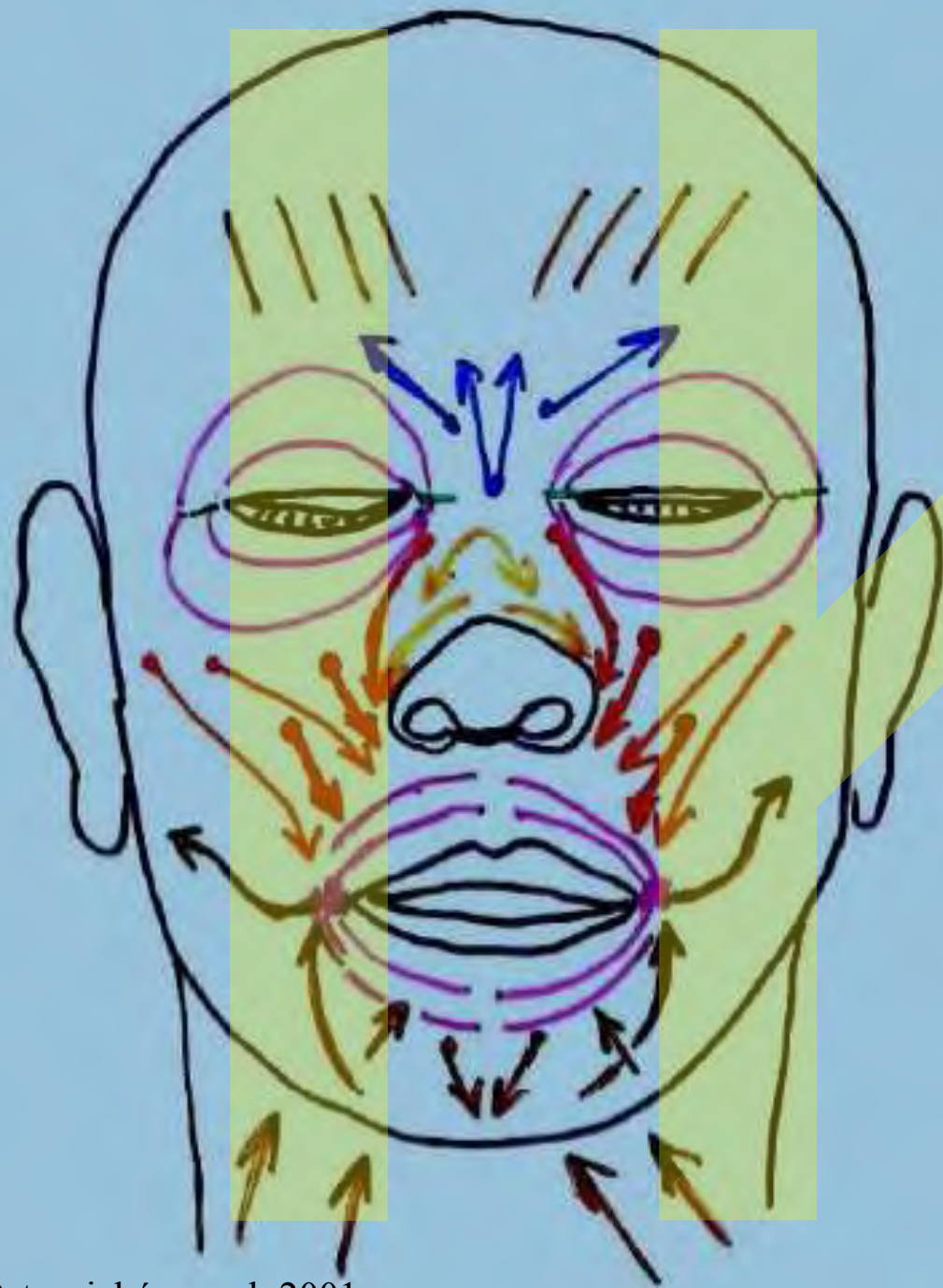


- A. supra-trochlearis
- A. supraorbitalis
- Aa. palpebrales mediales
- A. temporalis superficialis
- A. infraorbitalis
- A. carotis externa

- N. facialis, Rr. temporales
- A. u. V. angularis
- N. facialis, Rr. zygomatici
- N. facialis, Rr. buccales
- Gl. parotídea
- N. facialis, R. marginalis mandibulae
- A. u. V. facialis

trigonum mortis





Depressor anguli oris

arogance
odpor
arrogance
aversion

Zygomaticus

smích
laugh



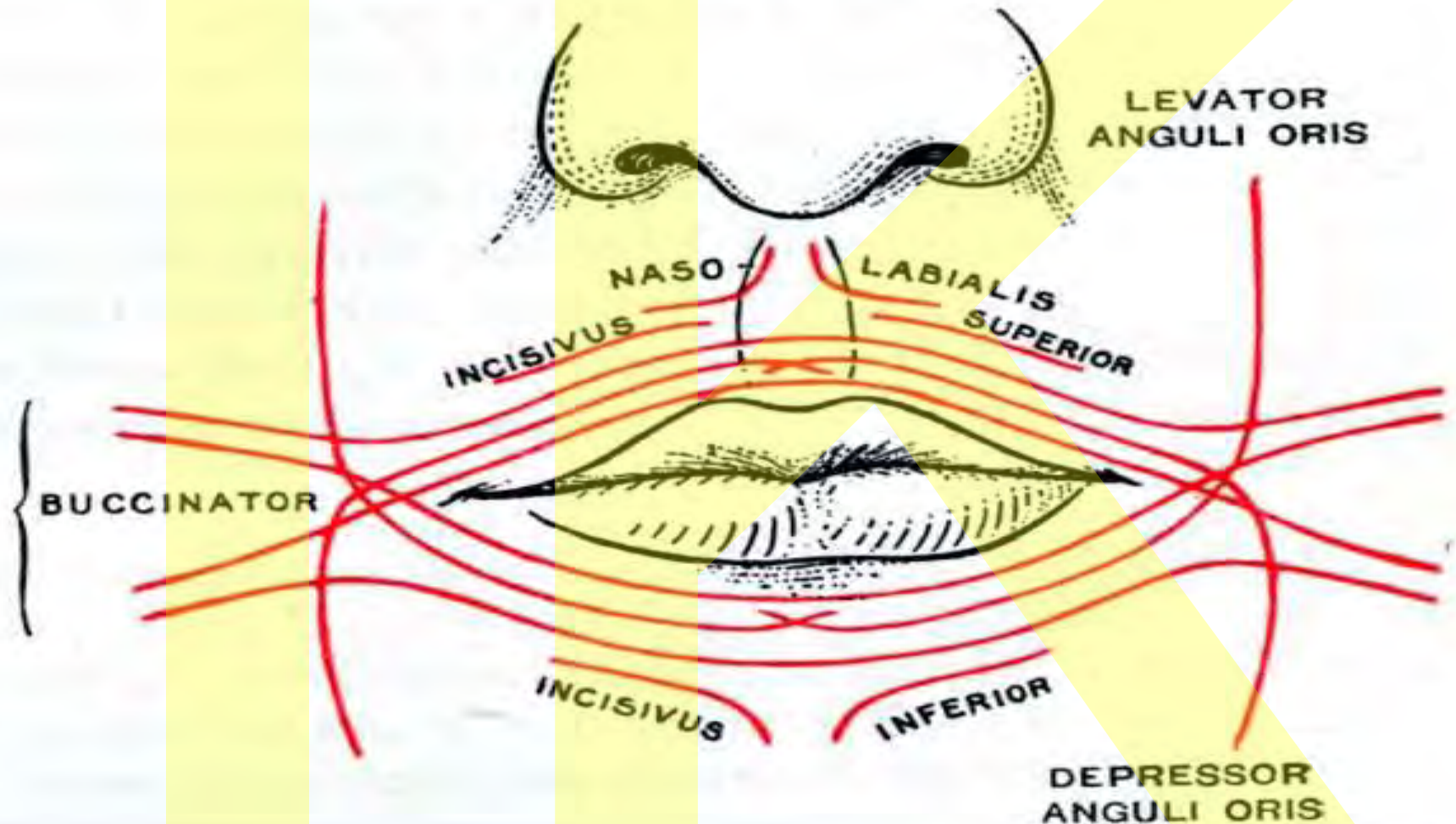
Levator labii superioris

pláč
cry

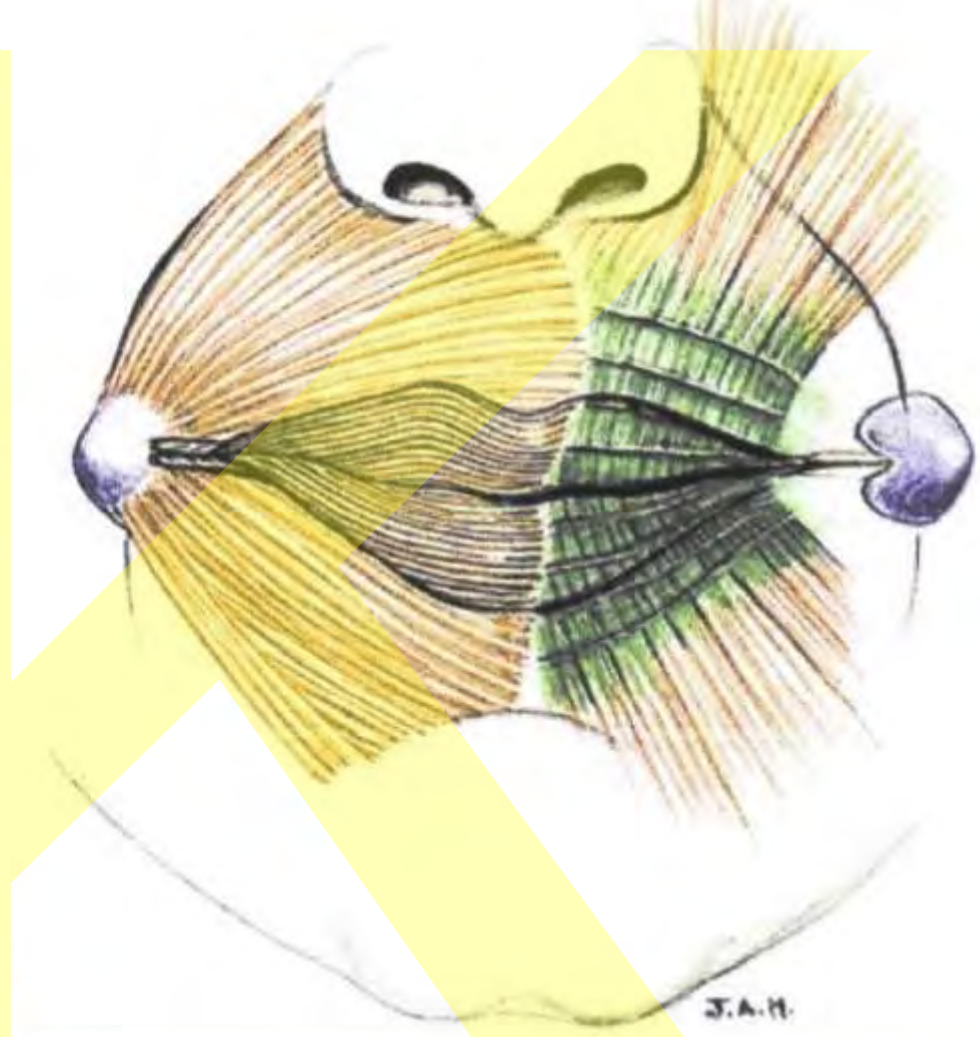
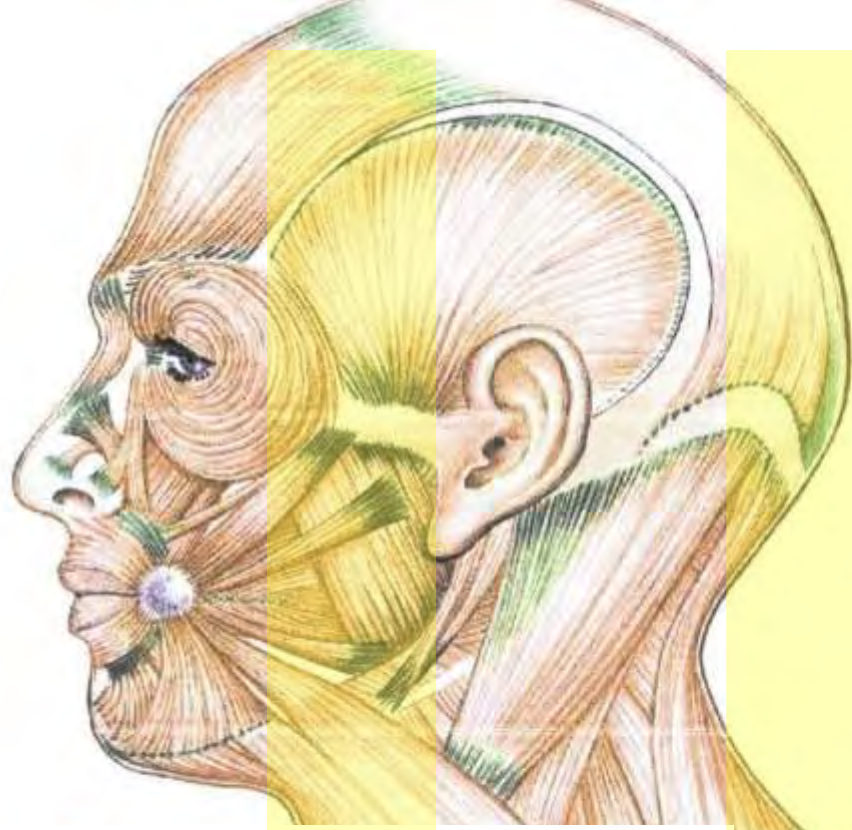
Levator alae nasi

hořký pláč
hopeless cry

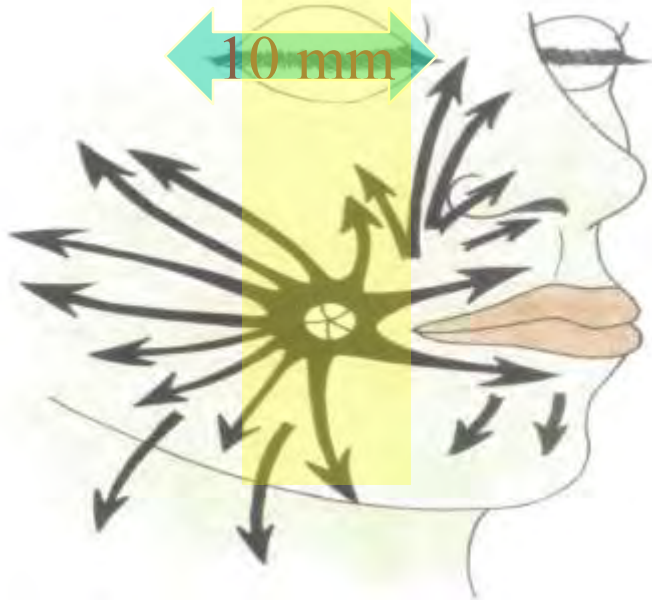
Trakční svaly: pars labialis m. levator labii superioris alaequae nasi, levator labii superioris, zygomaticus minor, depressor labii inferioris, pars labialis platysmatis
Kolmo se připojují do rtu (deprese, protrakce, everse)



Svaly kolem koutku: m. levator anguli oris, depressor anguli oris, levator labii superioris, zygomaticus major, pars modiolaris platysmatis, buccinator, risorius, orbicularis oris, m. incisivus superior et m. incisivus inferior
Hýbou koutkem (elevace, deprese, konstrikce a dilatace rima oris)



10 mm

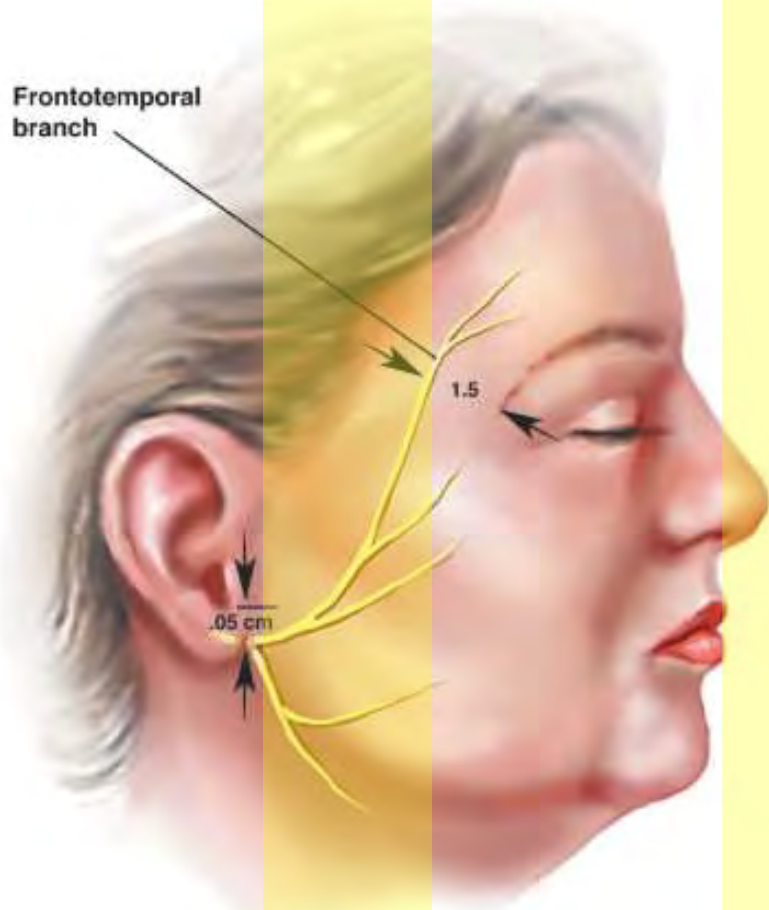


5 mm

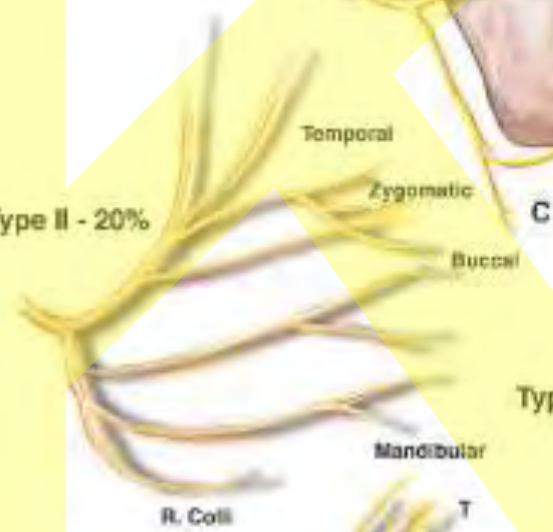
modiolus

The modiolus appears to be a tortuous, blunt conelike structure, extending vertically from the buccal mucosa to the dermis of the skin. The base of the cone is adjacent to the mucosa.

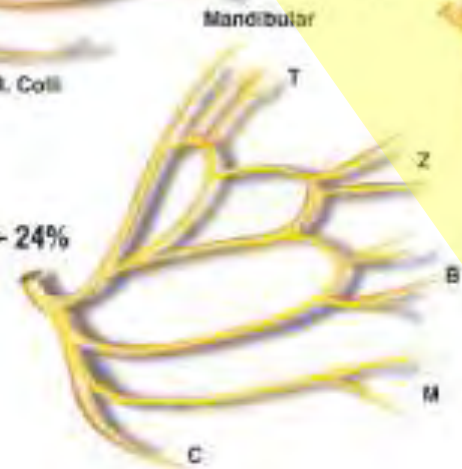
Frontotemporal branch



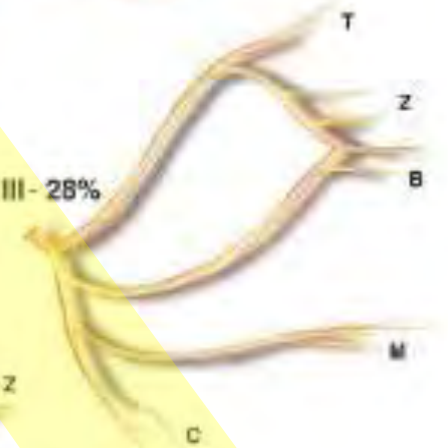
Type II - 20%



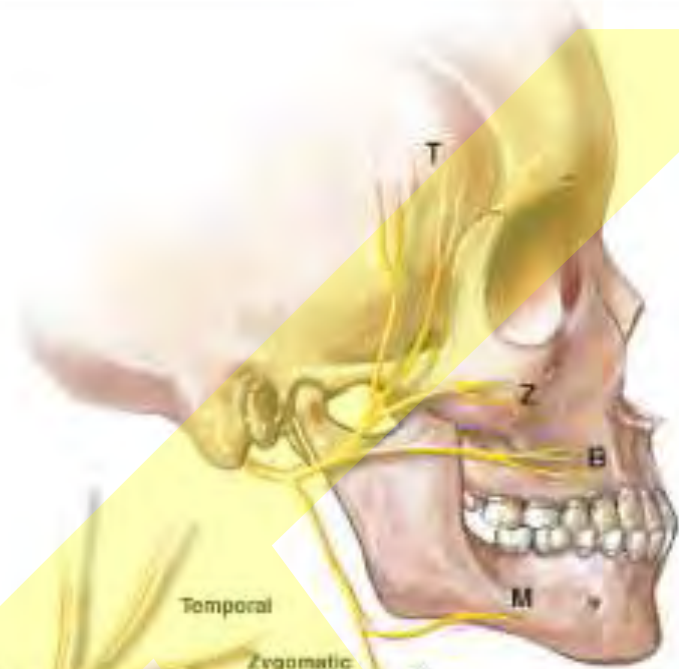
Type IV - 24%



Type III - 28%



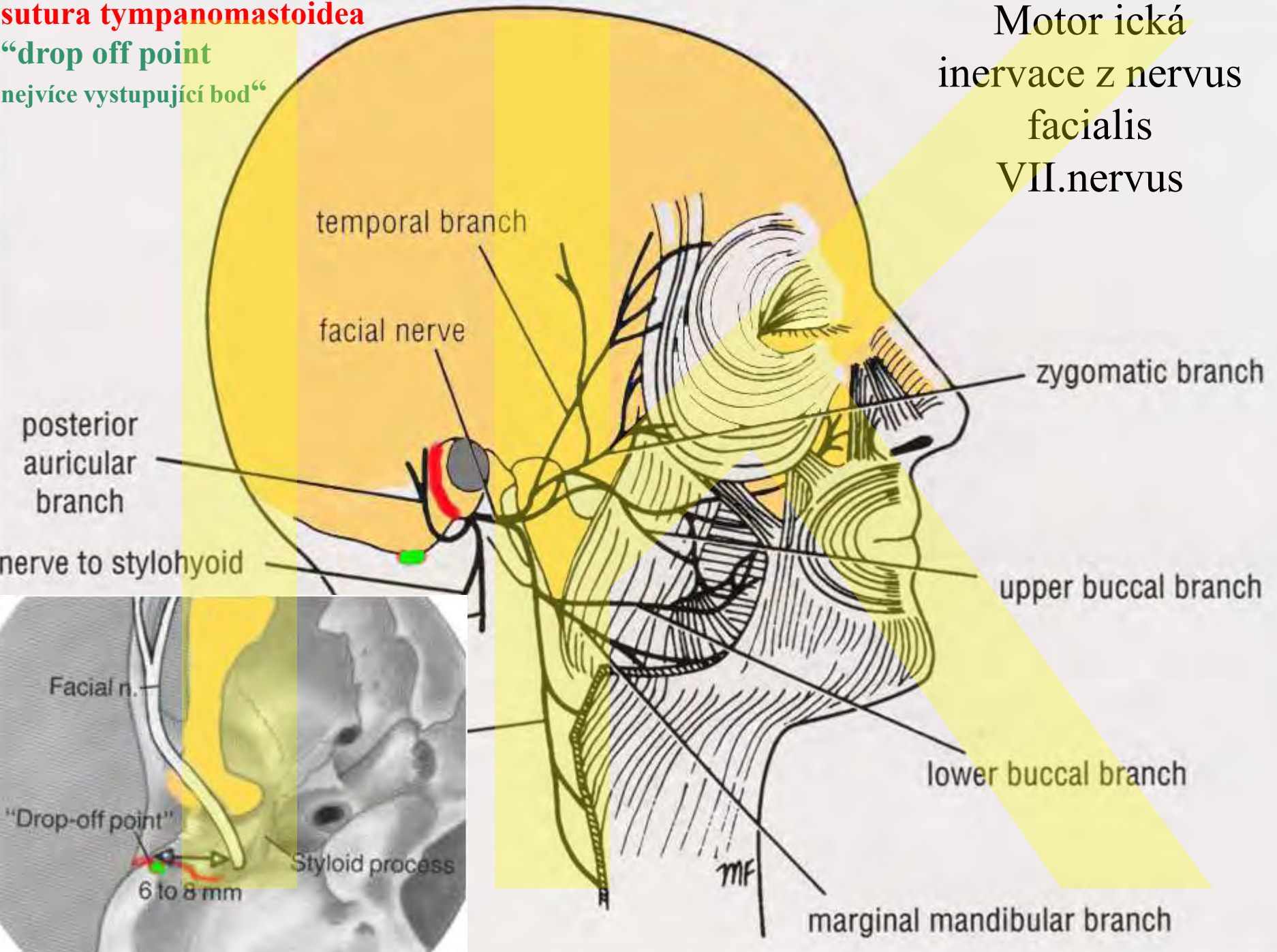
Type I - 13%



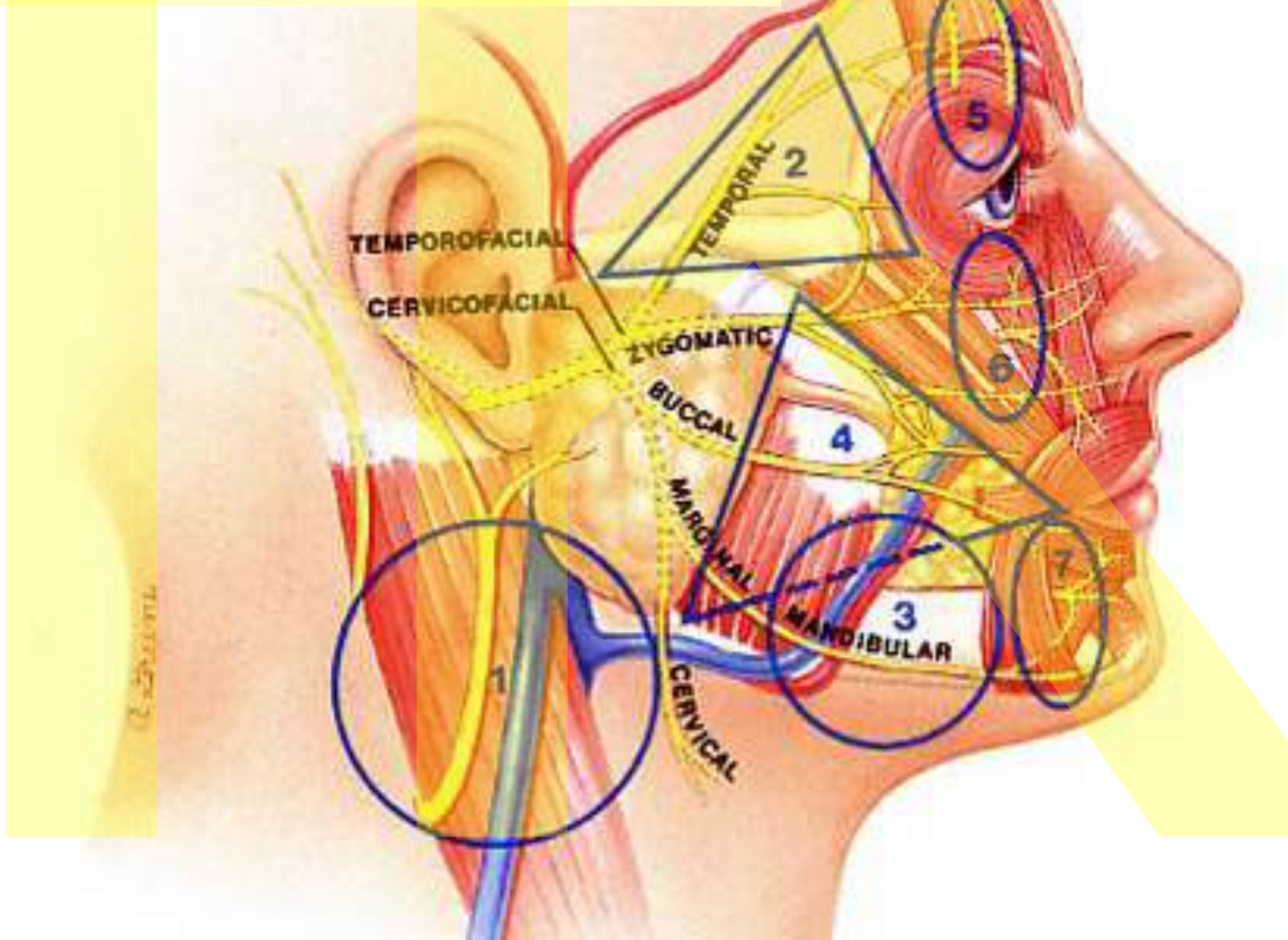
sutura tympanomastoidea

“drop off point
nejvíce vystupující bod“

Motor ická
inervace z nervus
facialis
VII.nervus



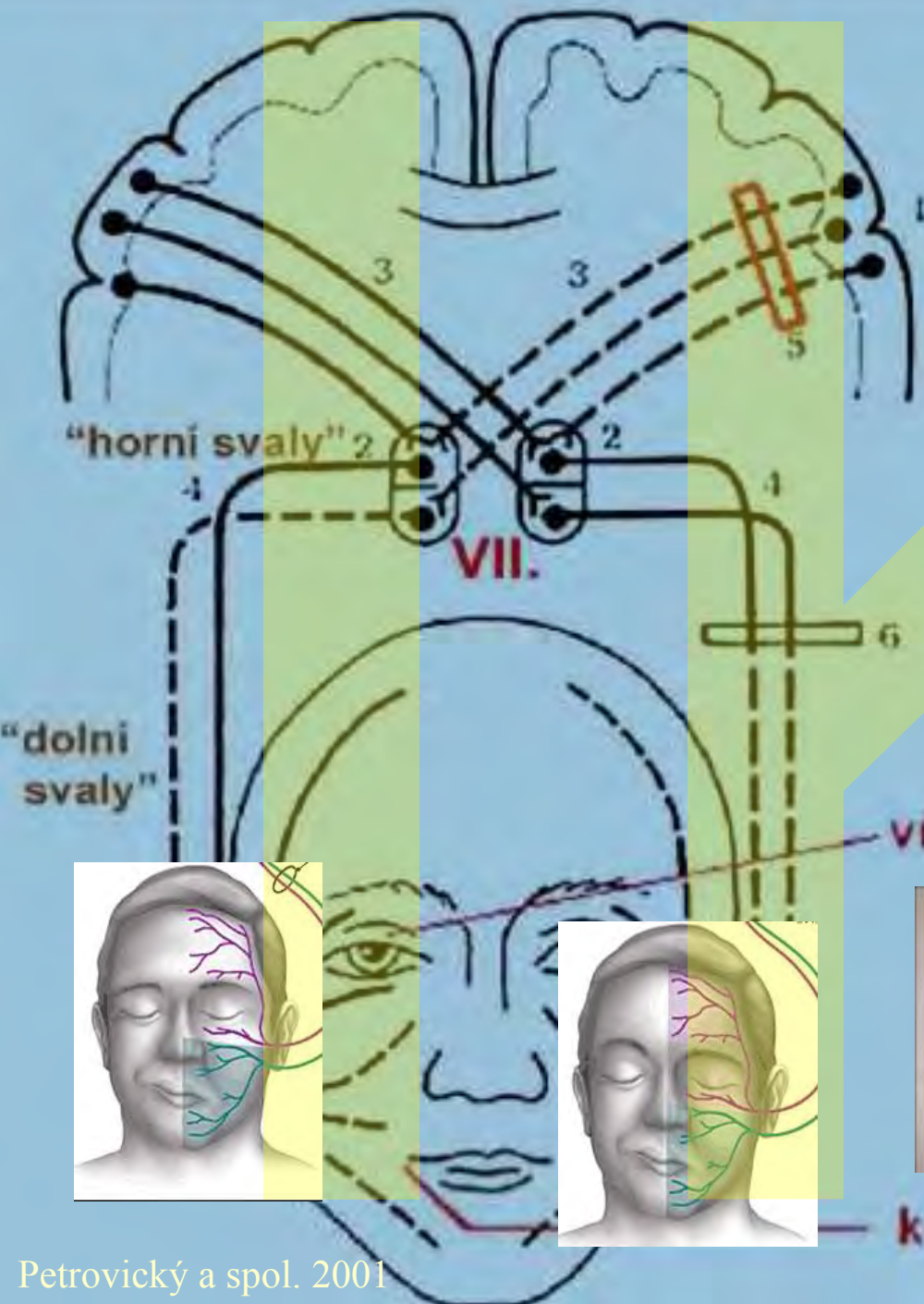
n. VII. : Tzv. „facial
danger zones“ - oblasti,
kde je zranitelněji uložen



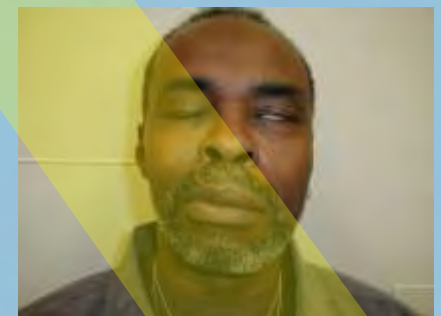
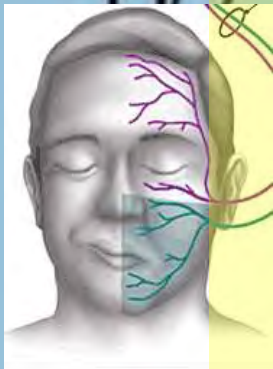
Obr. 41/II. Centrální a periferní obrna n. facialis.

Při centrální poruše je zachována hybnost mimických svalů kolem střediny oční, protože jejich nadřazená korová centra jsou bilaterální. Při periferní poruše jsou postiženy všechny mimické svaly obličeje. Plná čára – nepoškozená vlákna, přerušovaná čára – poškozená vlákna

- 1 – korové motorické centrum pro svaly obličeje
- 2 – nel. n. facialis
- 3 – tr. cortico-nuclearis
- 4 – n. facialis
- 5 – léze tr. corticonuclearis při centrální poruše
- 6 – léze periferních vláken n. facialis



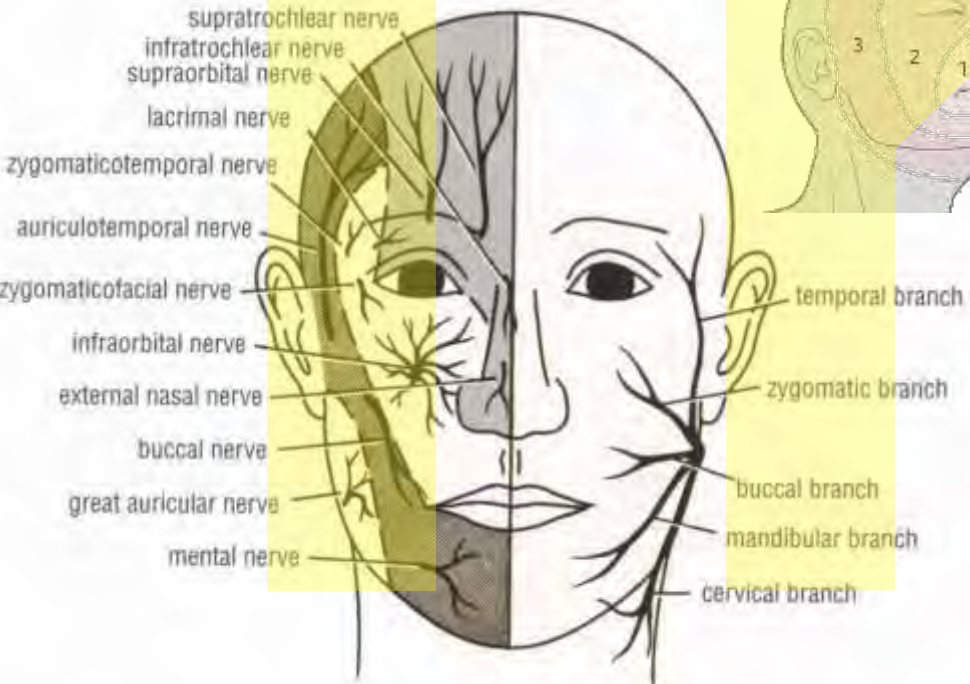
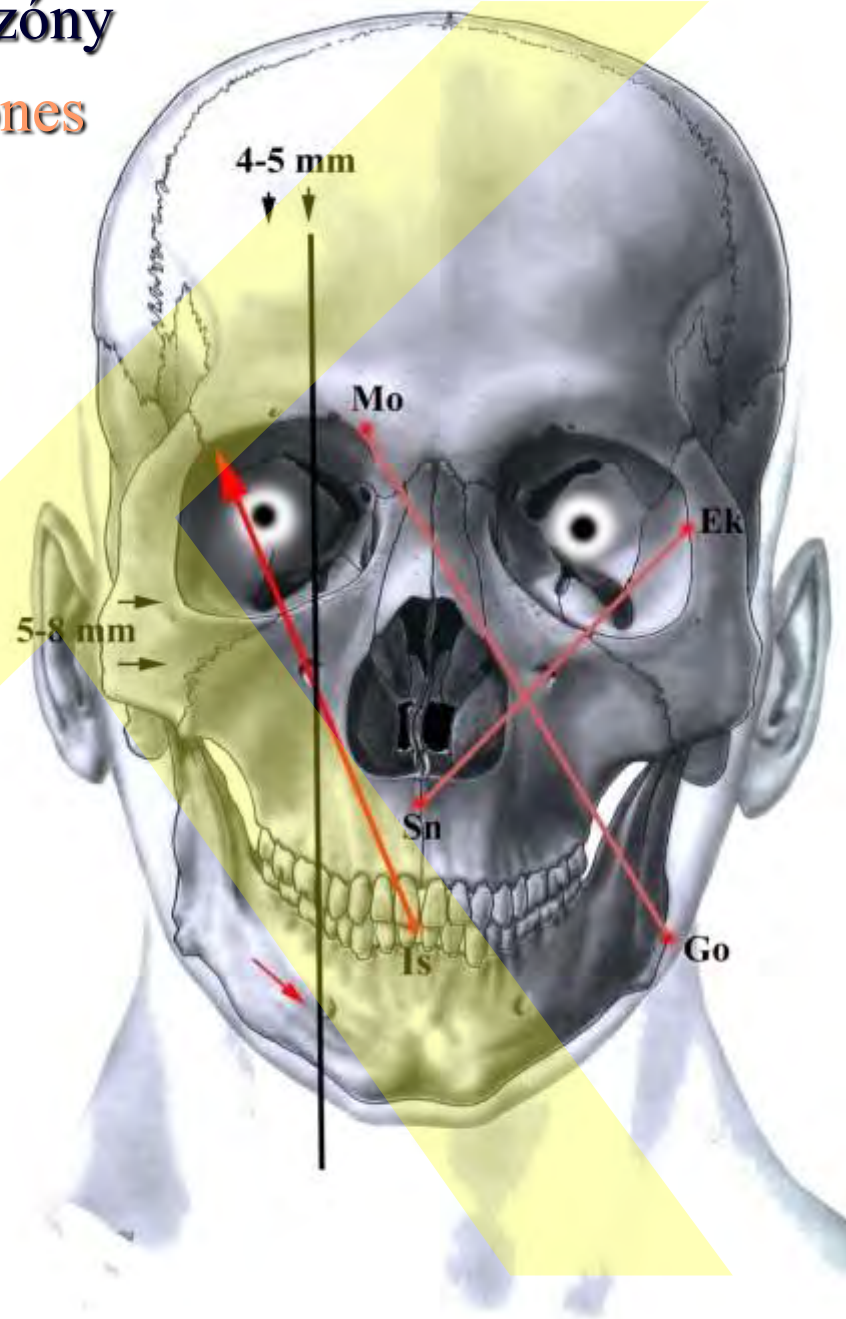
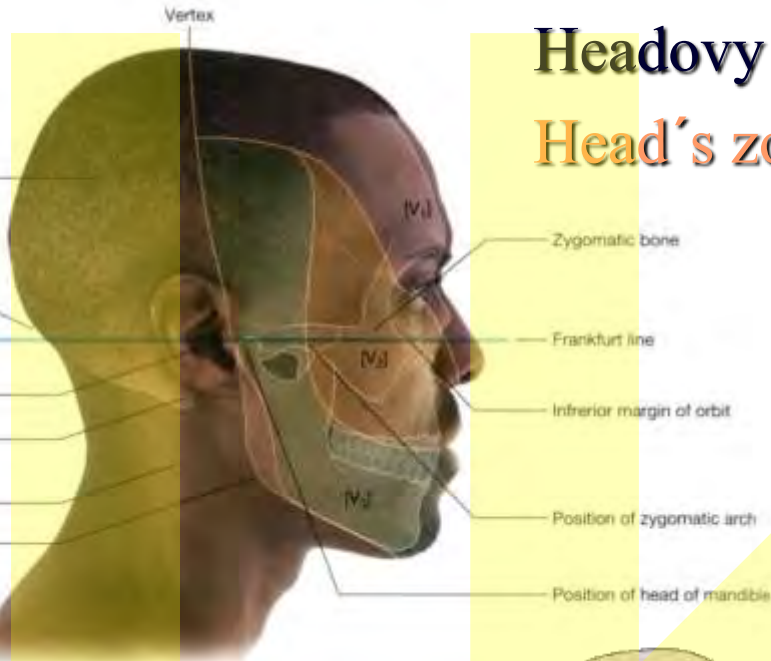
vičko ochabne - má jen 1/2 aferentů

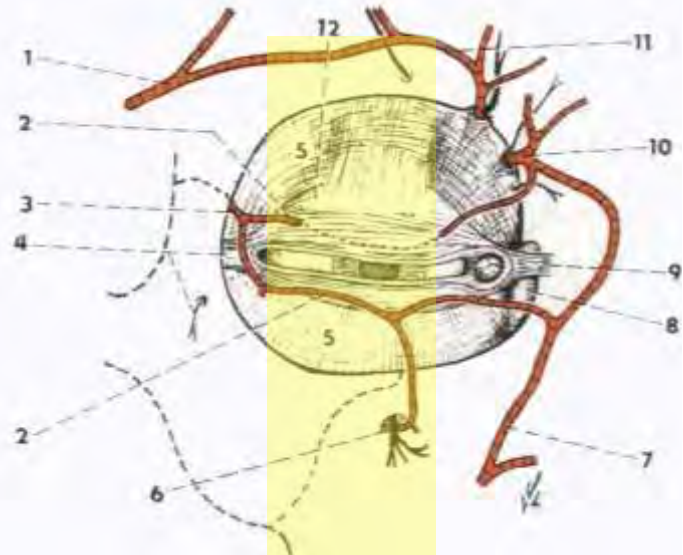


koutek visi - nemá žádné aferenty

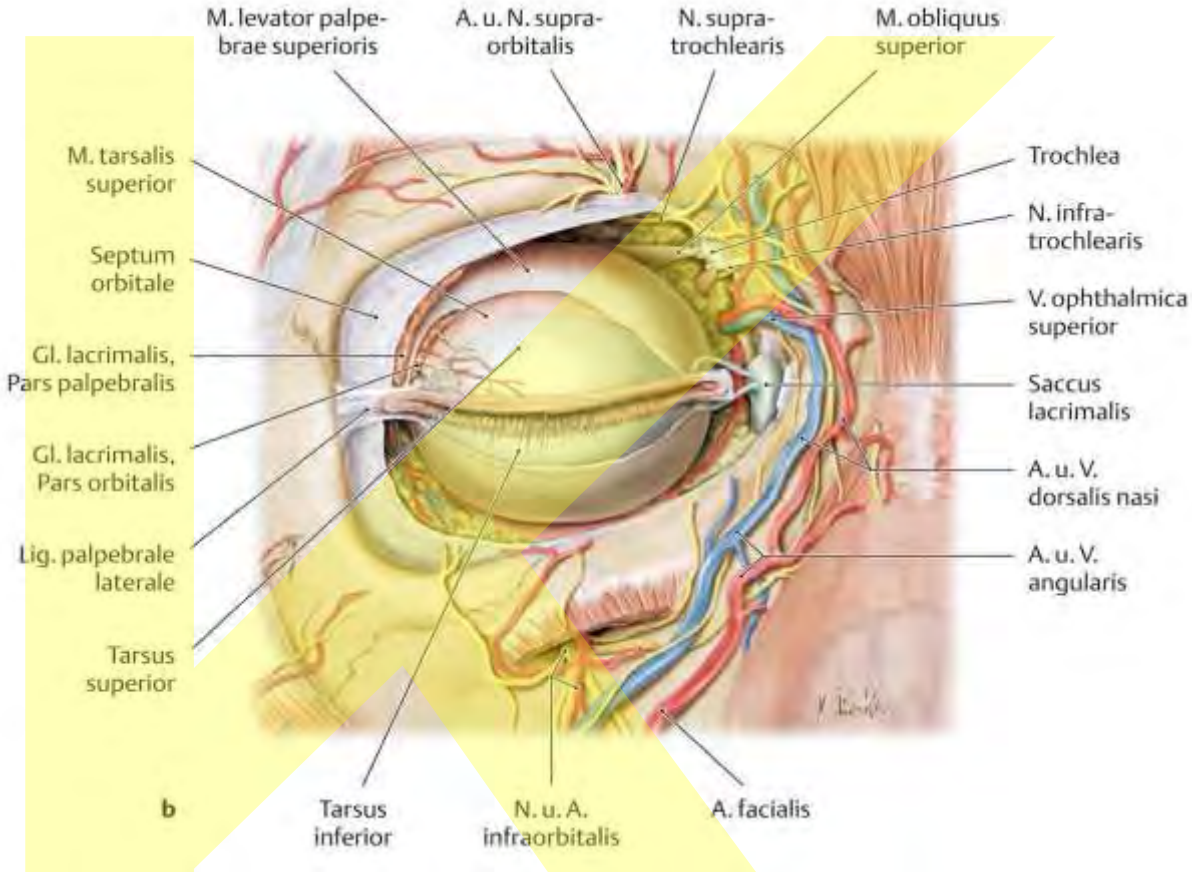
Headovy zóny

Head's zones



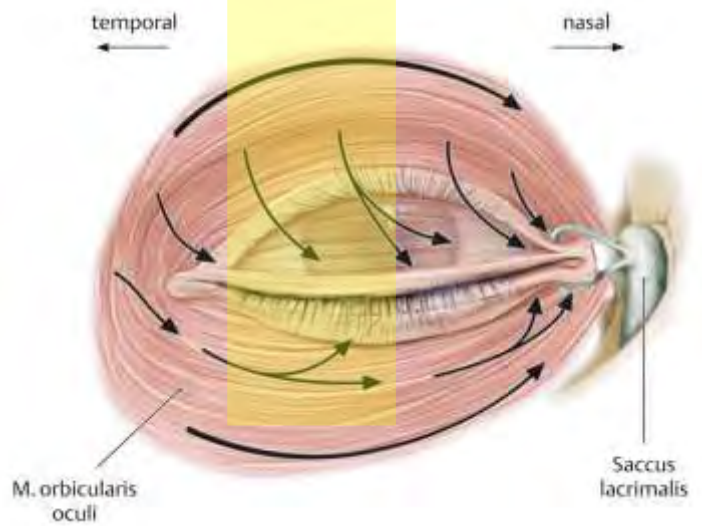


- 1 - r. frontalis (from a. temporalis superficial.)
- 2 - arcus palpebralis sup. et inf.
- 3 - r. palpebralis sup. (from a. lacrimalis)
- 4 - lig. palpebrale lat. et r. zygomaticofacialis
- 5 - septum orbitale
- 6 - a. et n. infraorbitalis
- 7 - a. angularis
- 8 - saccus lacrimalis
- 9 - lig. palpebrale med.
- 10 - a. supratrochlearis
- 11 - a. supraorbitalis
- 12 - tarsus sup.



- M. tarsalis superior
- Septum orbitale
- Gl. lacrimalis, Pars palpebralis
- Gl. lacrimalis, Pars orbitalis
- Lig. palpebrale laterale
- Tarsus superior

- M. levator palpebrae superioris
- A. u. N. supra-orbitalis
- N. supra-trochlearis
- M. obliquus superior
- Trochlea
- N. infra-trochlearis
- V. ophthalmica superior
- Saccus lacrimalis
- A. u. V. dorsalis nasi
- A. u. V. angularis
- Tarsus inferior
- N. u. A. infraorbitalis
- A. facialis

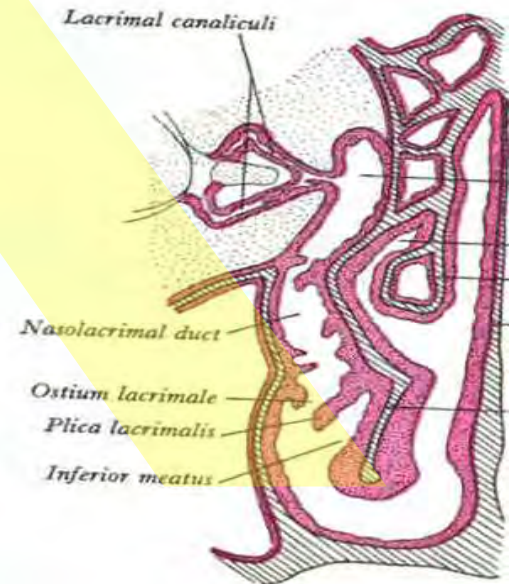
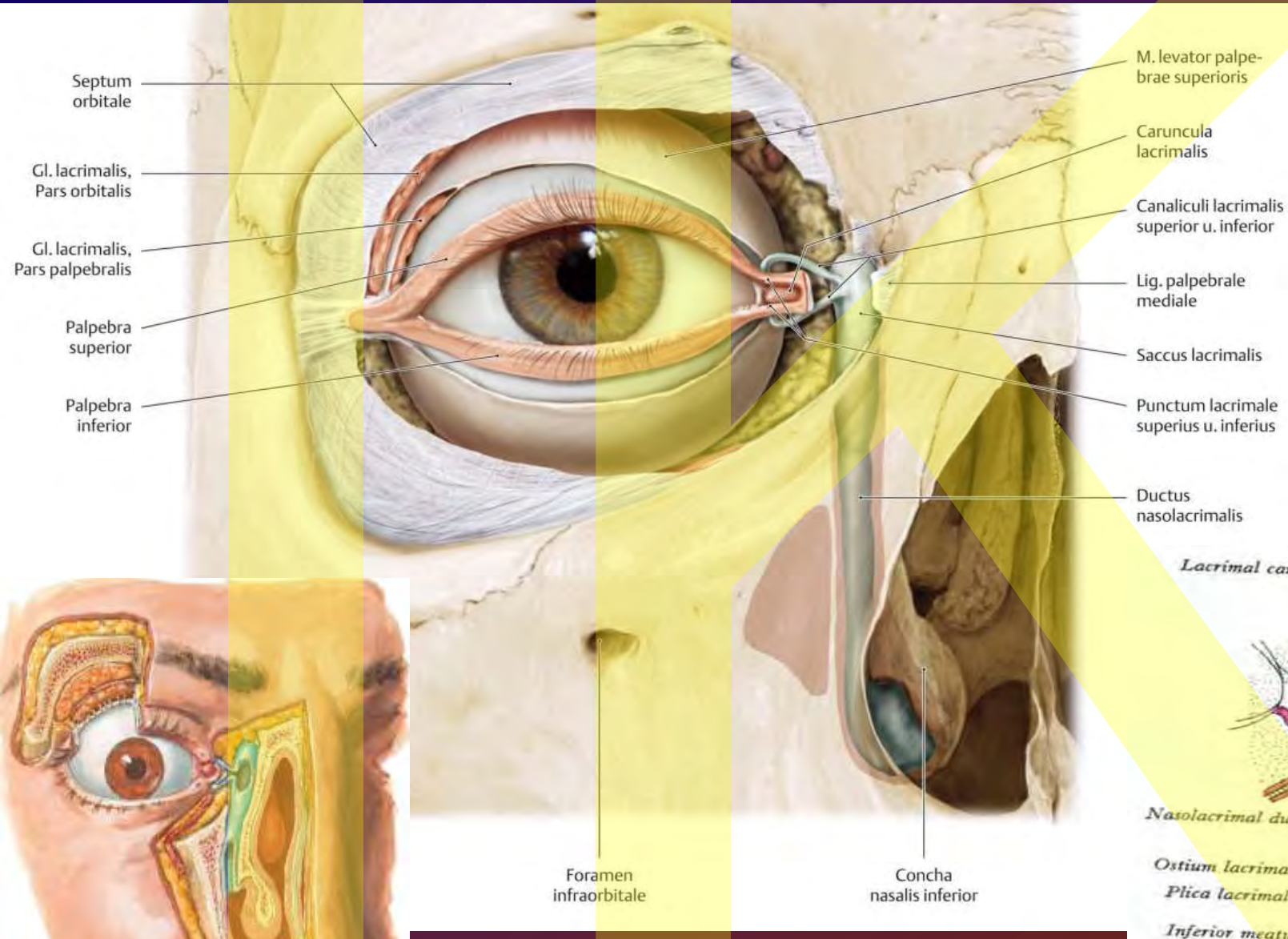


- M. orbicularis oculi
- Saccus lacrimalis

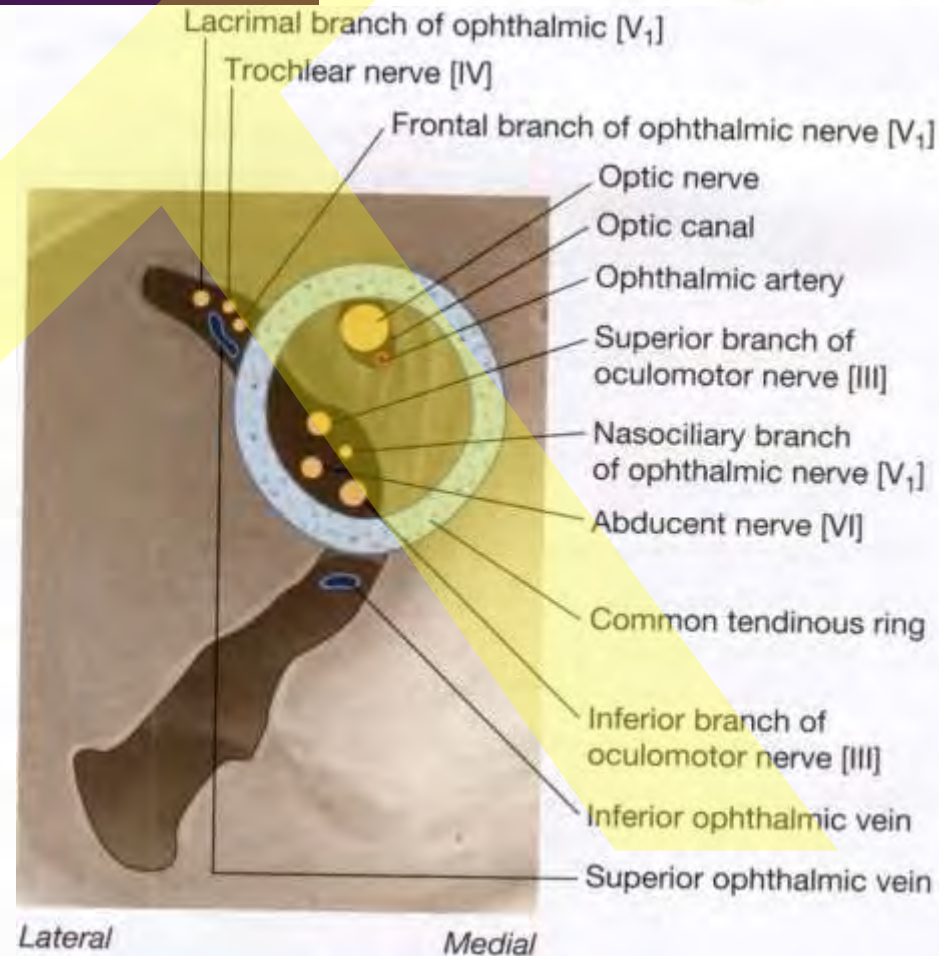
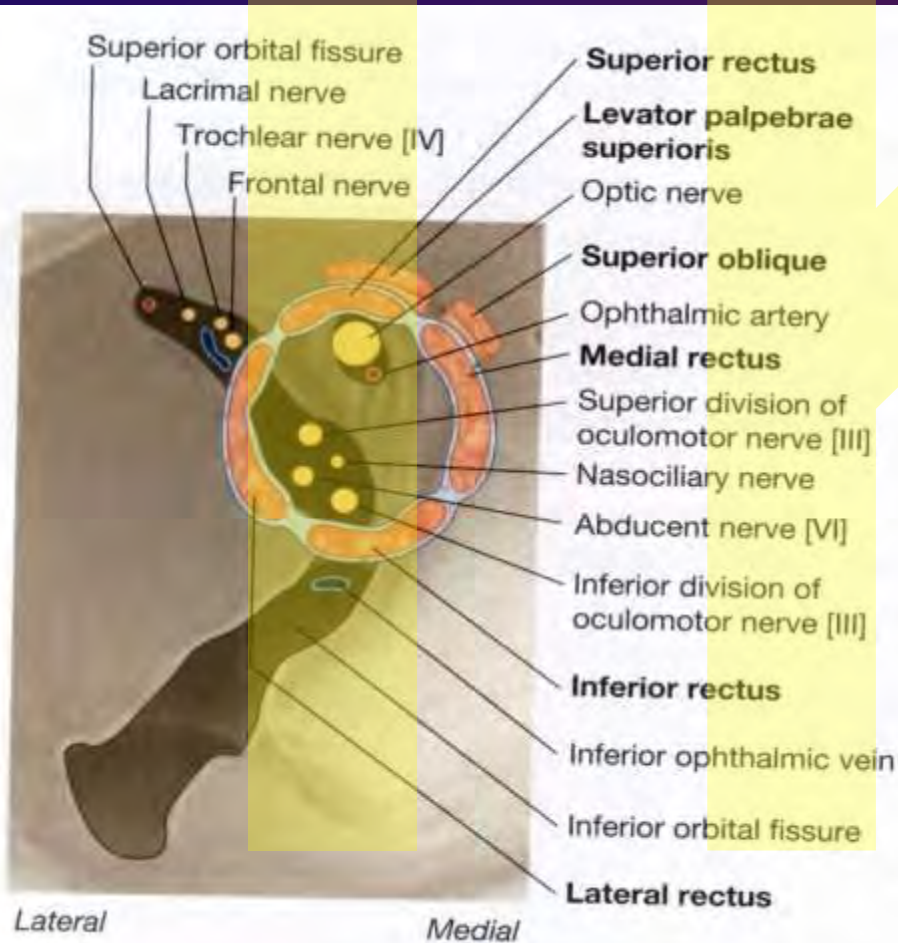
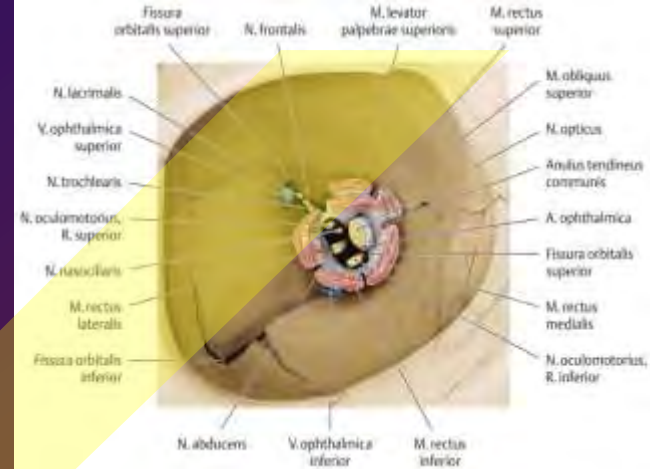


Apparatus lacrimalis

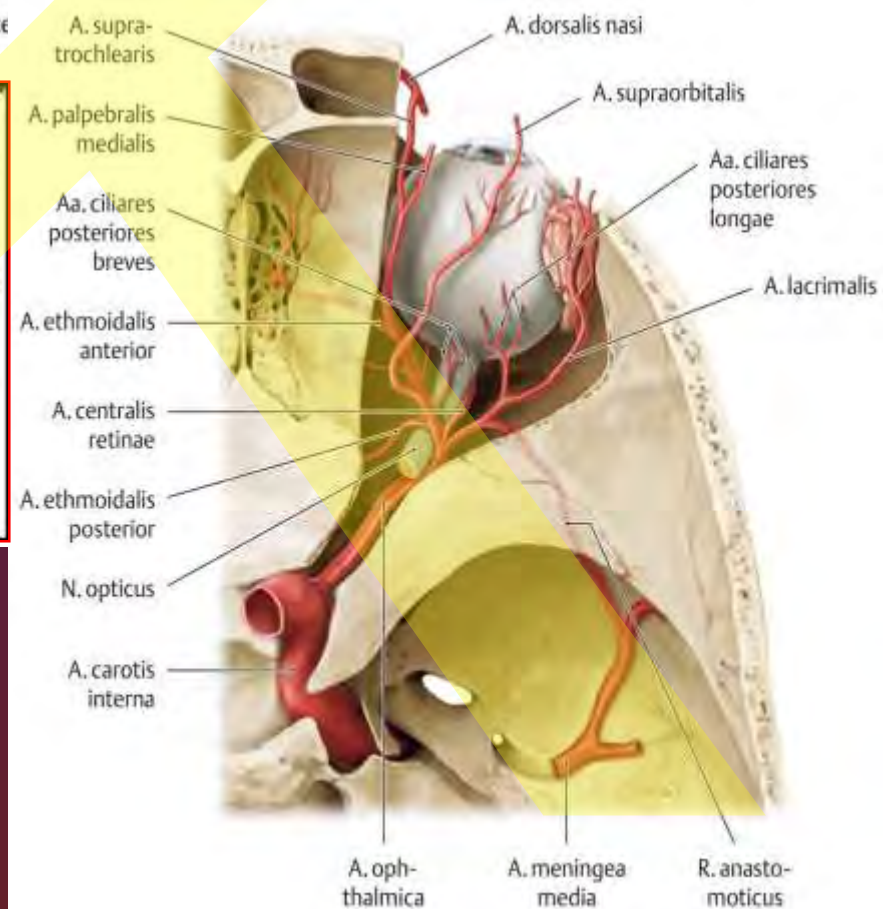
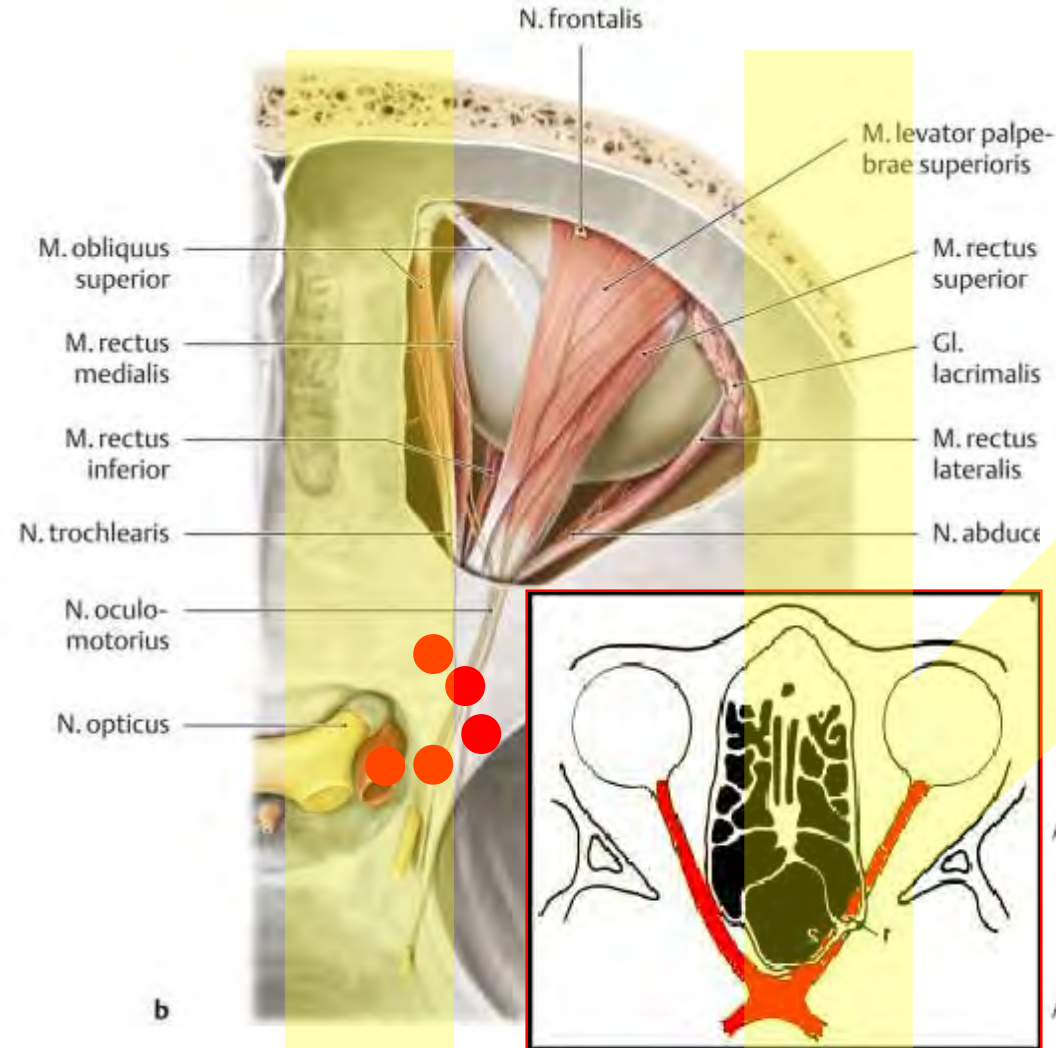
Lacrimal apparatus



Fissura orbitalis superior et canalis opticus et fissura orbitalis inferior



Vztah mezi orbitou, canalis opticus a paranasálními dutinami

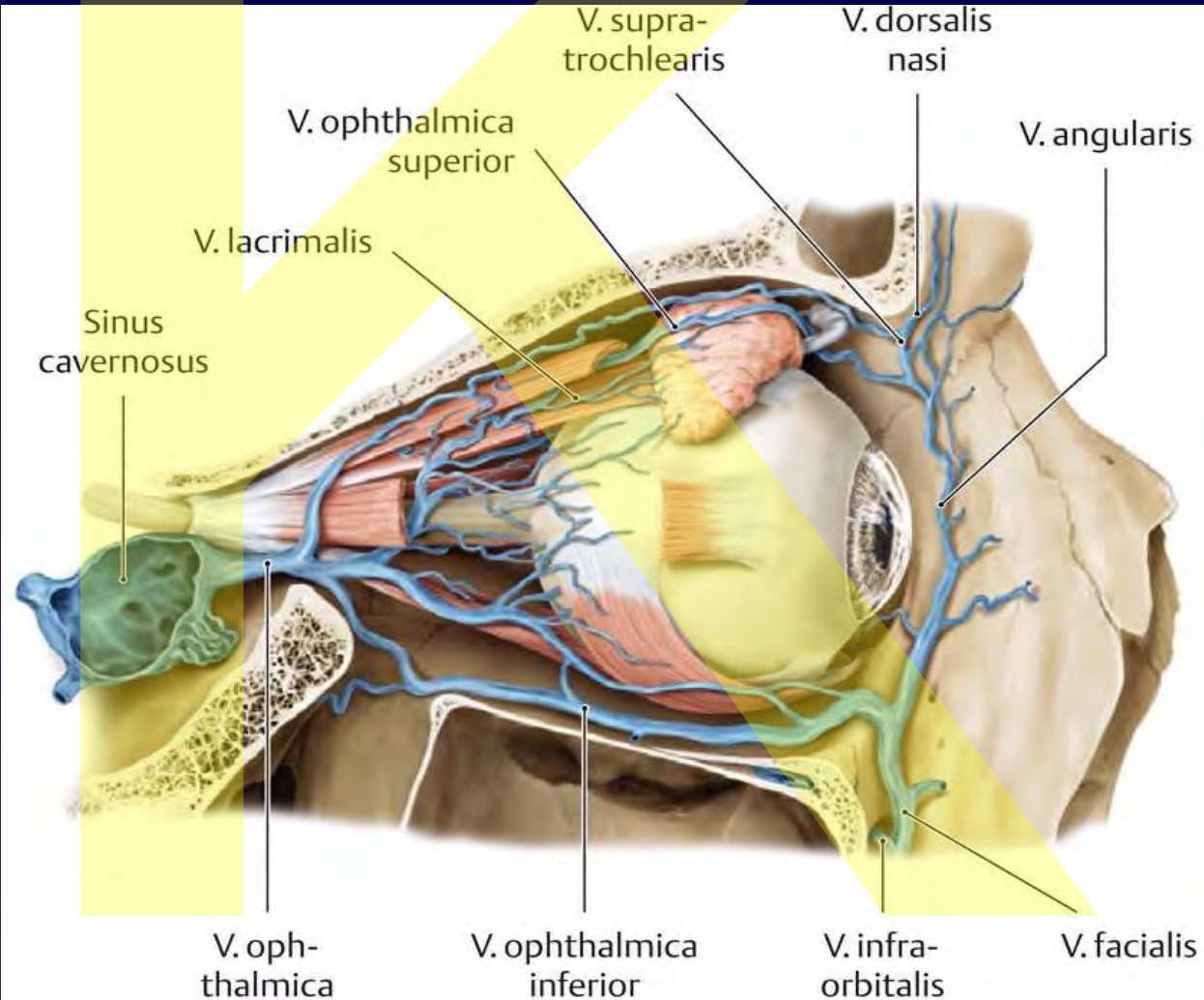
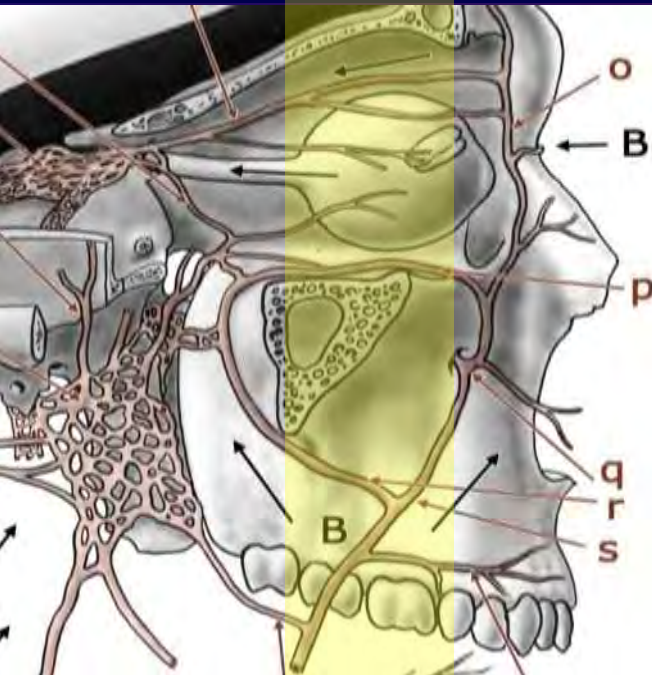


Relation between orbit, optic canal and paranasal cavities



Vztah mezi venae ophtalmicae, sinus cavernosus, plexus pterygoideus a v. facialis

Relation between ophtalmic veins, cavernous sinus, pterygoid plexus and facial vein



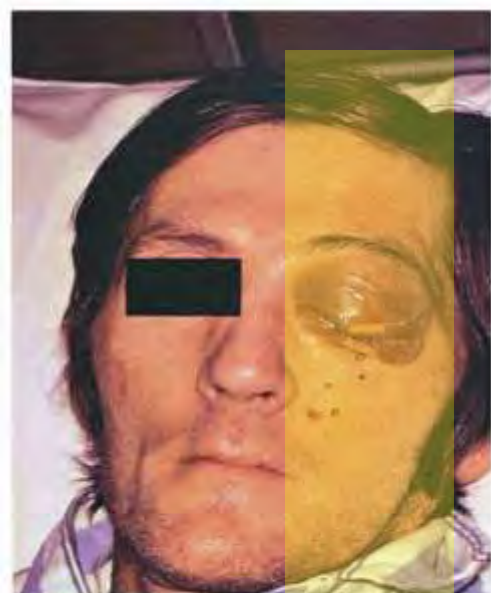
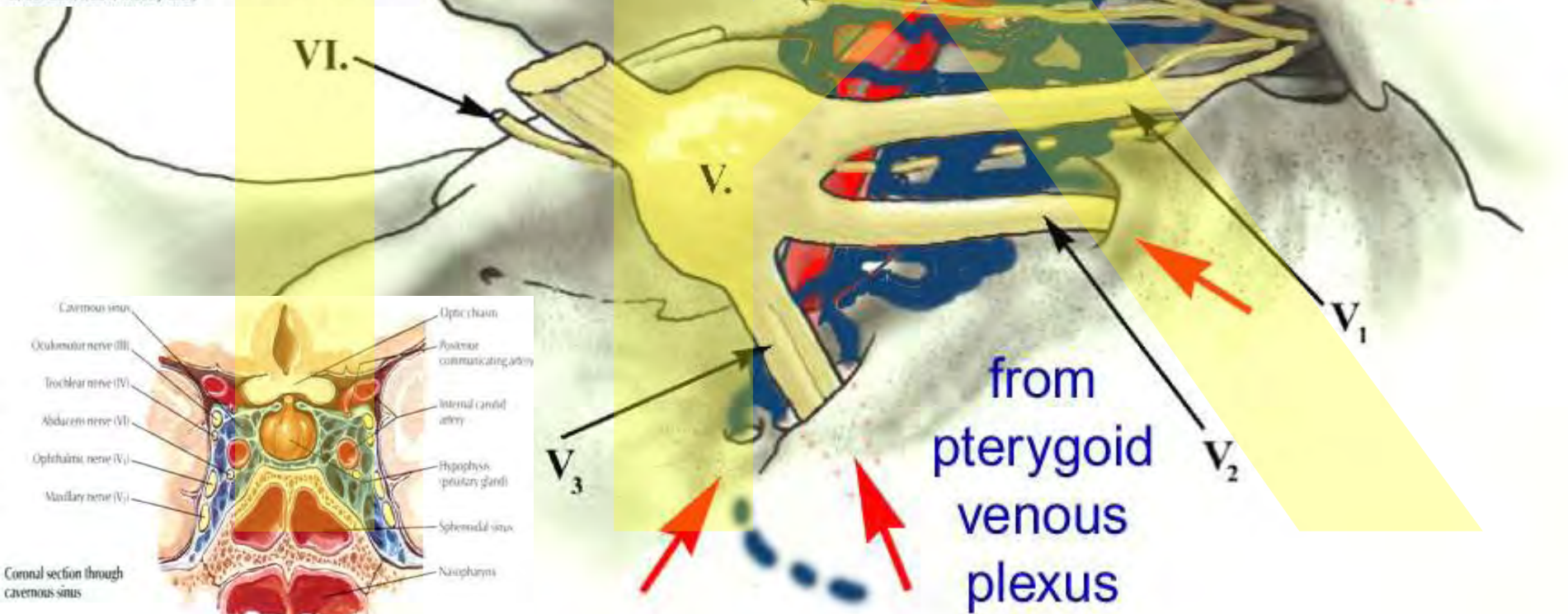


FIGURE 12-8 Cavernous sinus thrombosis, an infection of the venous sinus, with edema of the eyelids and conjunctivae, tearing, and extruded eyeballs. (From Reynolds PA, Abrahams PH: *McMin's interactive clinical anatomy: head and neck*, ed 2, London, 2001, Mosby Ltd.)



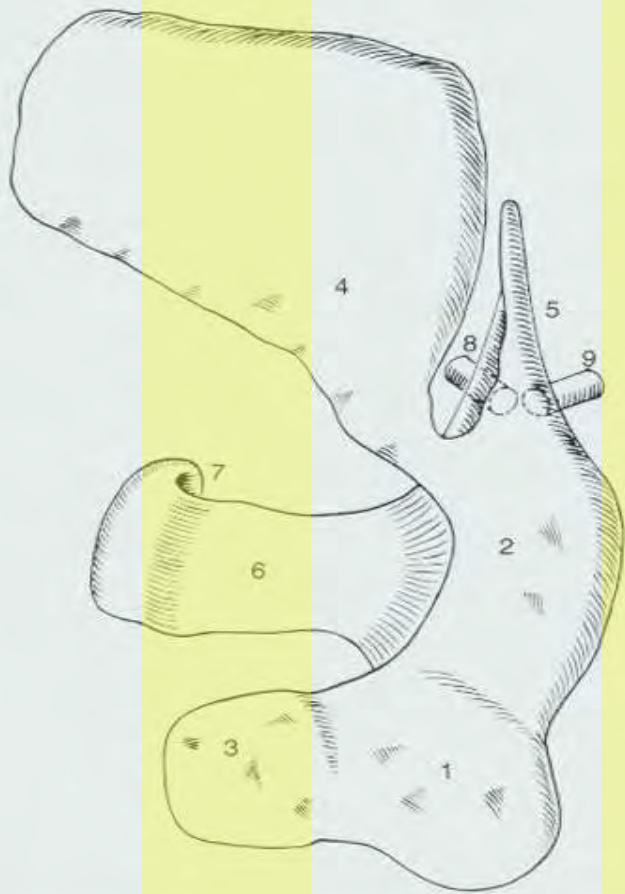


Fig. 115a The buccal fat pad and its processes (after Kahn, Sick, and Koritké 1988 after Bichat 1901)

- 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



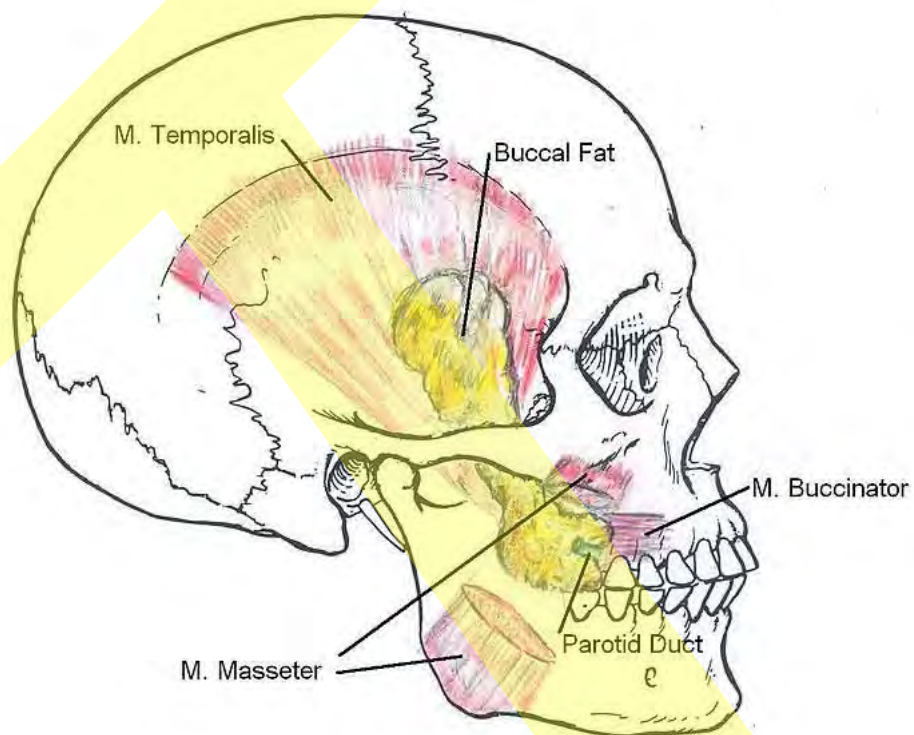
Fig. 115b Buccal fat pad in a 67-year-old man

- 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

FAT PAD has to be differed from the following ones:

The malar fat pad (it is directly below the skin of the cheek). It is implicated in the formation of hollow cheeks and the nasolabial fold.

Tukové těleso tváře
The buccal fat pad
(Bichat pillow, corpus adiposum Bichati)



a jeho rozšíření
and its extensions

aa. temporalis media (a.temp.superf.)

a. temporalis profunda ant., post. (a. maxillaris)

pars ventralis
pars media
pars dorsalis

3.6cm²

Nn. temporales profundi

Plexus pterygoideus

Klidové střední postavení
90% vřetének

M. temporalis et fascia temporalis

Sinus sagittalis superior

Falx cerebri

Spatium interfasciale

Dura mater encephali

N. opticus

M. temporalis
pars media

M. pterygoideus lateralis,
Pars superior

M. masseter,
Pars profunda

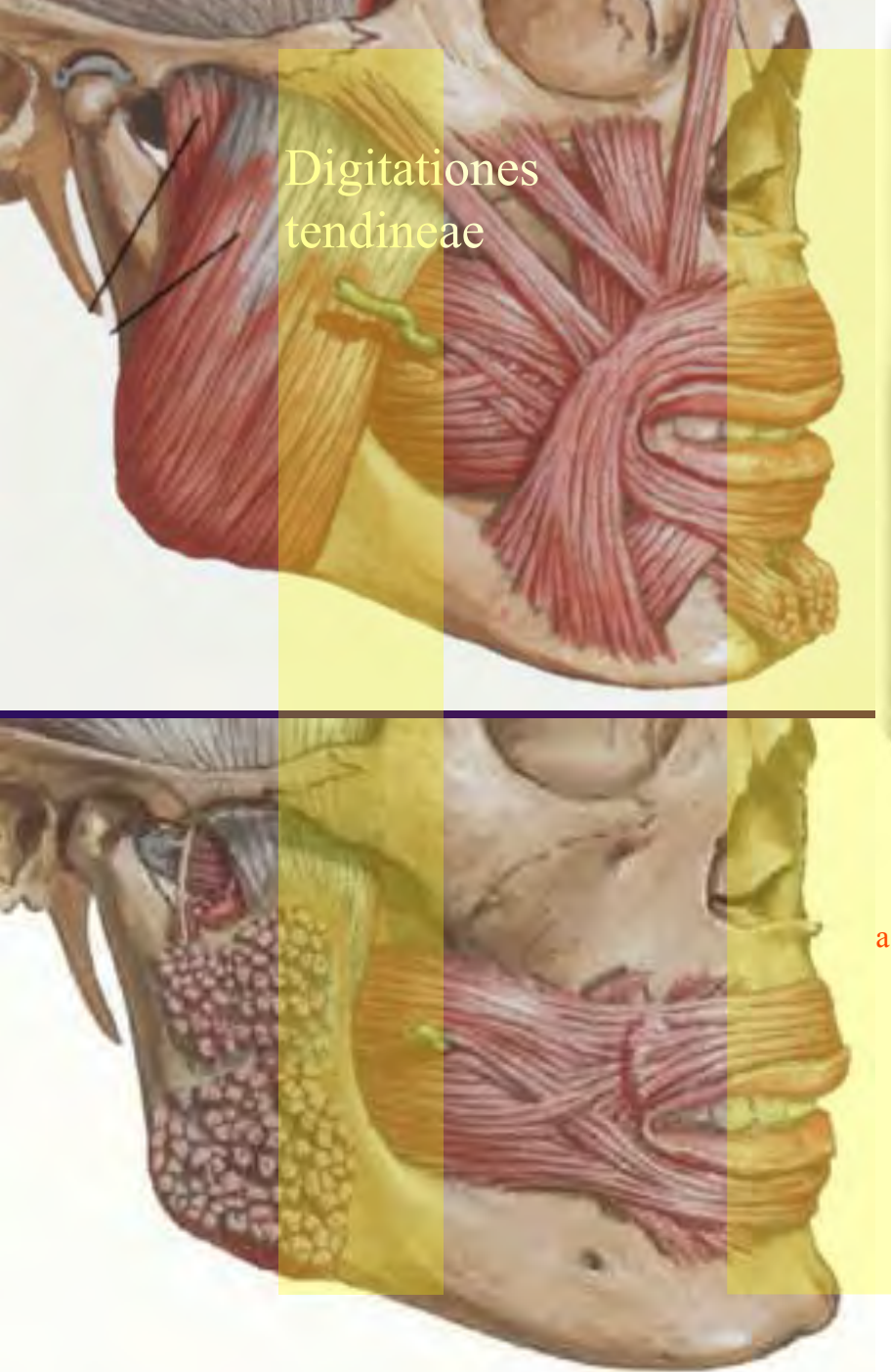
M. pterygoideus lateralis,
Pars inferior

M. pterygoideus medialis

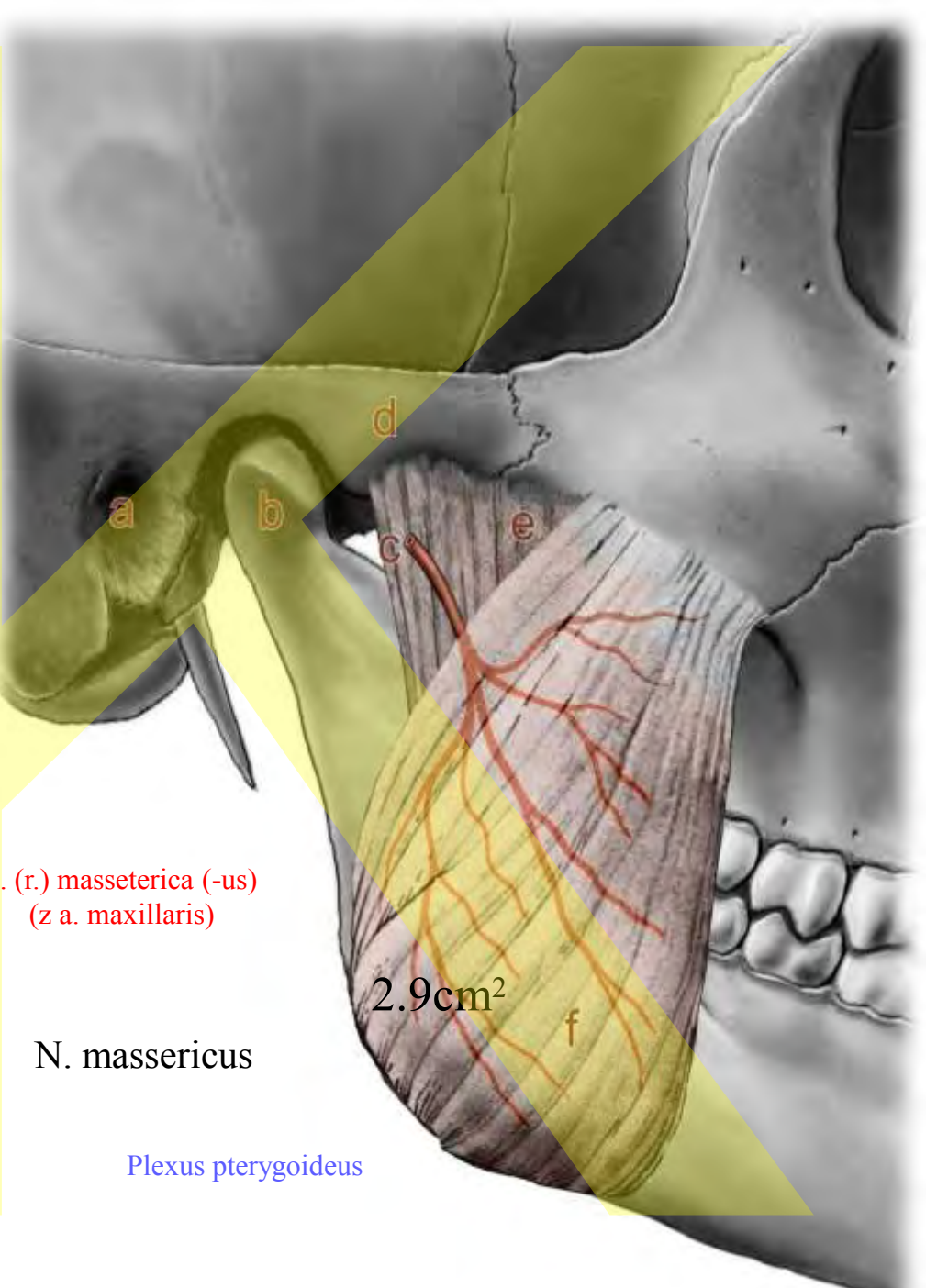
M. masseter,
Pars superficialis



Tendo
centralis



Digitationes
tendineae



a. (r.) masseterica (-us)
(z a. maxillaris)

2.9cm²

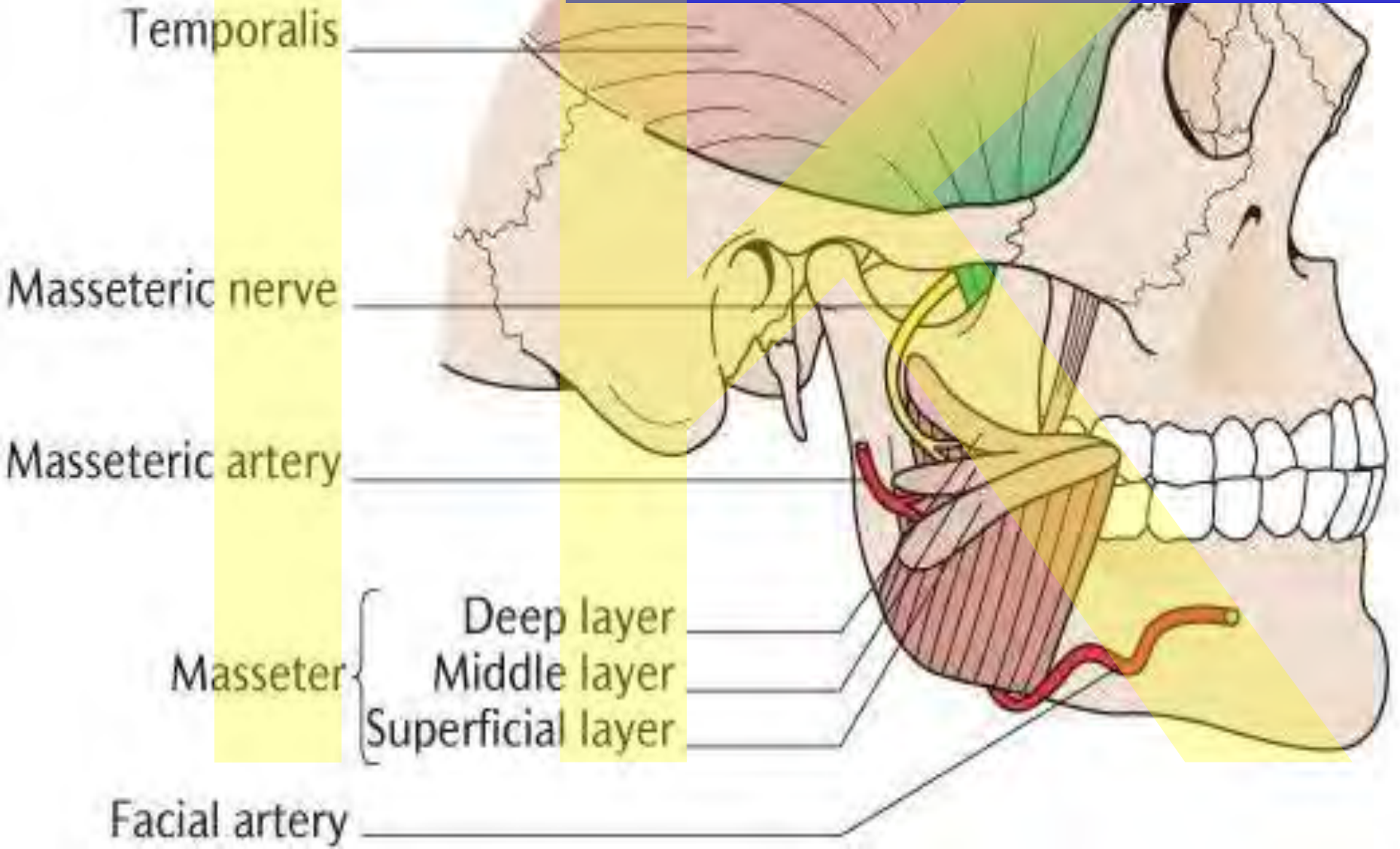
N. massericus

Plexus pterygoideus

Pars superficialis rozbíhající se šlachy

Pars media

Pars profunda hustěji u sebe uložené šlachy



Fascie ve vztahu ke komplexu žláza sval:

- 1 - m. temporalis
- 2 - m. masseter (pars prof.)
- 3 - m. masseter (pars superfic.)
- 4 - ductus parotideus
- 5 - n. auriculotemporalis

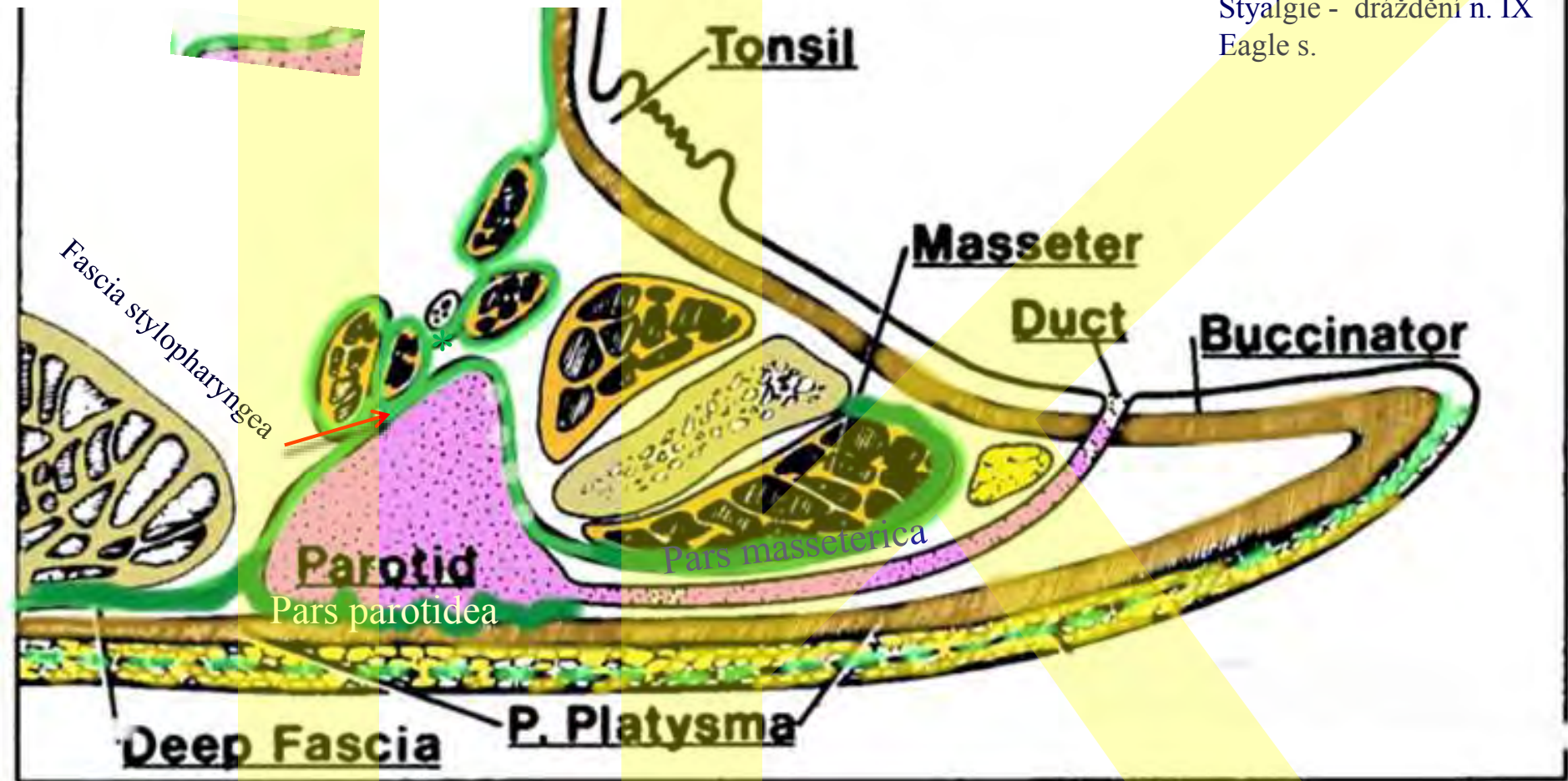


- 6 - a. carotis ext. et a. transversa faciei
- 7 - n. VII. et a. retroauricularis
- 8 - r. colli (n. VII.)
- 9 - plexus parotideus
- ~~~~~ - resection line

Parotidea (1.parotidomasseterica, 2.lamina profunda fasciae parotidae, 3.tractus angularis (navazuje na lig. stylomandibulare))

Lamina profunda fasciae parotidae

Styalgie - dráždění n. IX
Eagle s.



Fascia parotideomasseterica
Pars parotidea (lamina superficialis)
Pars masseterica

After Jost, G, Levet, V.: Parotid fascia and Face lifting: A critical Evaluation of the SMAS concept. Plastic and Reconstructive Surg, 74:42-51, 1983
modified

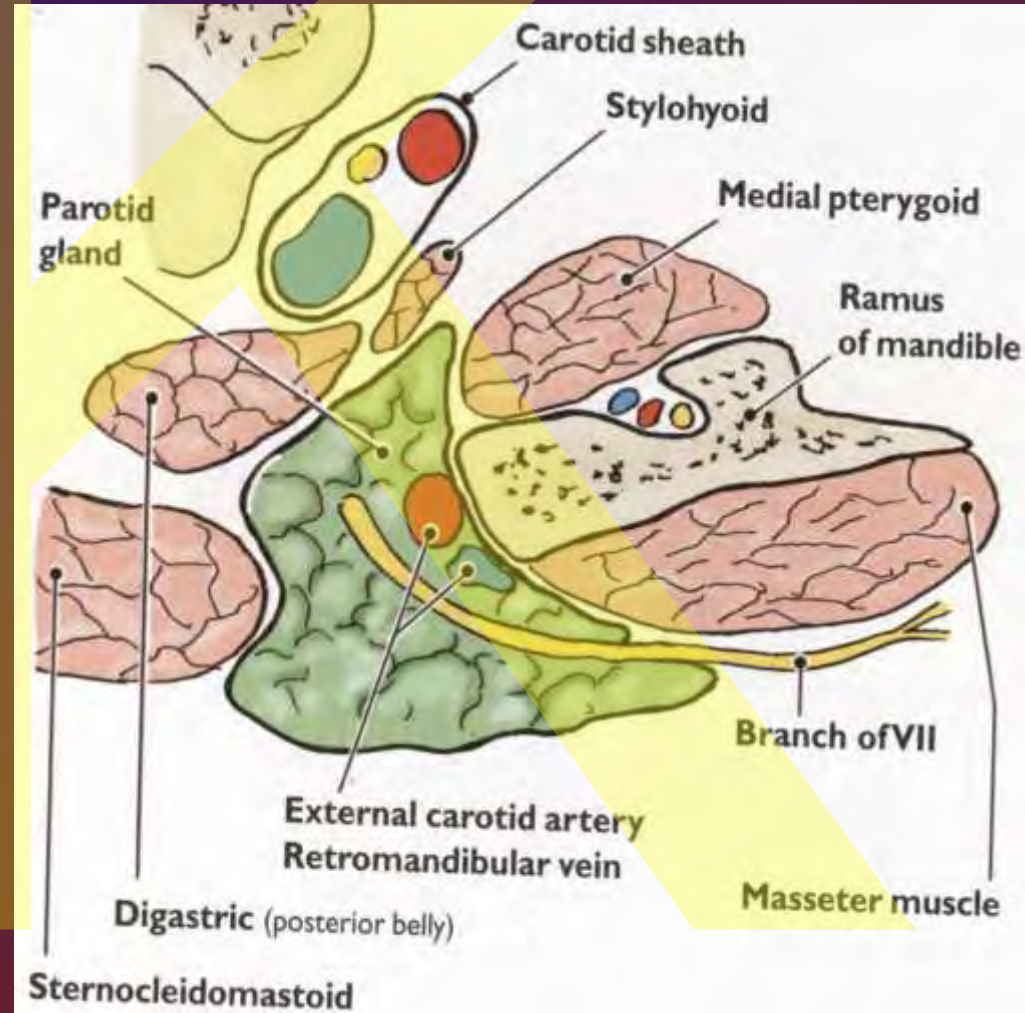
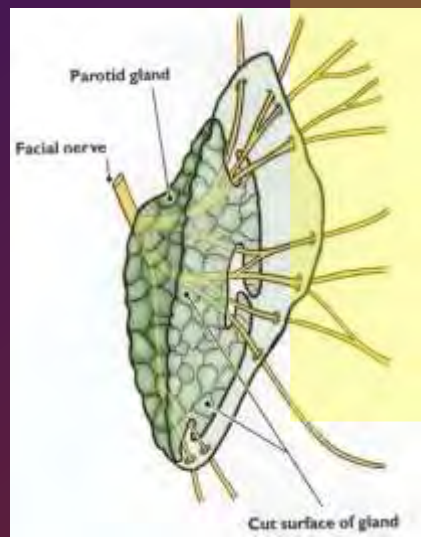
Glandula parotis

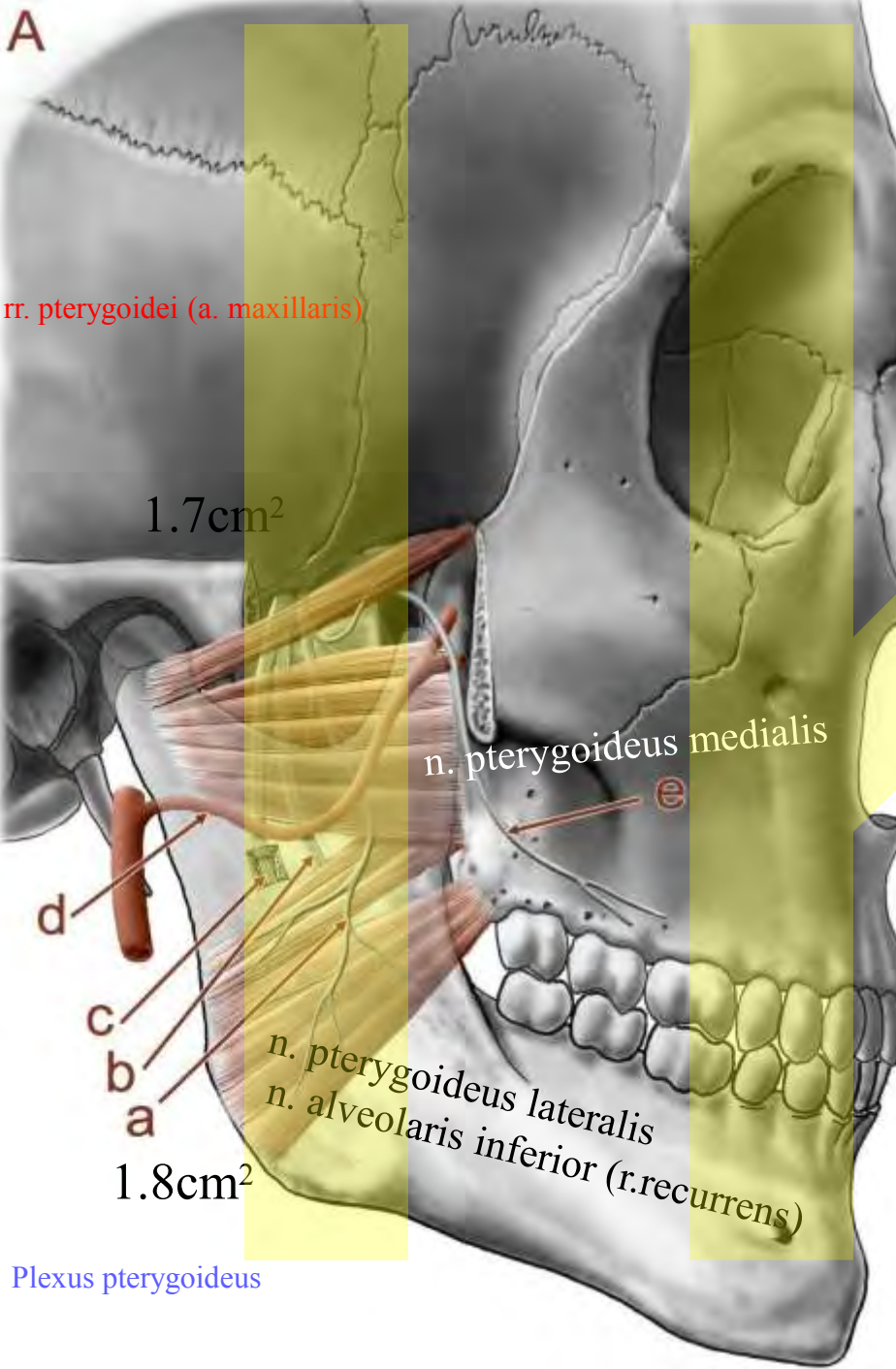
Povrchová Superficial part

Hluboká Deep part (processus pharyngeus)

Serózní tkáň Serous tissue

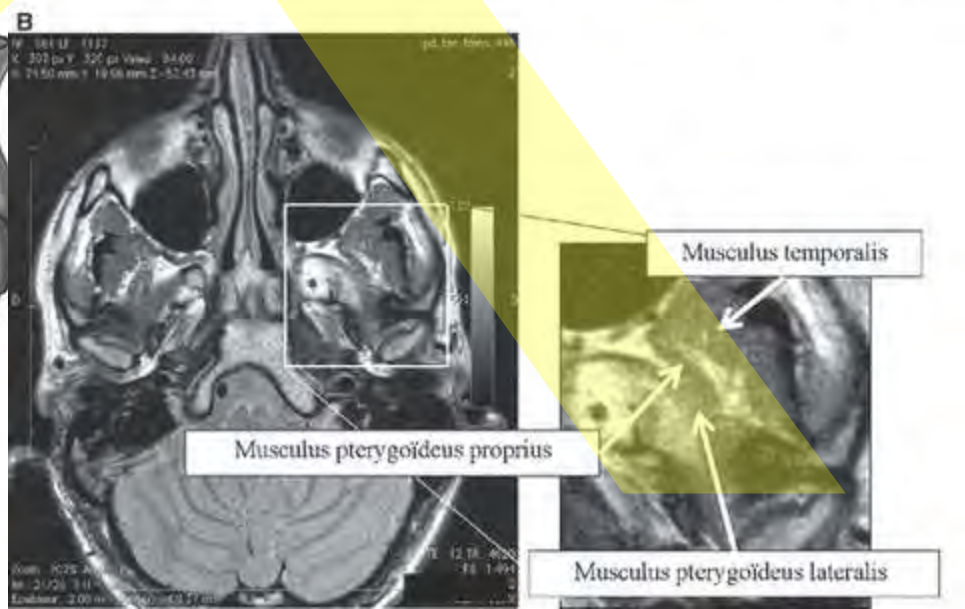
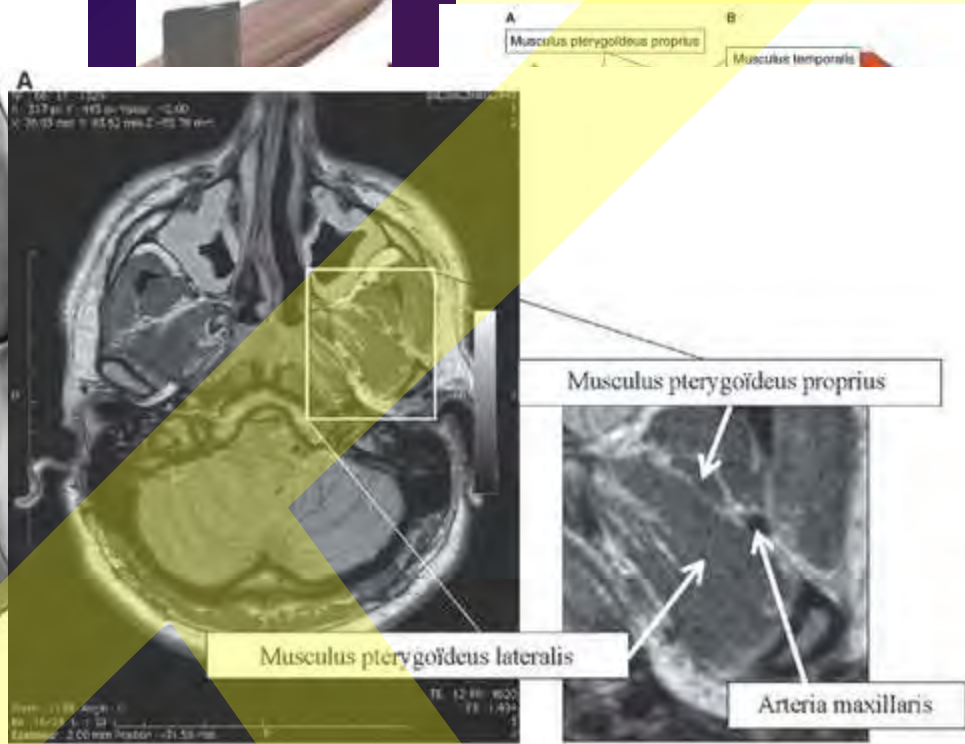
Ductus parotideus (Stenoni, of Stensen)

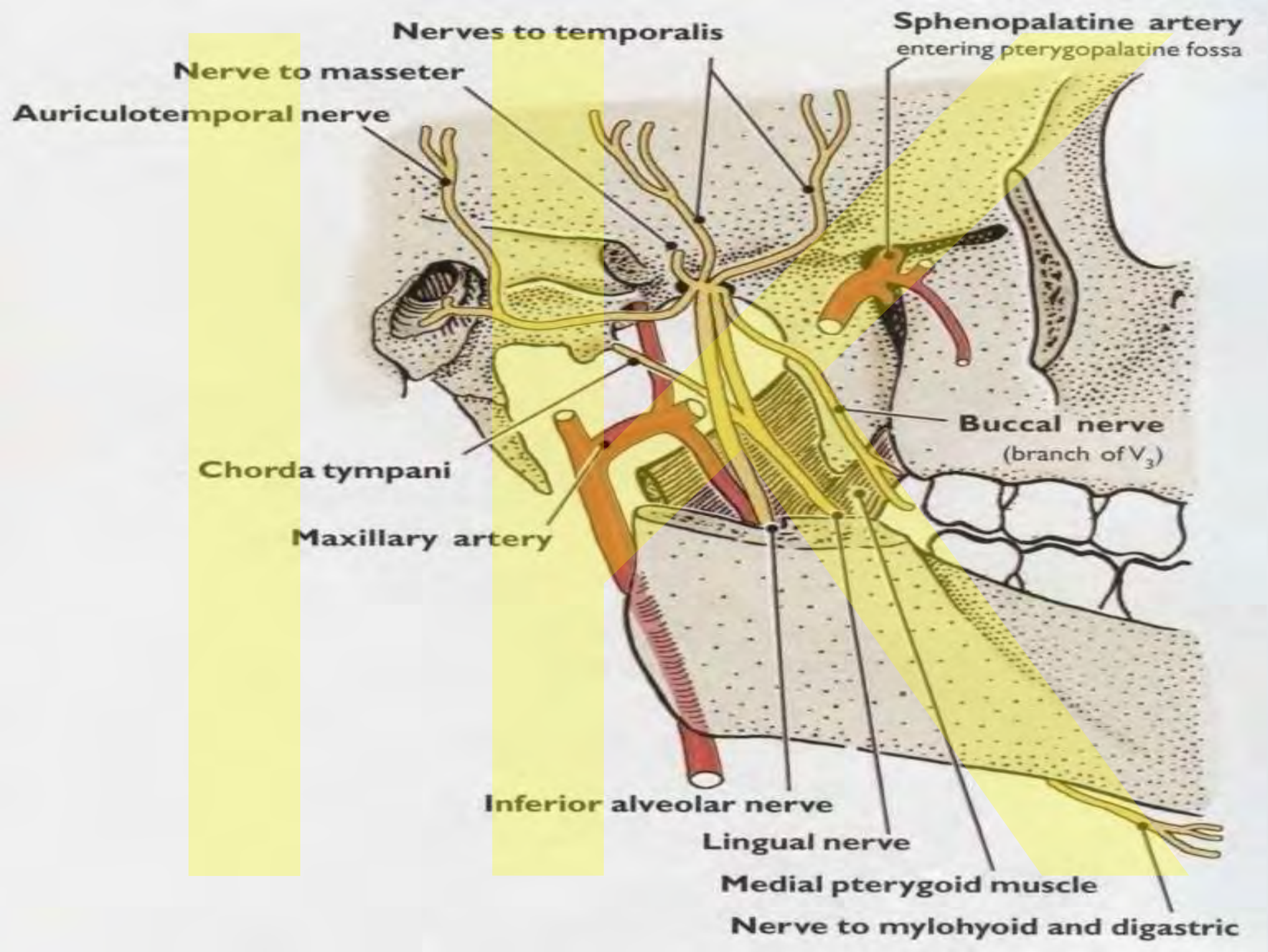


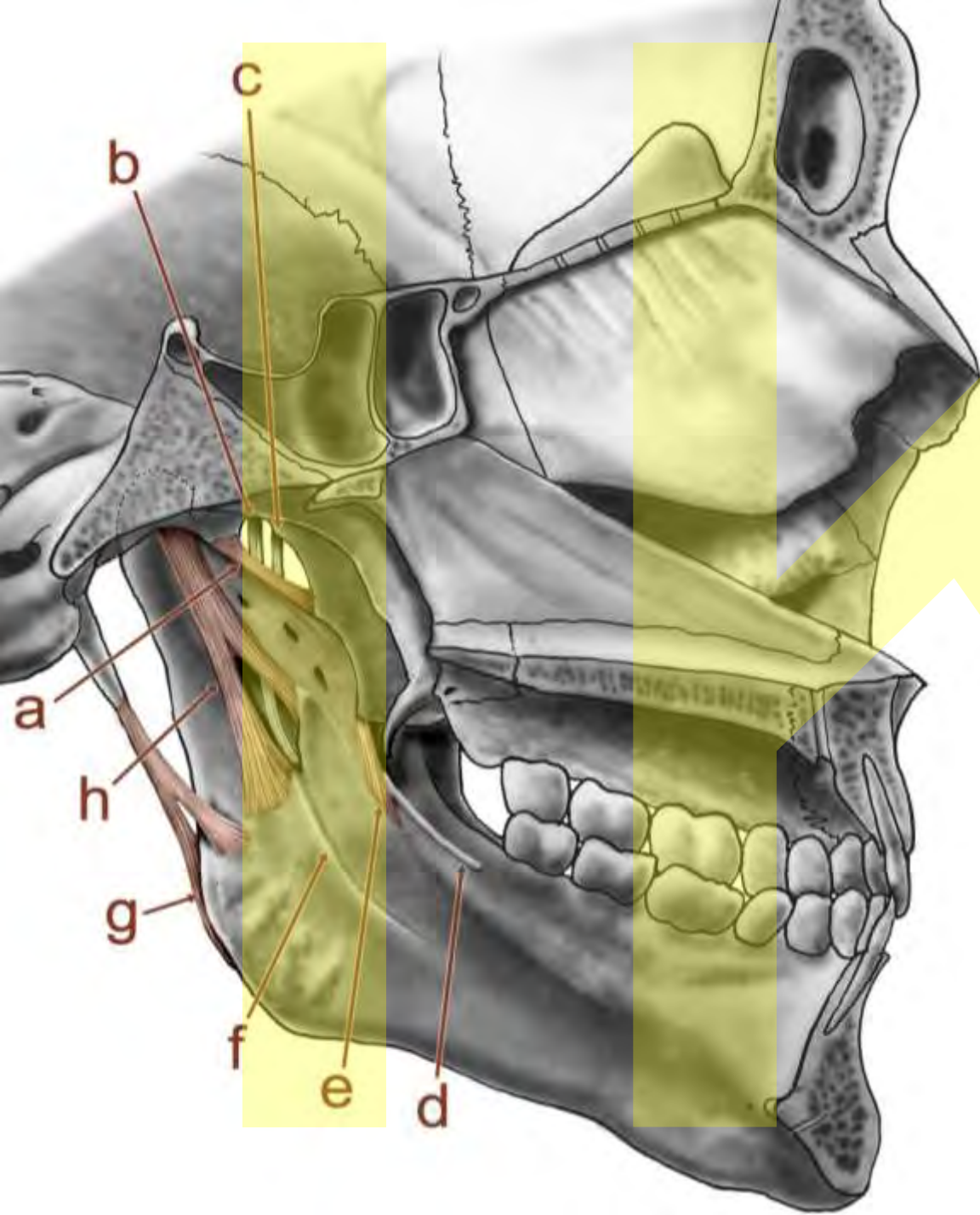


pterygomandibularis

pterygoideus proprius







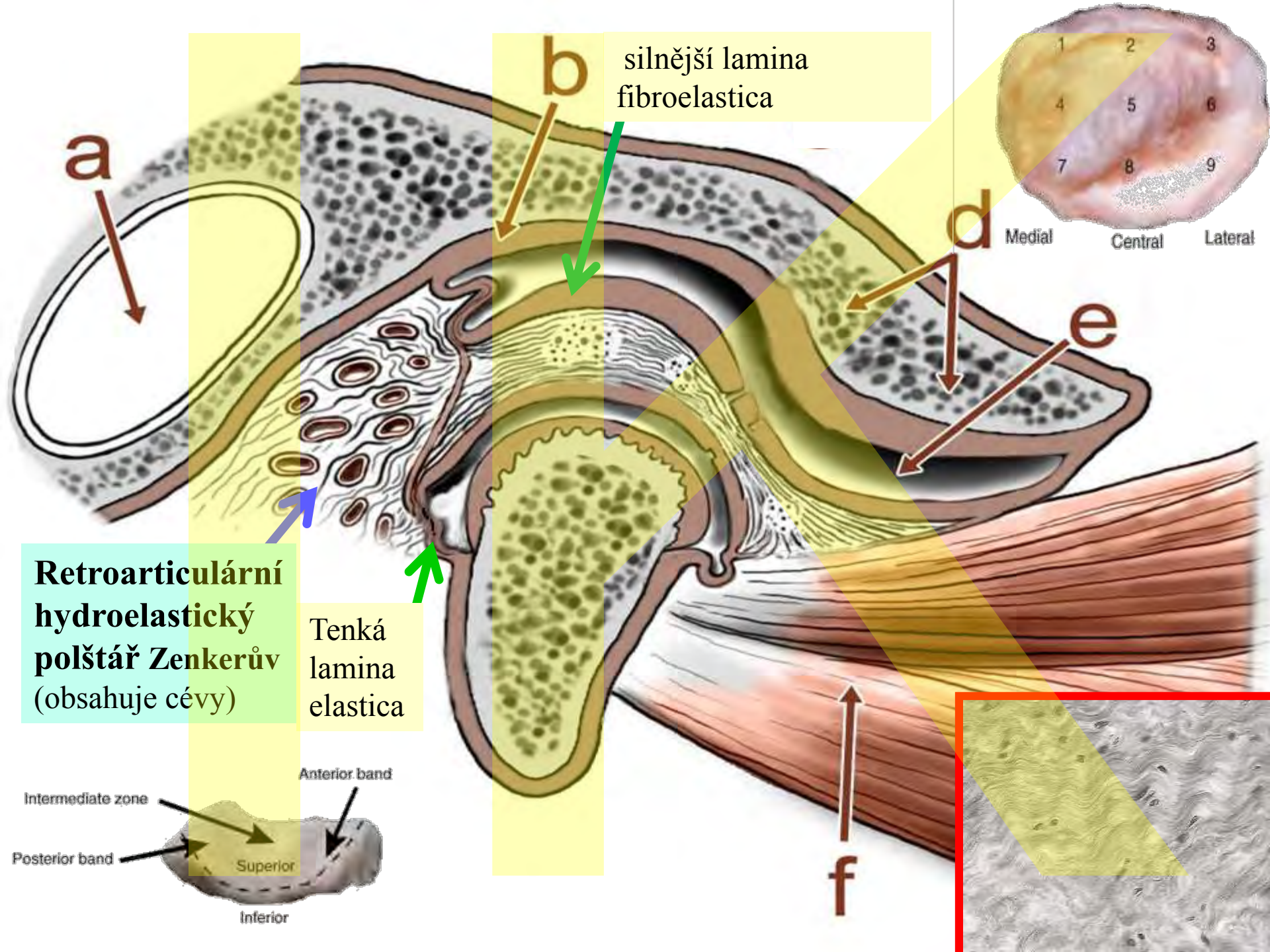
g- lig. stylomandibulare
fascia parotideomasseterica

a- lig. pterygospinosum

h- lig. sphenomandibulare

e- lig. pterygomandibulare

fascia interpterygoidea



Fossa infratemporalis

Infratemporal fossa

Sup.:

Ala major ossis
sphenoidalis

Med.:

Lamina medialis
processus ptergoideus
+ pharynx

Ventr.:

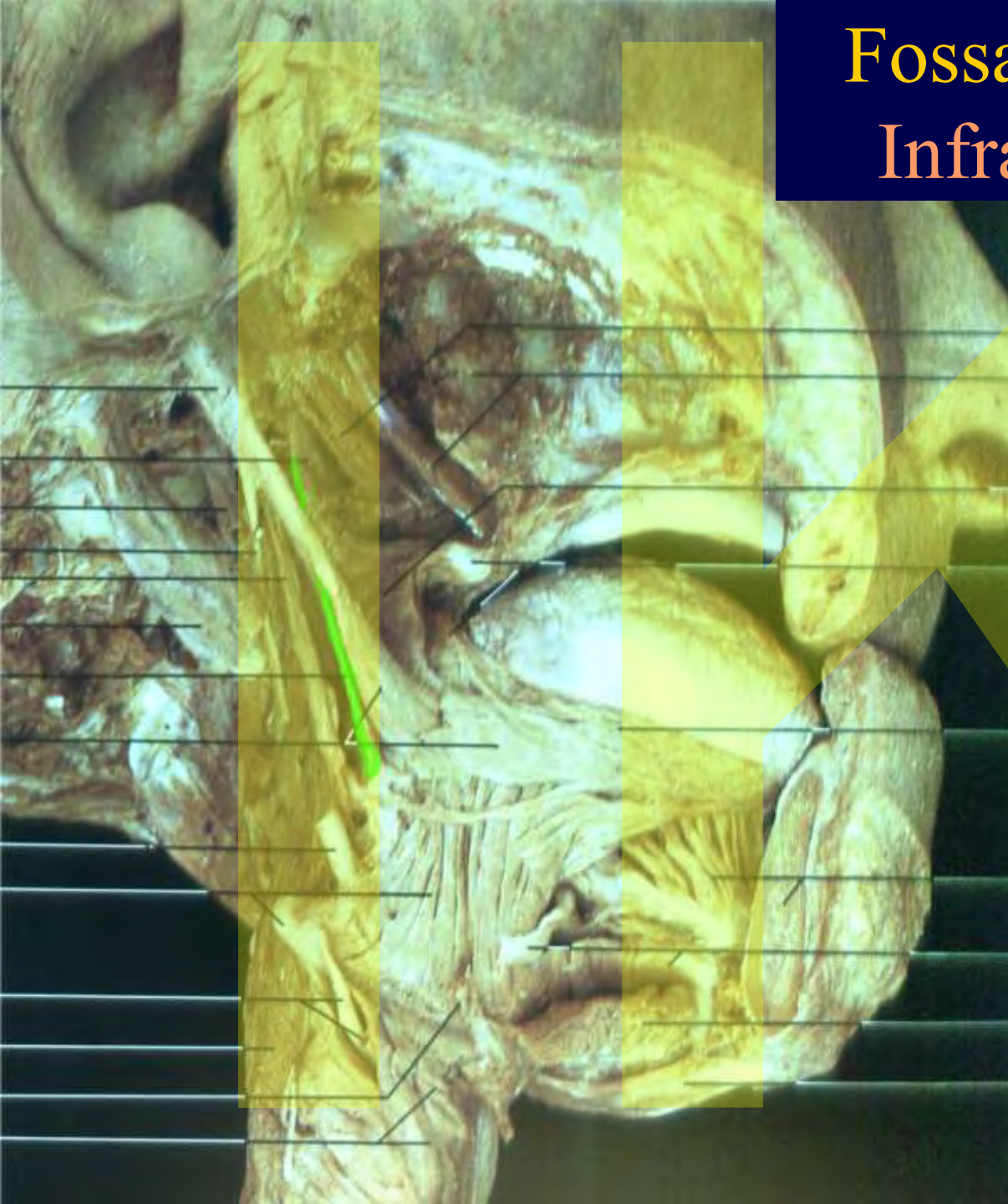
Tuber maxillae

Lat.:

Ramus mandibulae

Dors.:

Septum styloideum

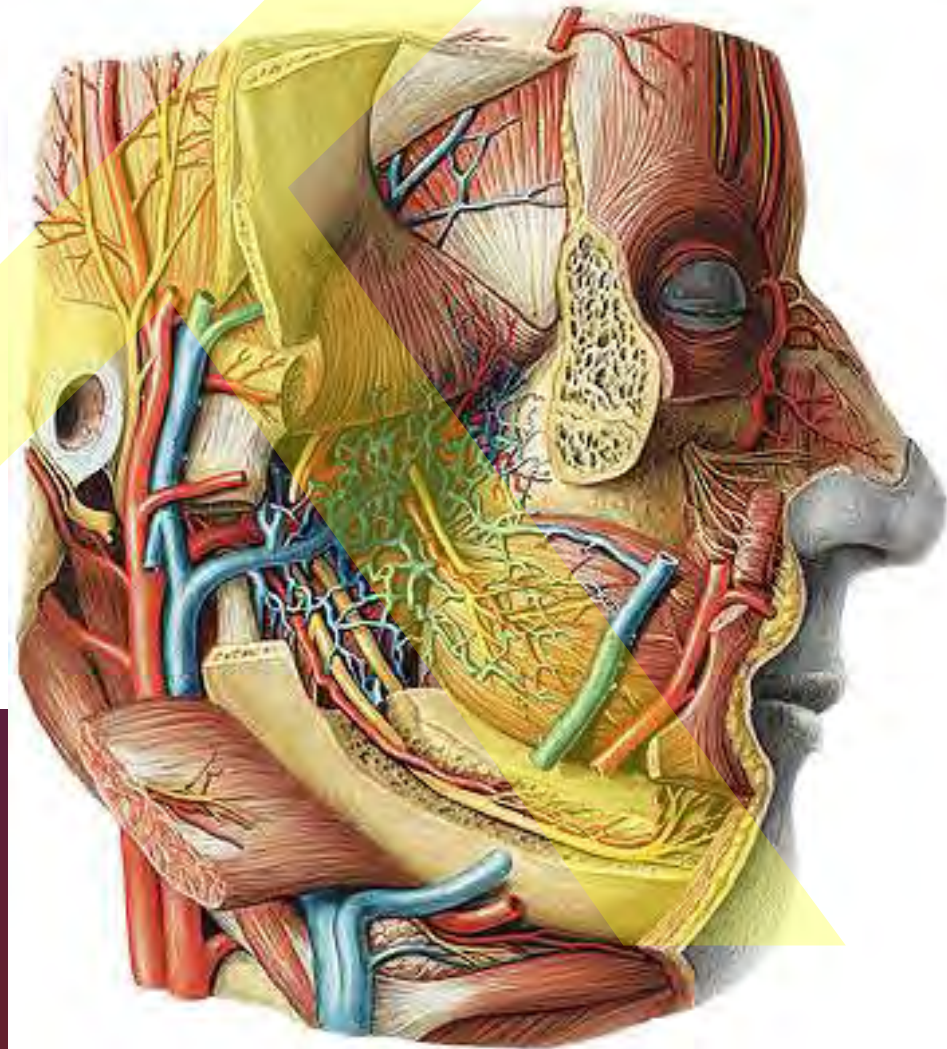
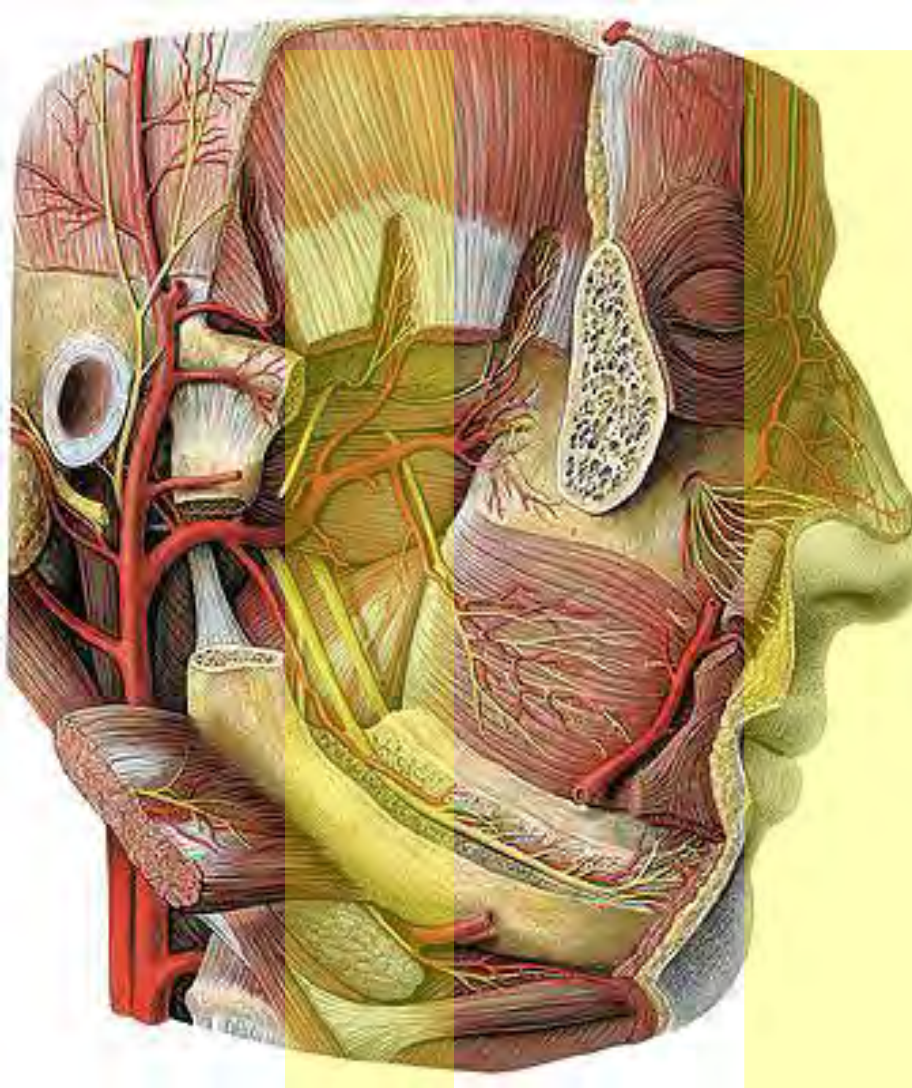


Fossa infratemporalis

„Povrchová vrstva“

Infratemporal fossa

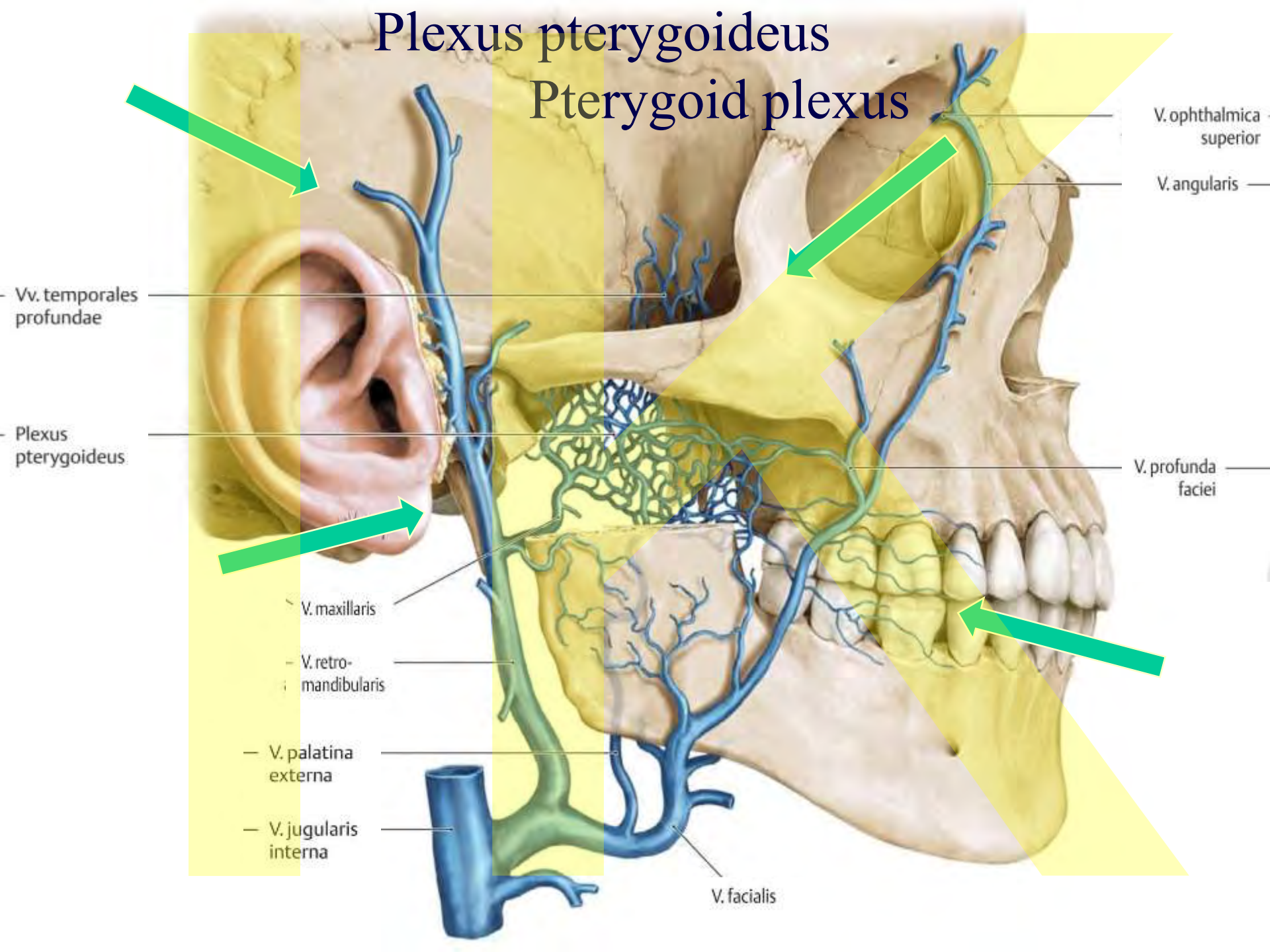
“superficial layer“

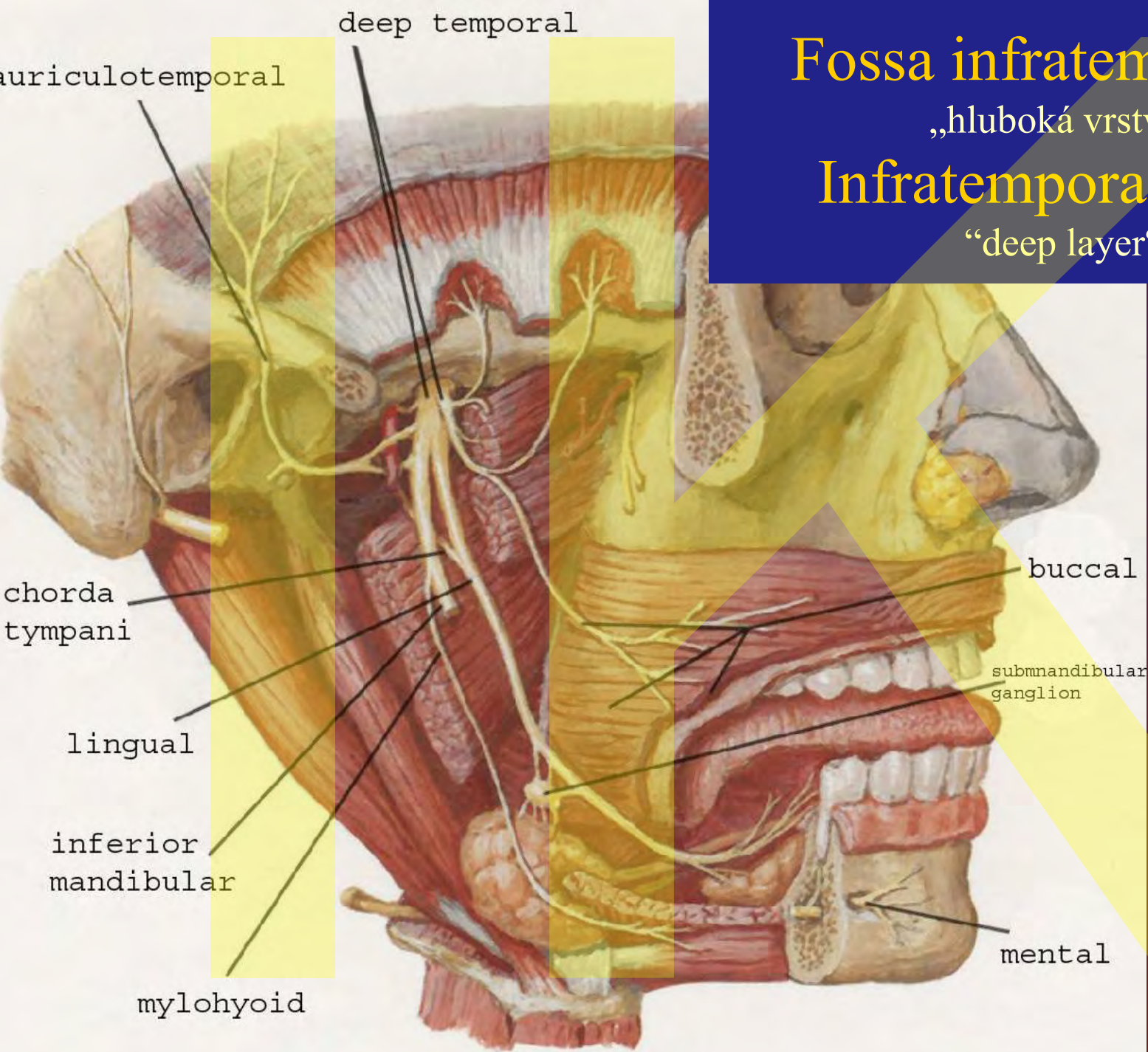


Tepny a žilní pleteně
Arteries and plexiform-like veins

Plexus pterygoideus

Pterygoid plexus





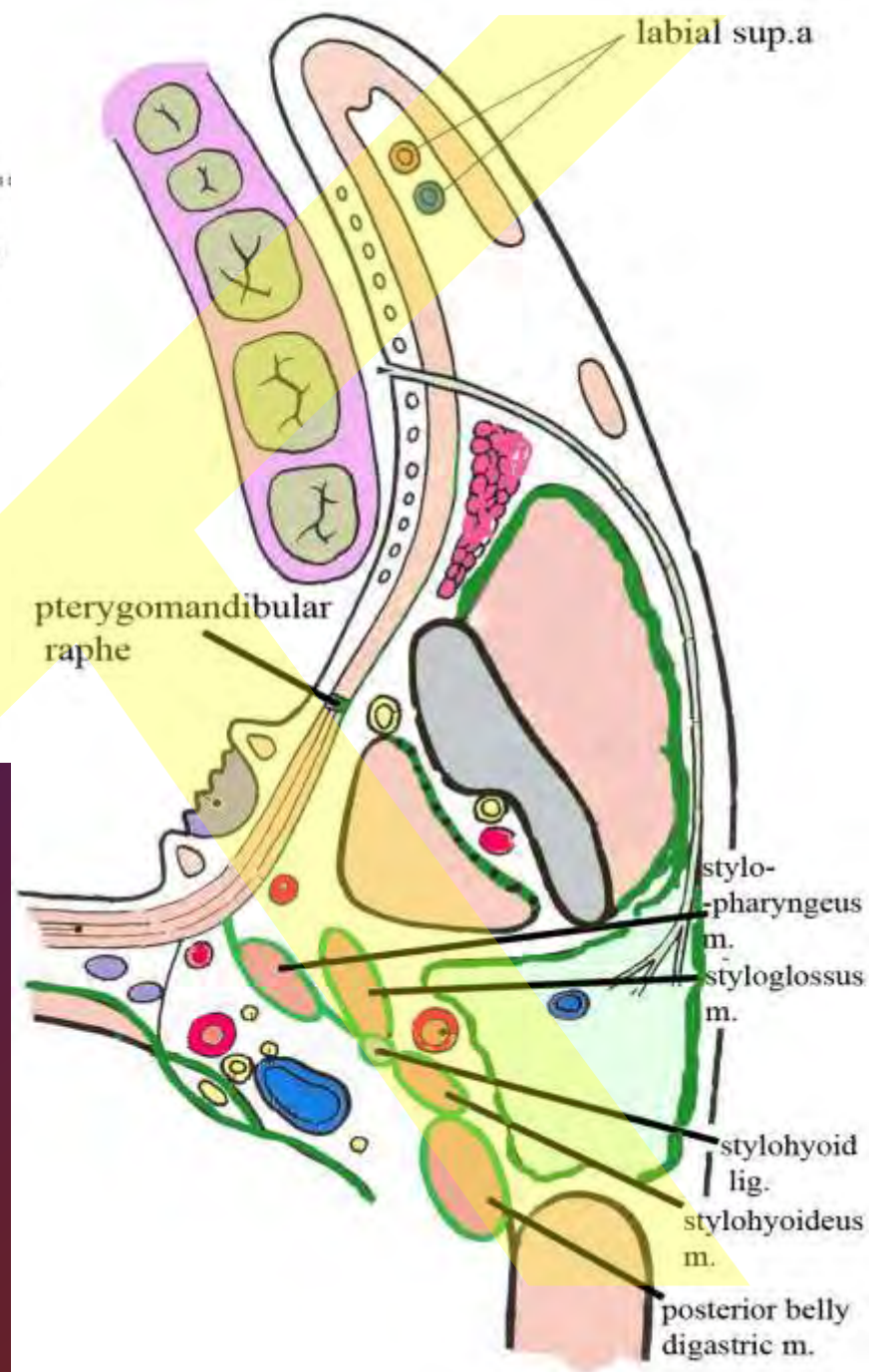
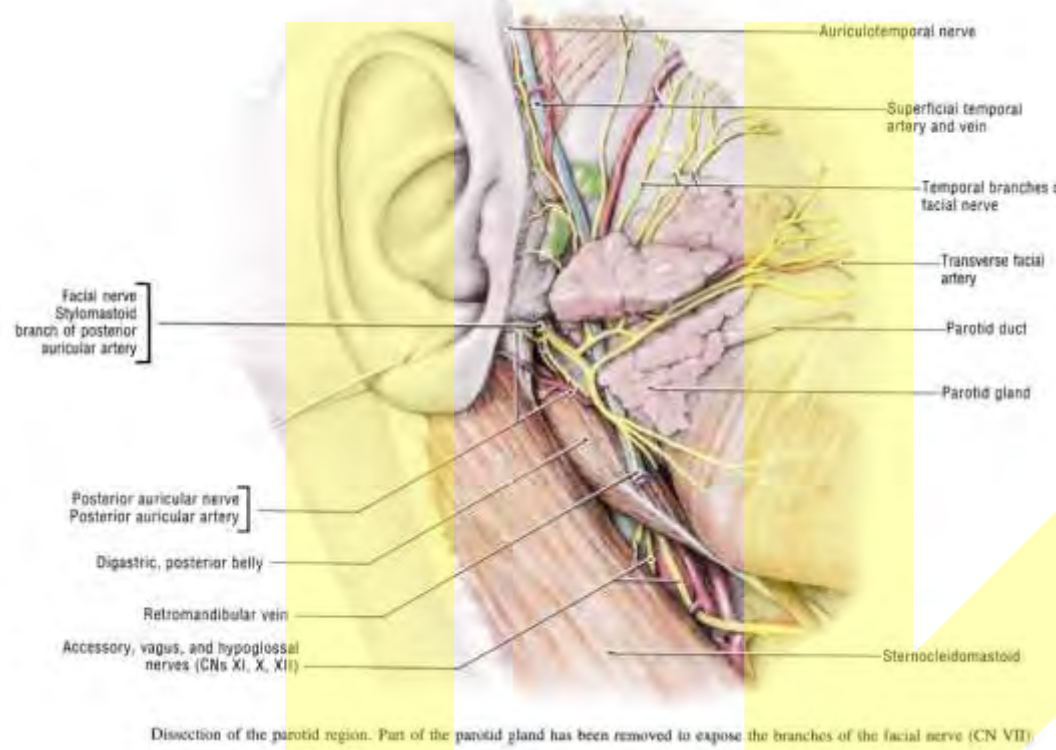
Fossa infratemporalis

„hluboká vrstva“

Infratemporal fossa

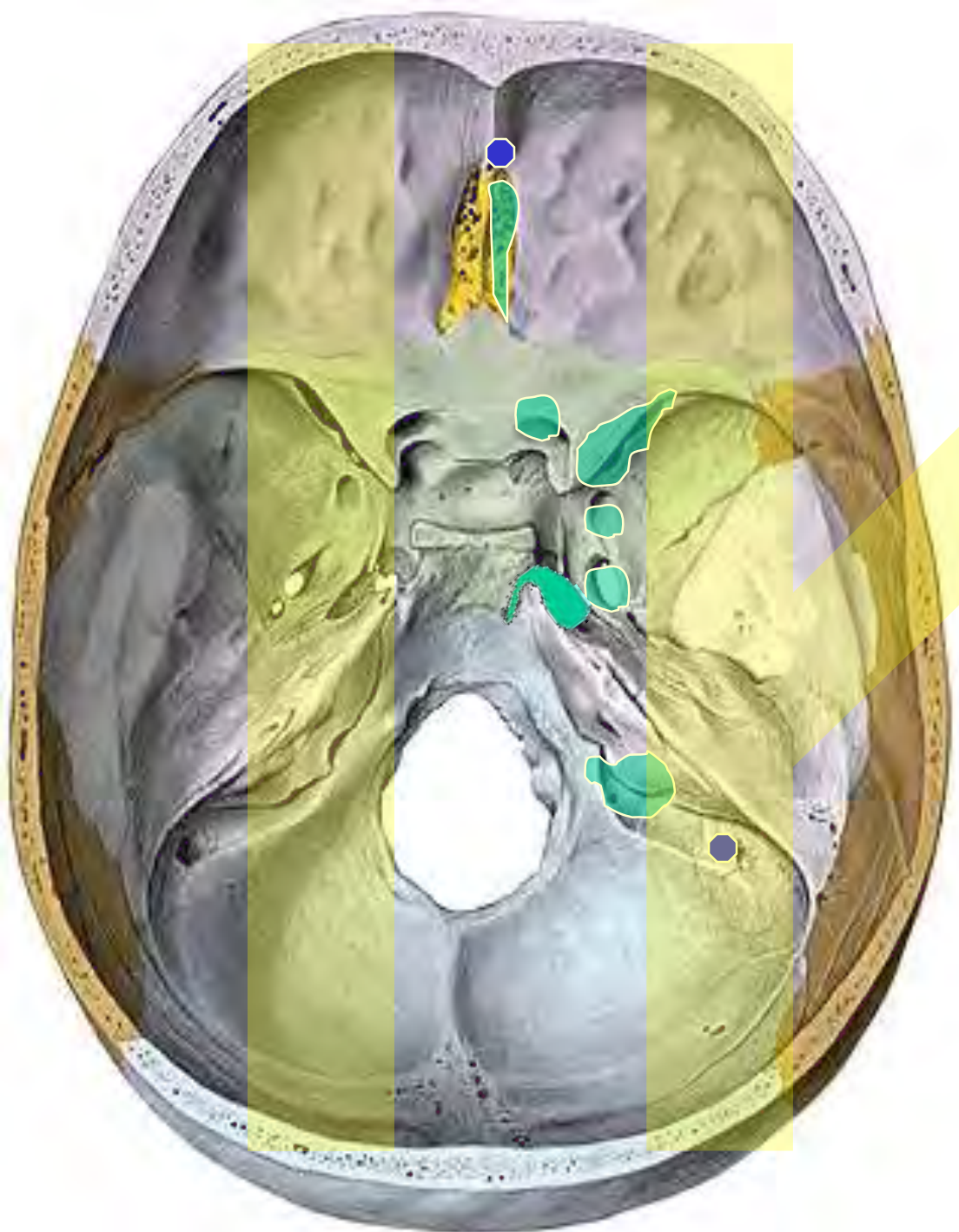
“deep layer“

Mandibular
branches
(V₃)



Fossa retromandibularis et Prostory na hlavě Head spaces

Sp. parapharyngeum: prestyloideum (pterygomandibulare, parotideum, paratonsillare), retrostyloideum (parapharyngeum dorsale)
Sp. retropharyngeum



Cribriform plate - I.

Optic canal

- II., ophthalmic artery

Superior orbital fissure

- III., IV., V₁. (nasociliar, lacrimal, frontal), VI., superior orbital v.

Foramen lacerum

greater petrosal nerve and sphenoooccipital synchondroses)

- internal carotid artery

Round foramen

V₂

Foramen ovale

- V₃., communicating veins

Foramen spinosum

- middle meningeal artery

Carotid canal

- internal carotid artery, sympathetic nerves (caroticotympanic)

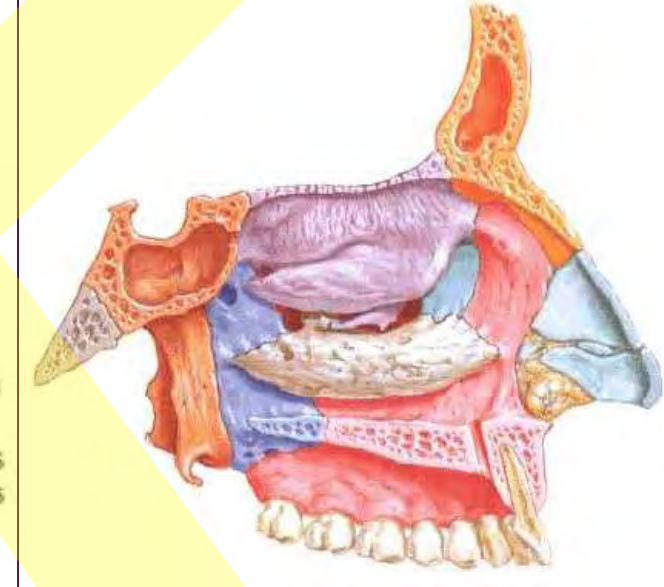
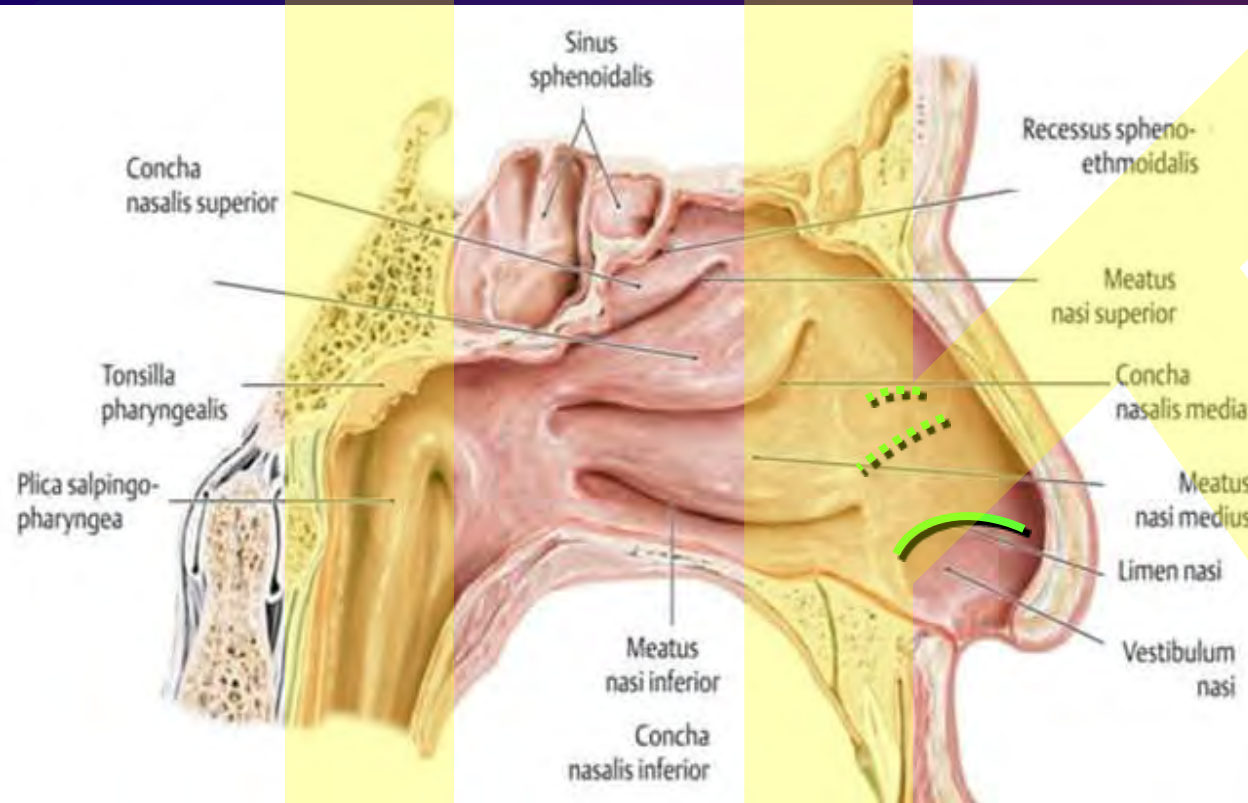
Jugular foramen

- IX., X., XI. internal jugular vein

Limen nasi = line between skin and respiratory epithelium

Agger nasi = swelling on the lateral nasal wall at level of middle concha

Recessus apicis nasi = recess to nasal top



Nasal septum
(nasal vestibule)

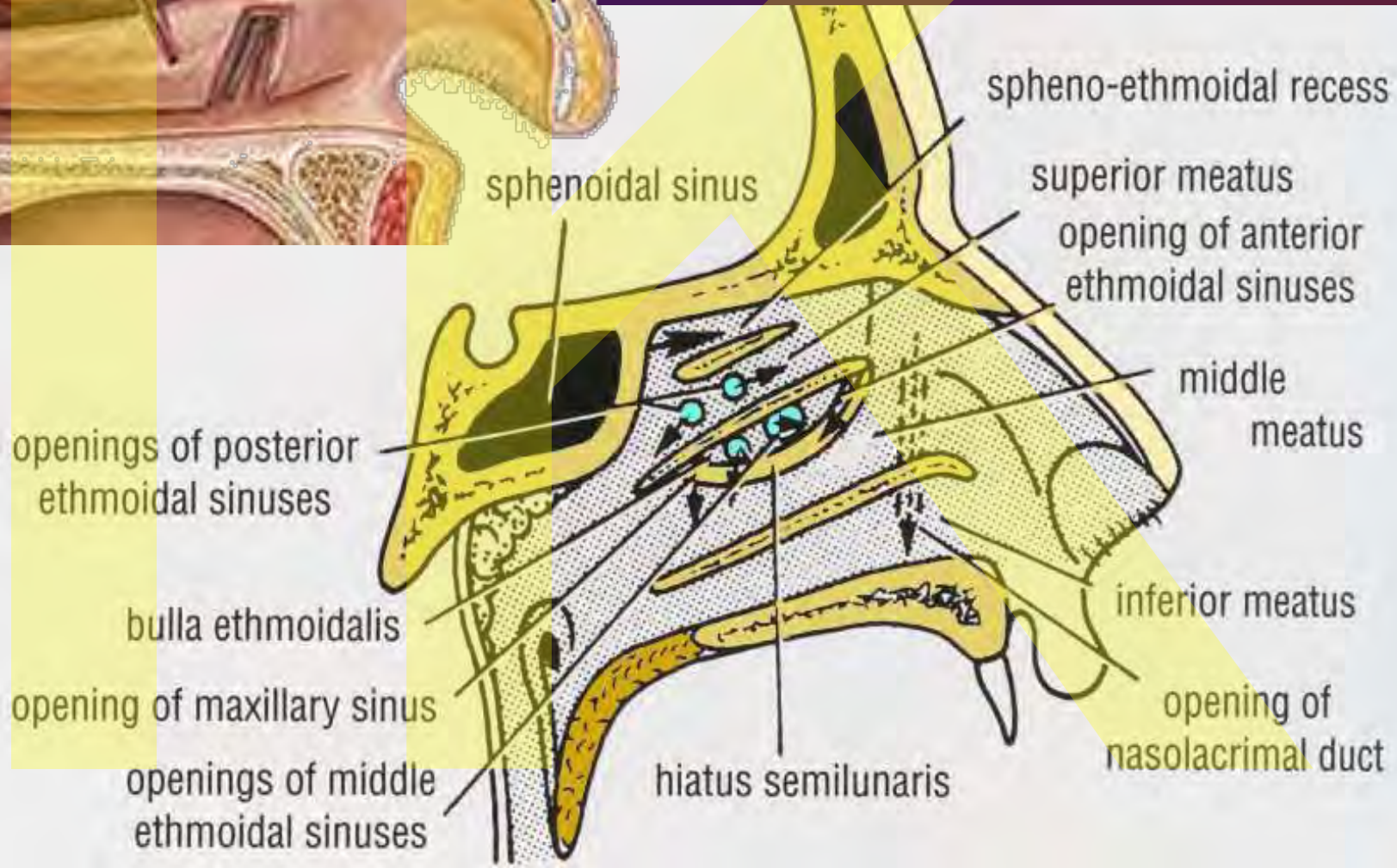
contains vibrissae

Proper nasal cavity
(Cavitas nasi propria)

pars respiratoria (respiratory epithelium)

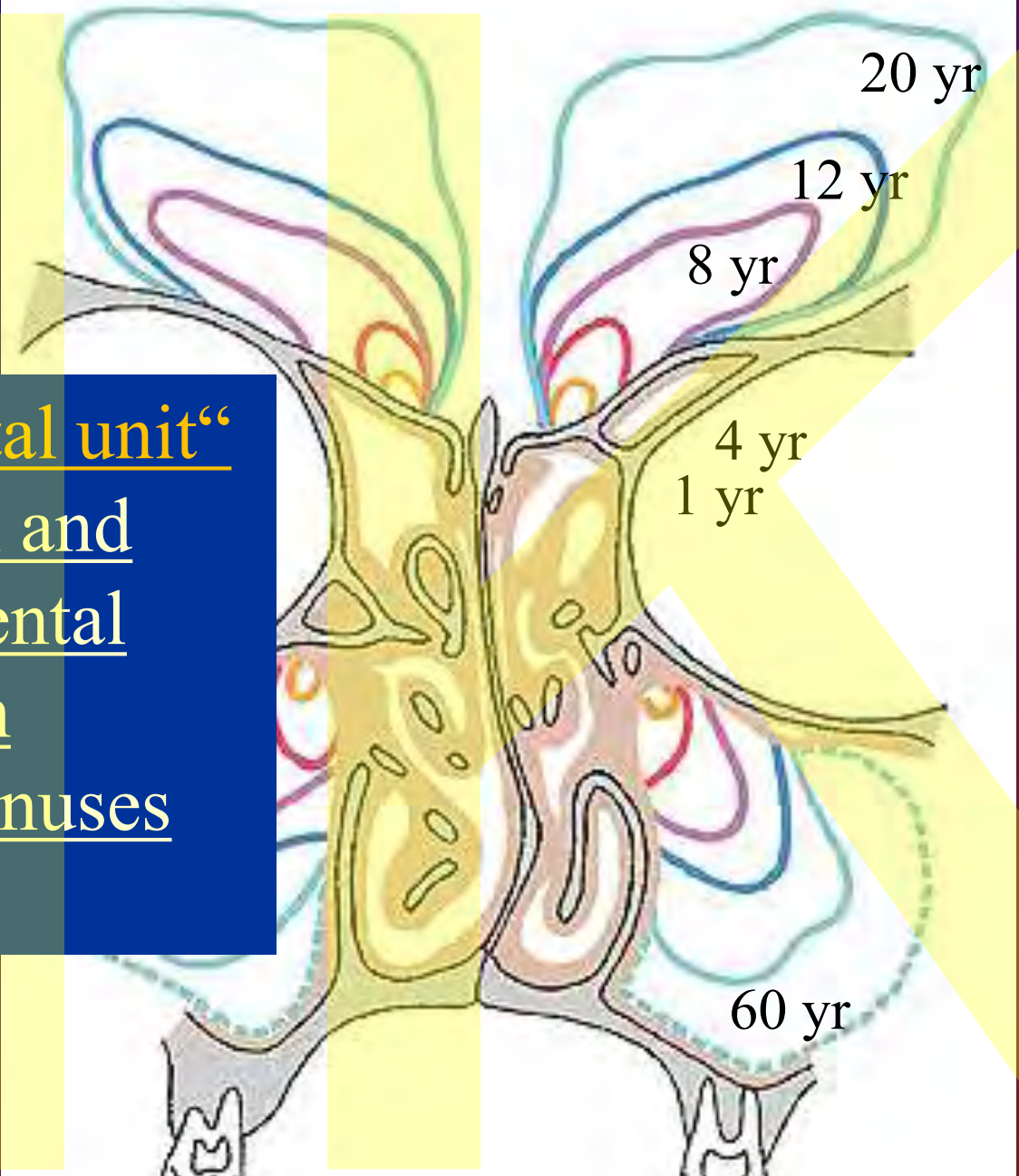
pars olfactoria (olfactory epithelium about 10cm^2 on superior septum and upper nasal concha)

Vyústění paranasálních dutin Paranasal cavities - openings



Frontal
Ethmoidalis
anterior ethmoid
Maxillary

“ostiomeatal unit“
Functional and
developmental
connection
between sinuses



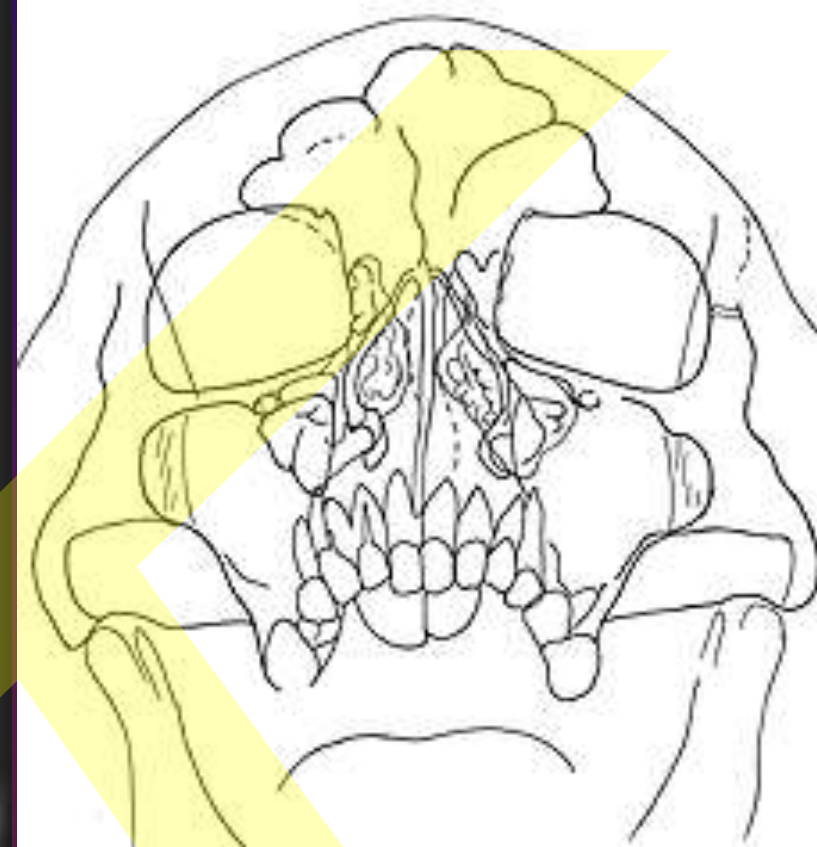
N. Highmore:
*Corporis humani
disquisitio
anatomica; in qua
sanguinis
circulationem in
quavis corporis
particula plurimis
typis novis ac
aenigmatum
medicorum succincta
dilucidatione
ornatam prosecutus
est.*
Hagai-Comitis [The
Hague], 1651.

Antrum
Highmori
(of
Higmore)

The sinus was well known to anatomists before Highmore. It had been illustrated by Leonardo da Vinci (1452-1519) and had been noticed by Giulio Casserio (1561-1616)

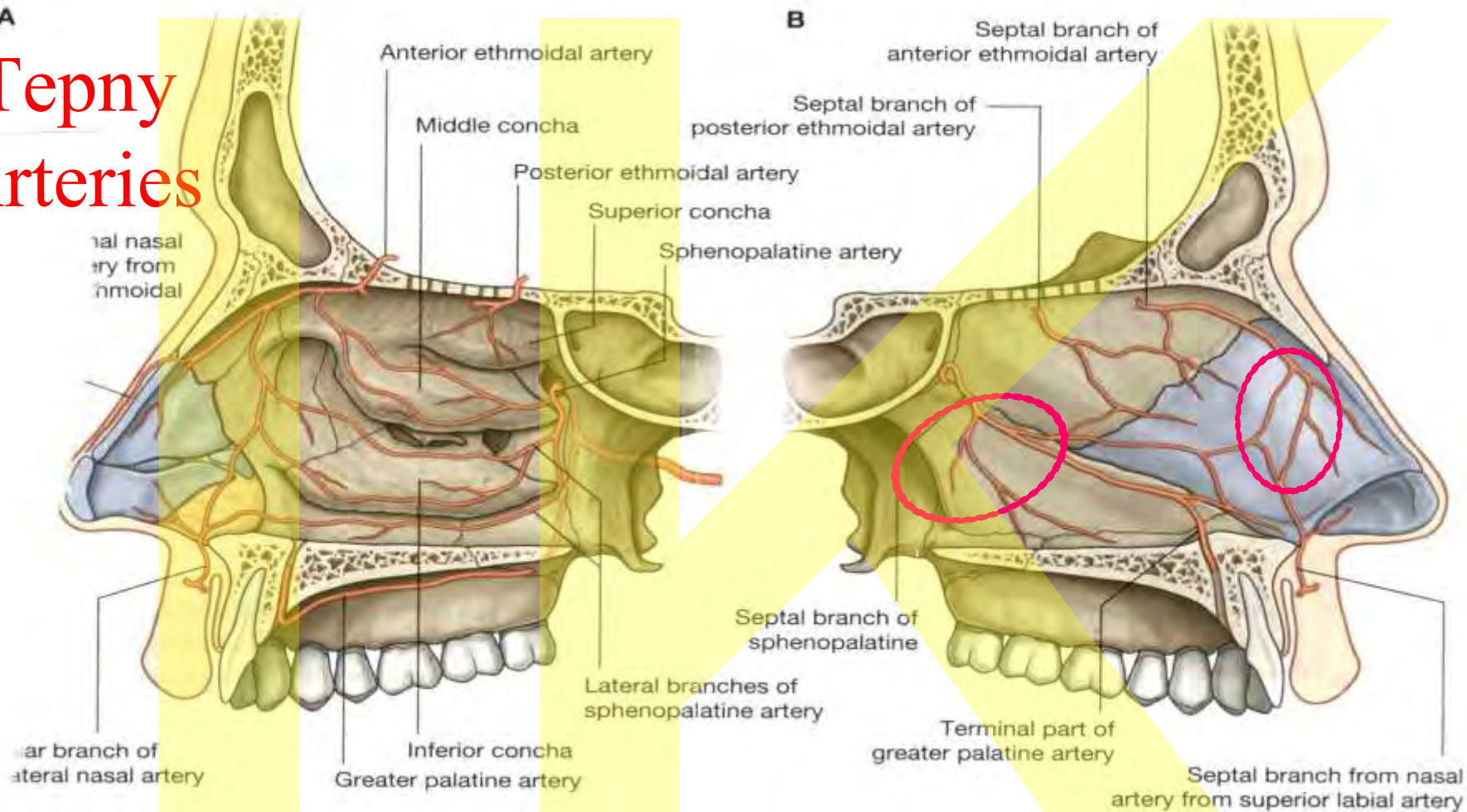


**Following Waters (Towne)
projection**



**Upper posteroanterior
projection**

Tepny Arteries



Wilhelm Kiesselbach (1839-1902) German
otolaryngologist,

Plexus Kiesselbachi

Locus Kiesselbachi

Plexus nasopharyngeus Woodroffi

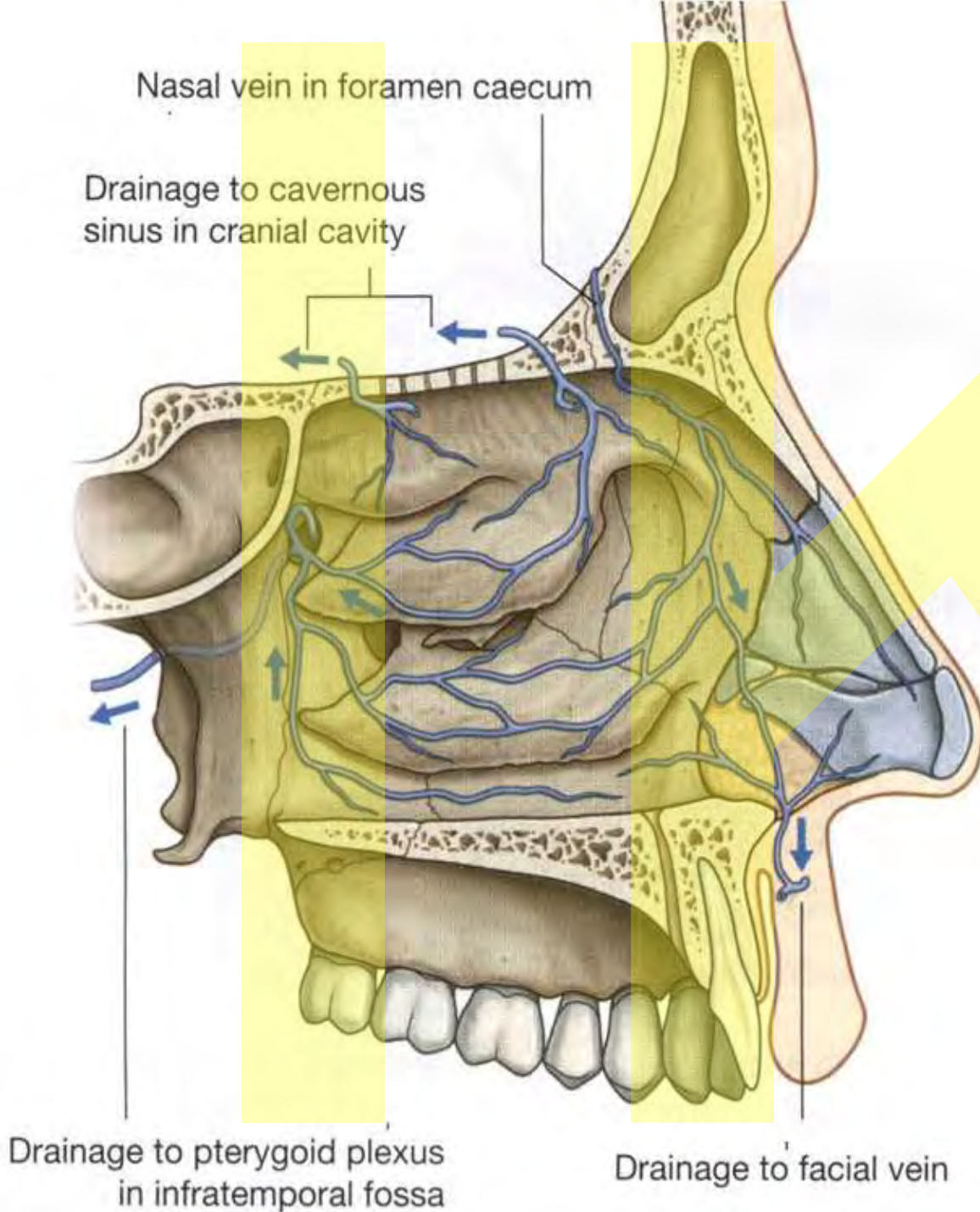
Little's area

a.ethmoidalis ant. a. palatina major, a. sphenopalatina, a. labialis superior anterior ethmoid, great palatine arteries, **sphenopalatine a.** and superior labial a. rr. septales a.ethmoidalis post. a. sphenopalatina Septal branches of the posterior ethmoid, **sphenopalatine arteries**

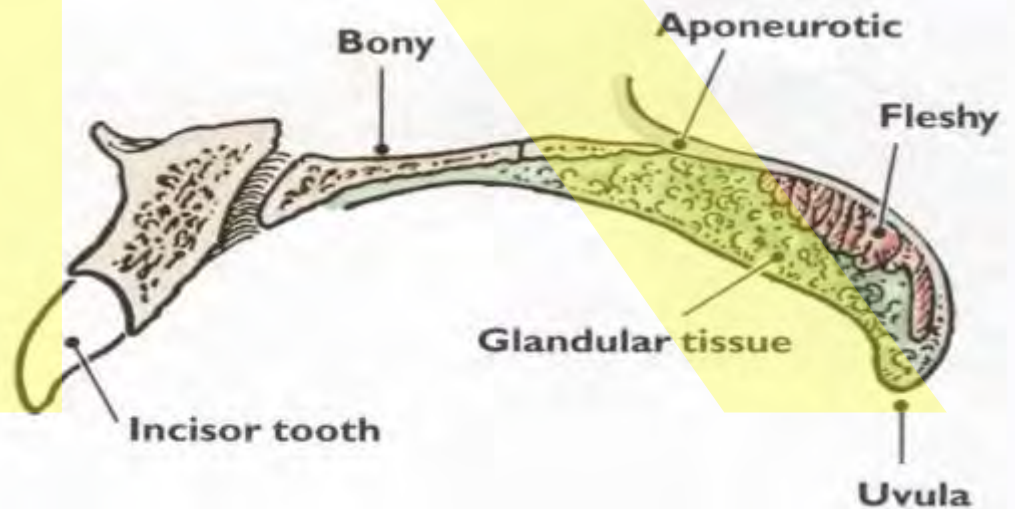
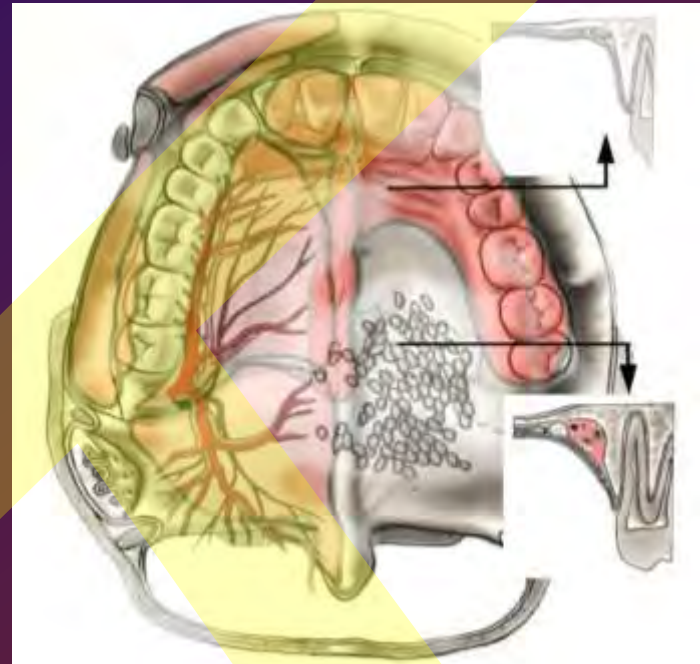
Žíly Veins

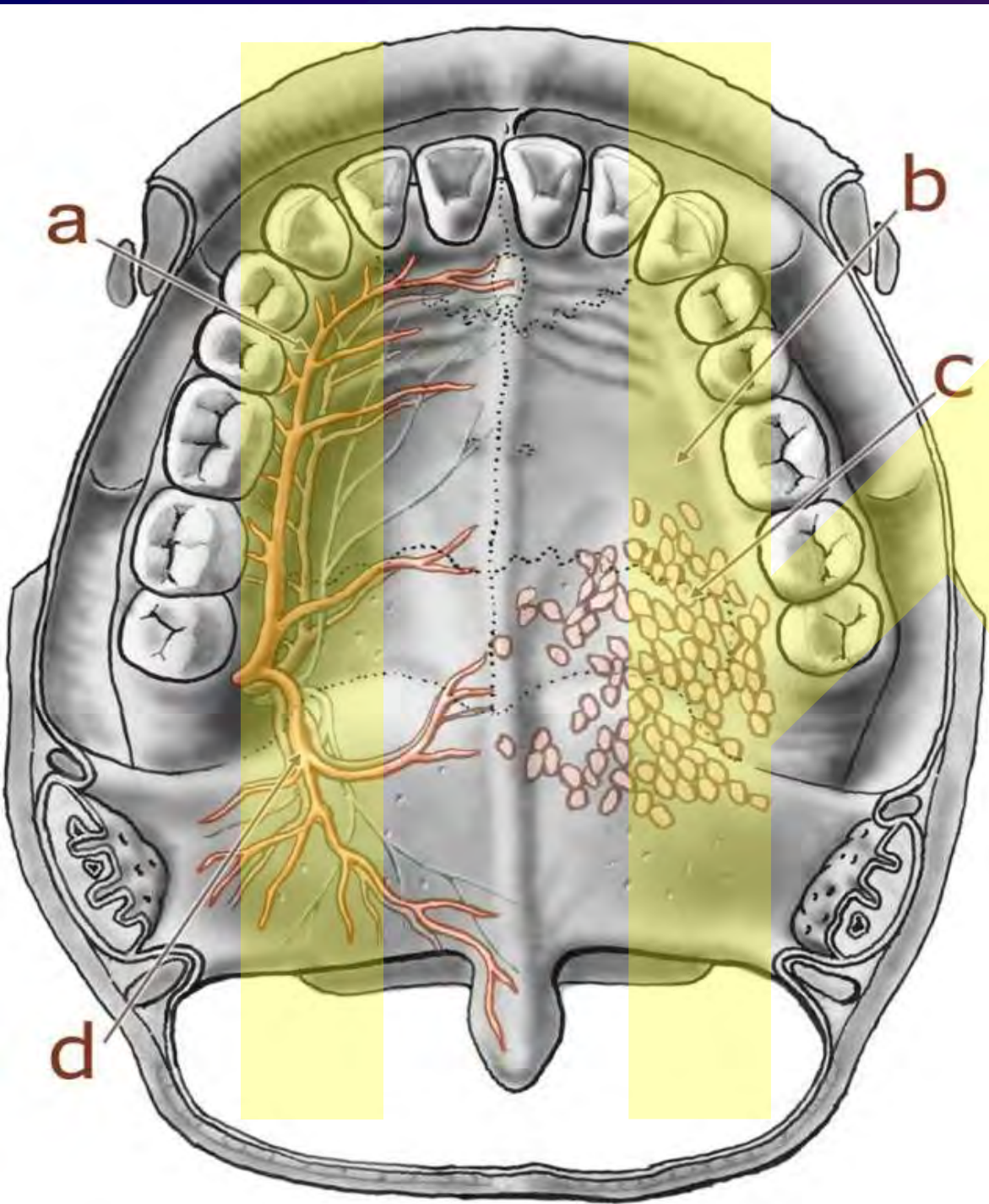
plexus cavernosi
concharum:

- v. sphenopalatina →
plexus pterygoideus
 - a) → v. maxillaris →
v. retromandibularis
 - b) → v. profunda faciei → v. facialis
- b) → vv. ethmoidales →
vv. ophtalmicae
- c) → via lamina cribrosa
→ vv. cerebri



Palatal relief with rugae, foveolae palatinae, papilla incisiva





a –
a.+v. +n. palatinus major
greater palatine artery, vein,
nerve

b –
sulcus palatinus major
greater palatine groove

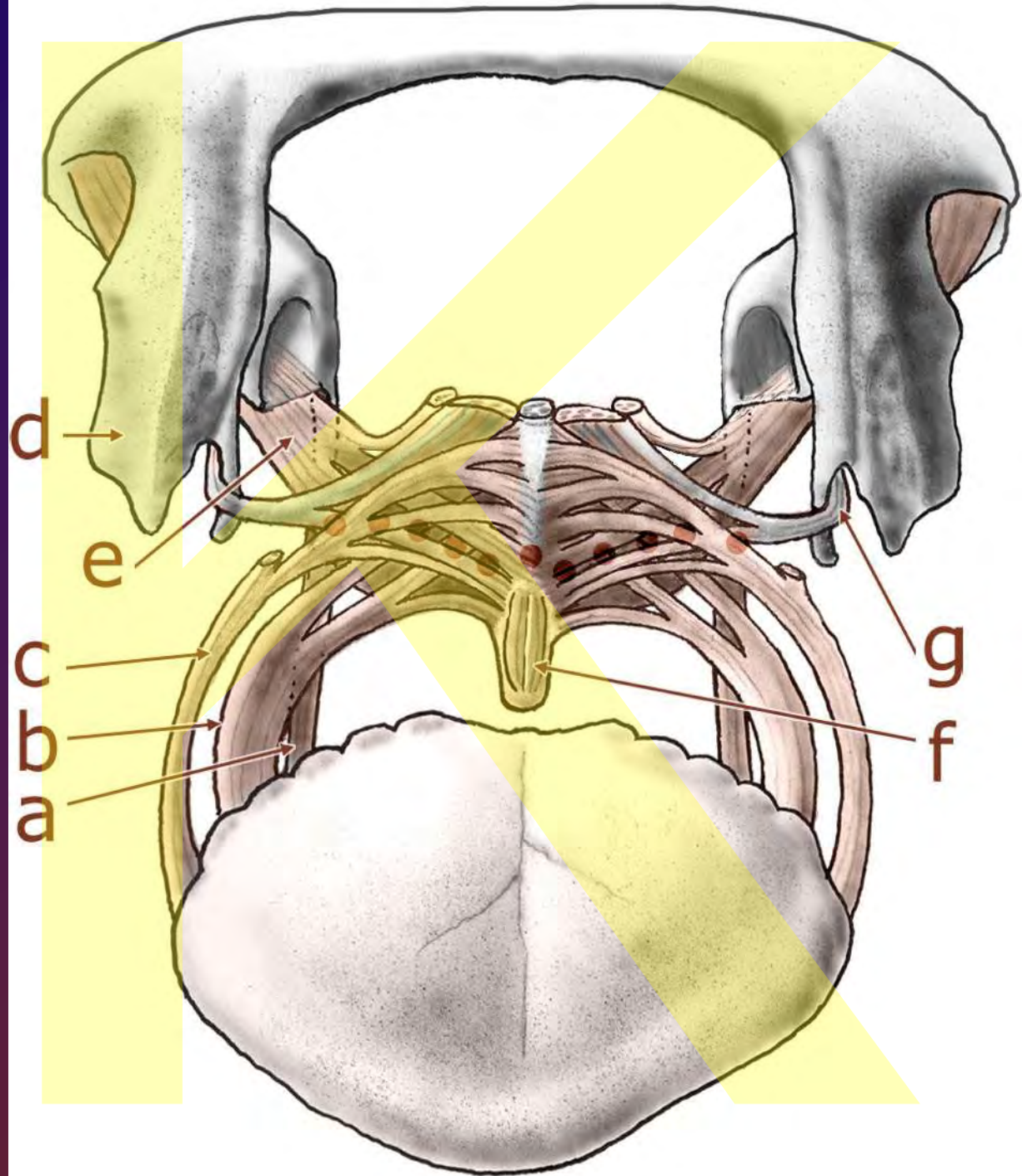
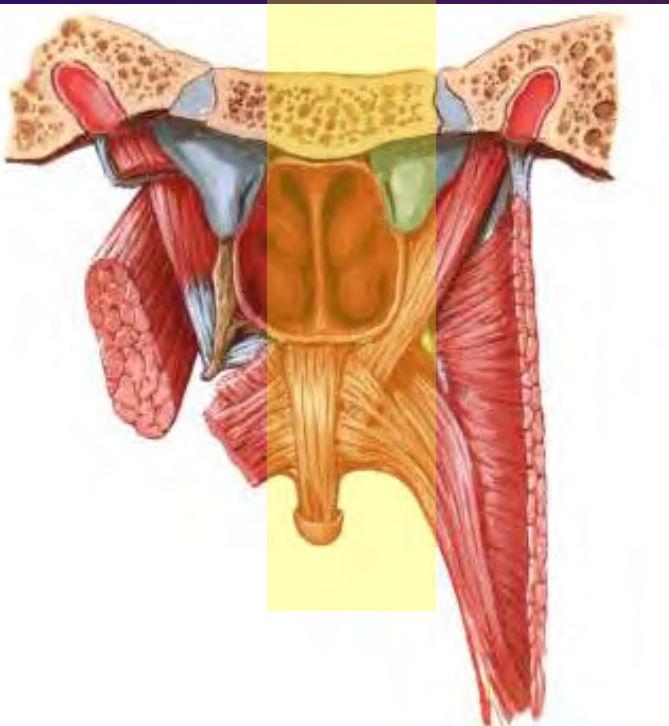
c –
glandulae palatinae
palatal glands

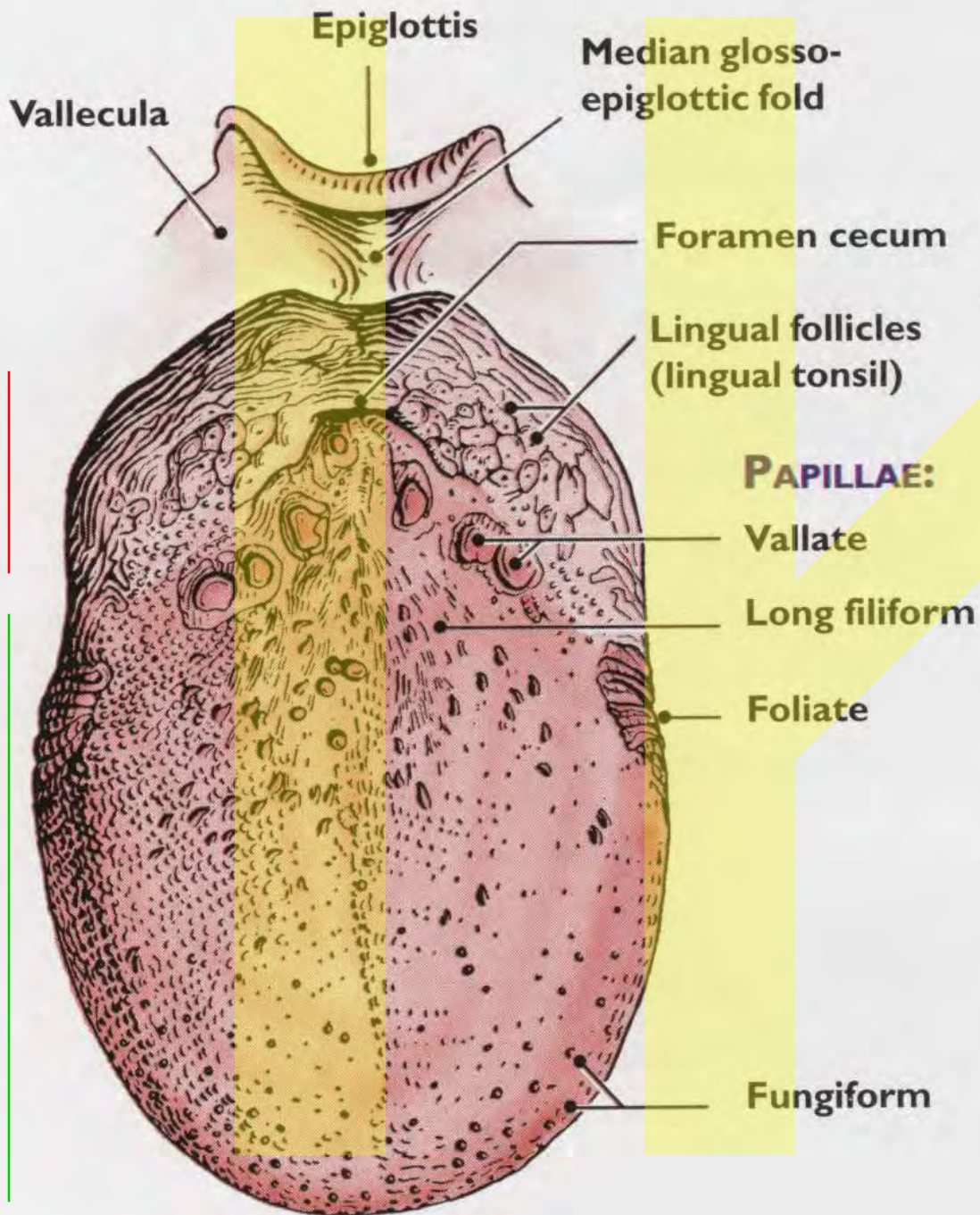
d –
a.+v.+n. palatinus minor
lesser palatine artery, vein,
nerve

Palatum molle Soft palate

– ventrálně
ventral view

– dorzálně
dorsal view





Lingua, glossa tongue

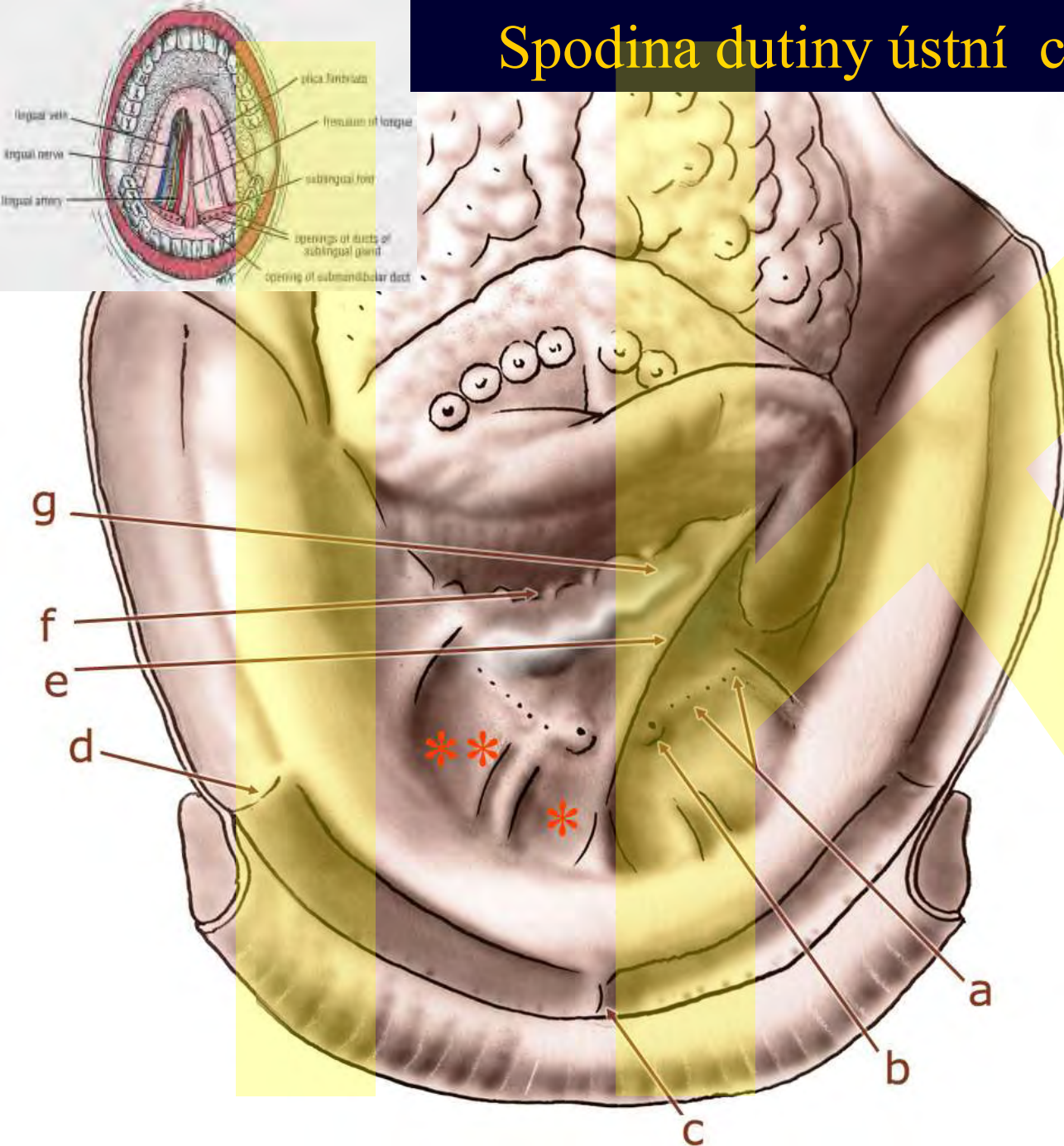
Pohyblivý svalověepitelový orgán
 Mobile musculoepithelial organ;
 Located in the oral cavity and
 pharynx

Žvýkání Mastication,
 Polykání Deglutition,
 Řeč Speech

Formuje sousto
 Squeezing food into pharynx
 during swallowing;

Pomáhá artikulovat
 slova Forming words during
 speaking

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

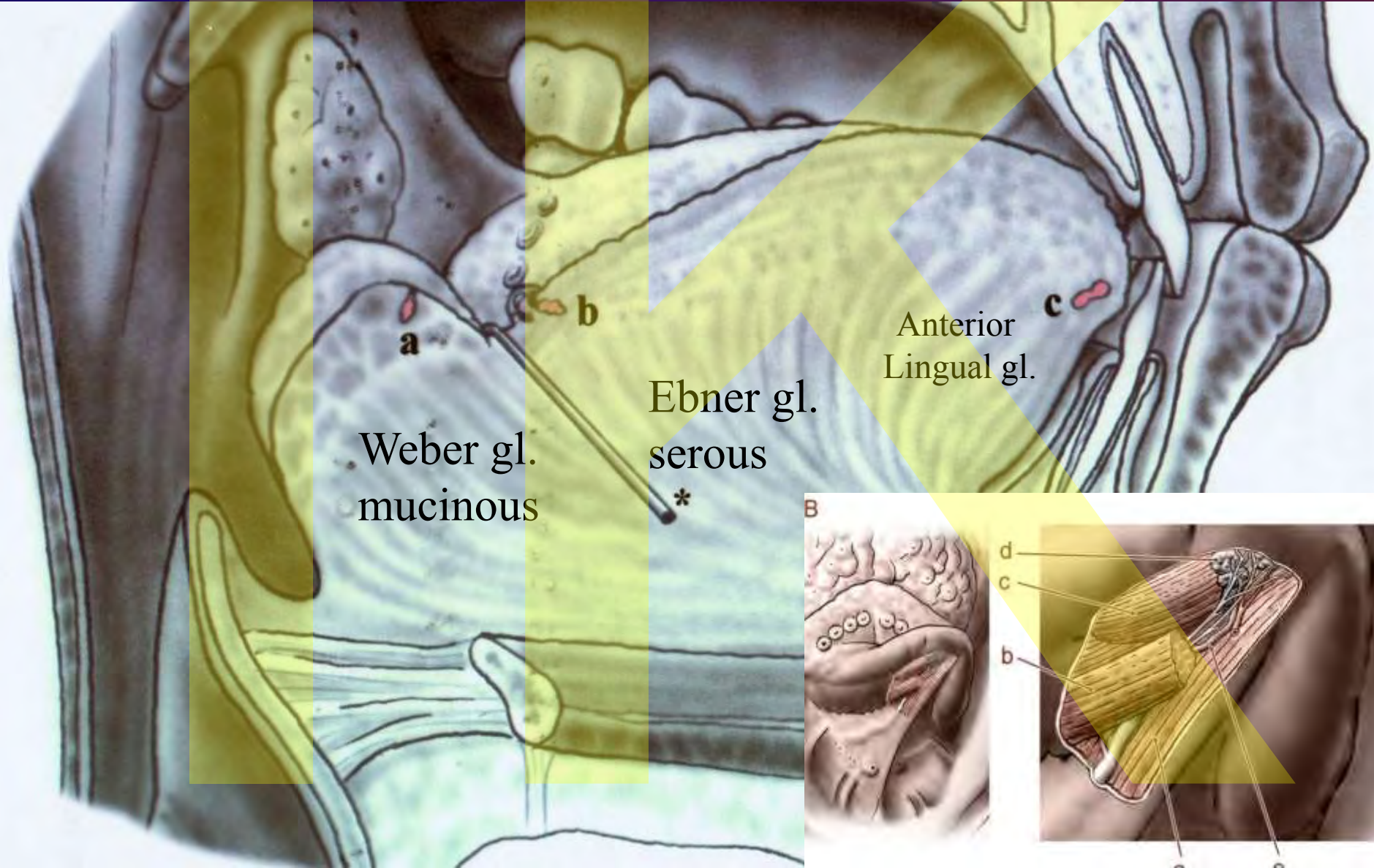
** Area submandibularis

Canalis paralingualis

Paralingual canal =
between hyoglossus and
genioglossus

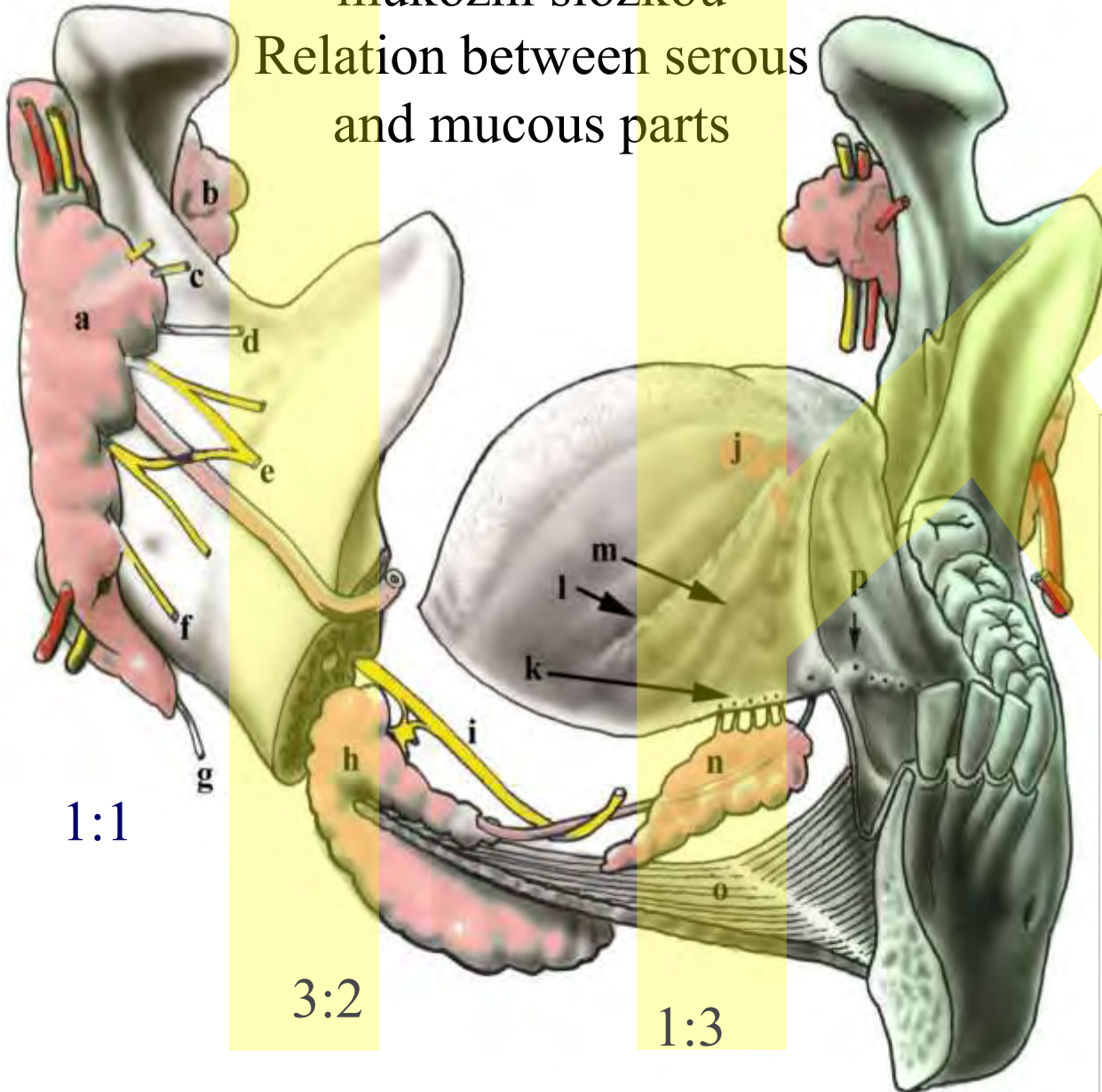
Drobné serózní a mukózní žlázy

Mucous and serous small glands



Vztahy mezi serózní a mukózní složkou

Relation between serous and mucous parts



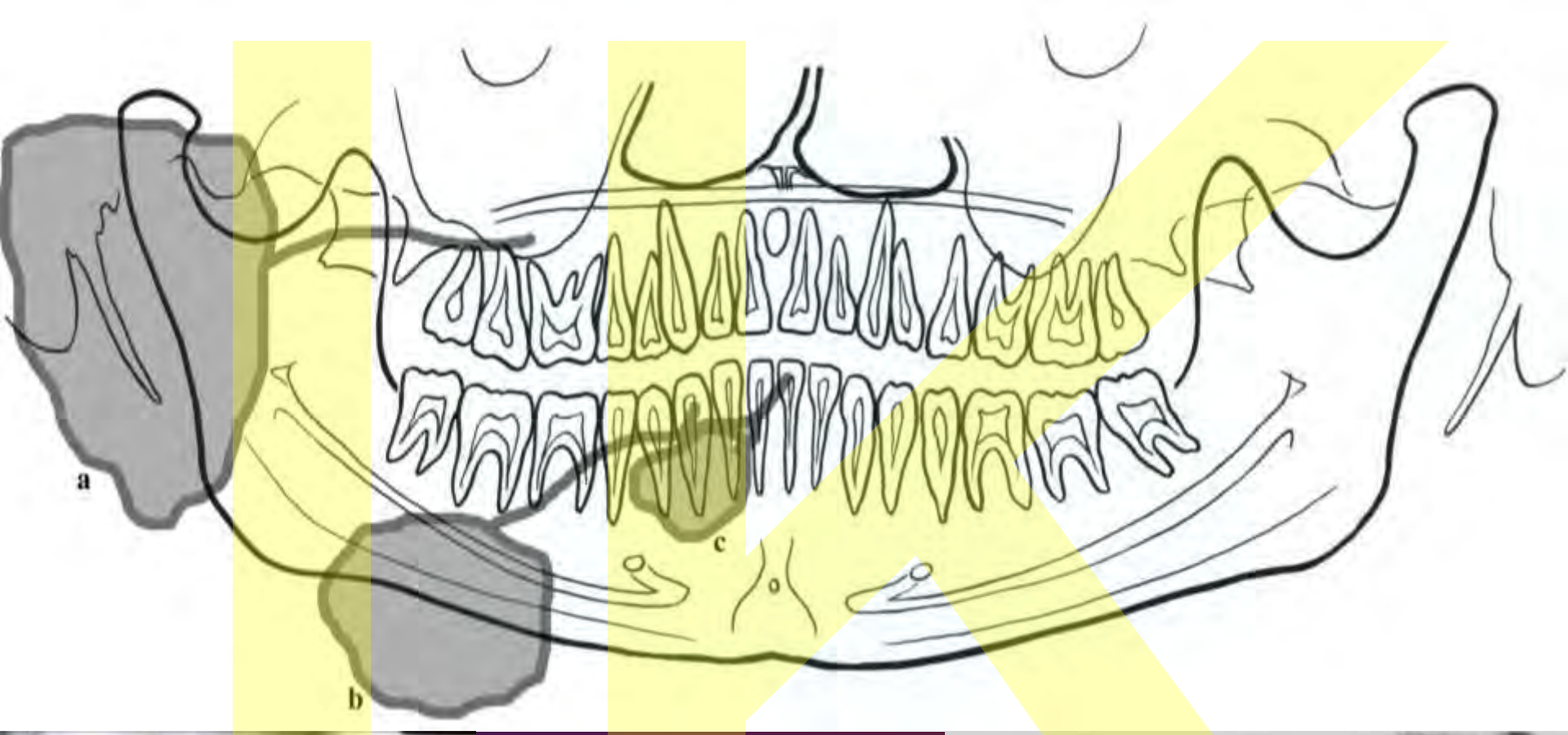
1:1

3:2

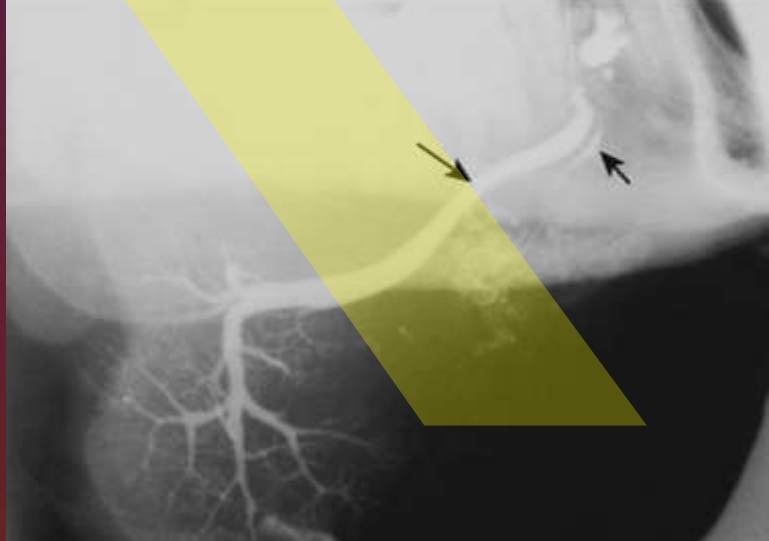
1:3

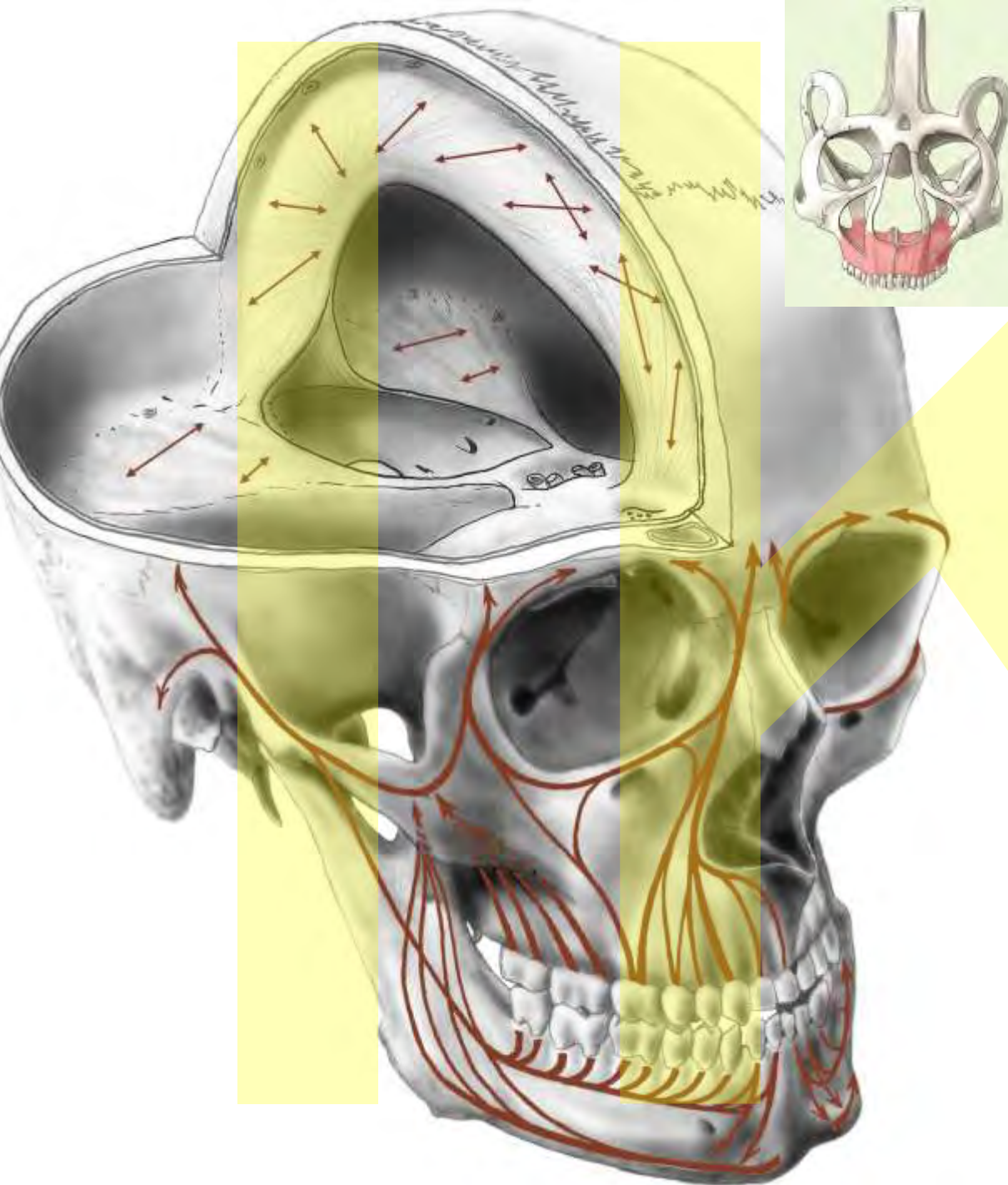
Glandula parotidea
Sublingualis
Sublingualis anterior
Submandibularis





Panoramatický
snímek
panoramic x – ray
photo





Tahové a tlakové linie lebky

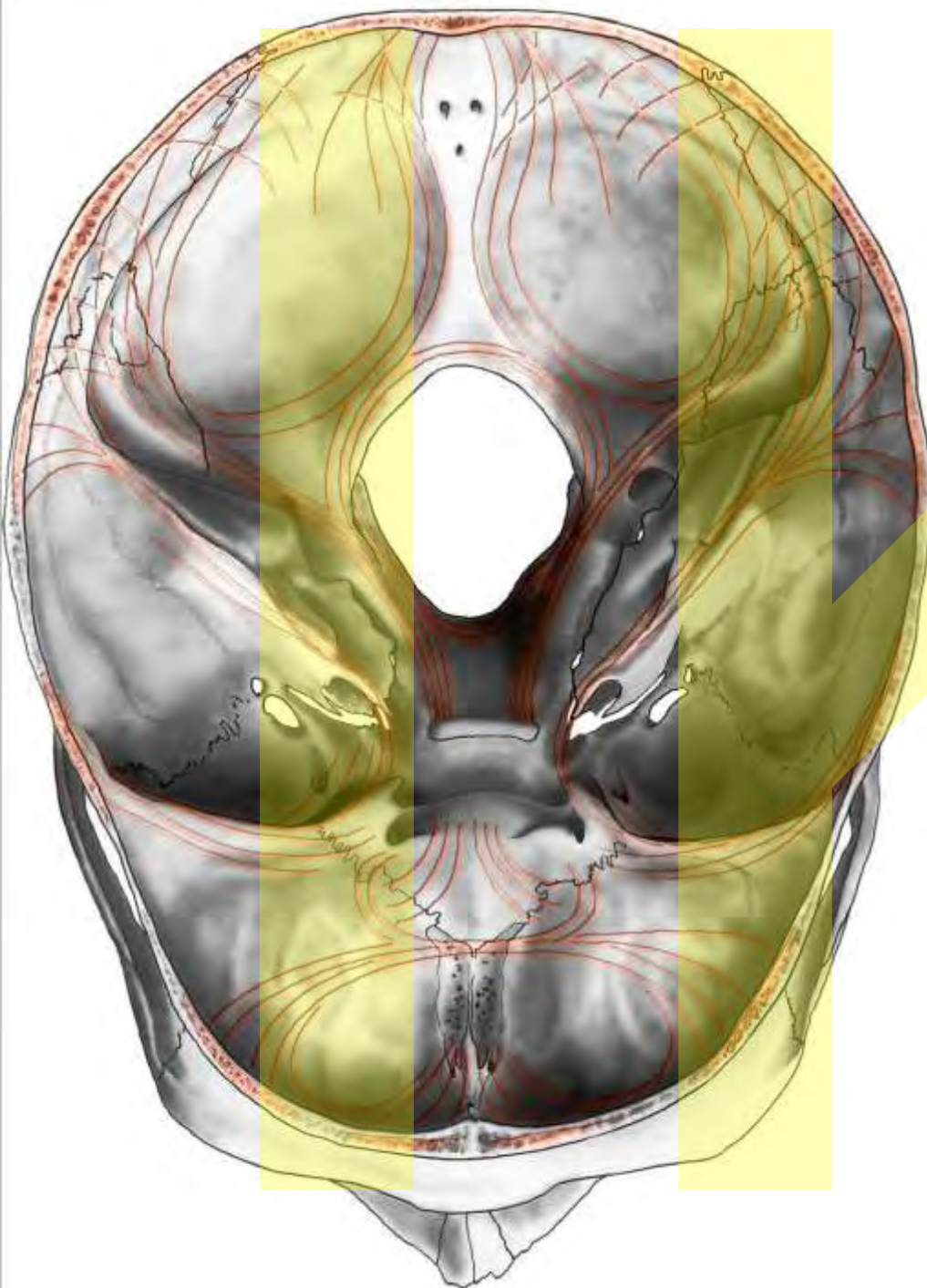
Traction
and pressure lines
in skull

Pilíře:

špičákový, stoličkový
(jármový), pterygoidní,
dolní čelisti

Pillars (counterforts, buttresses):

canine,
molar,
pterygoid, mandibular

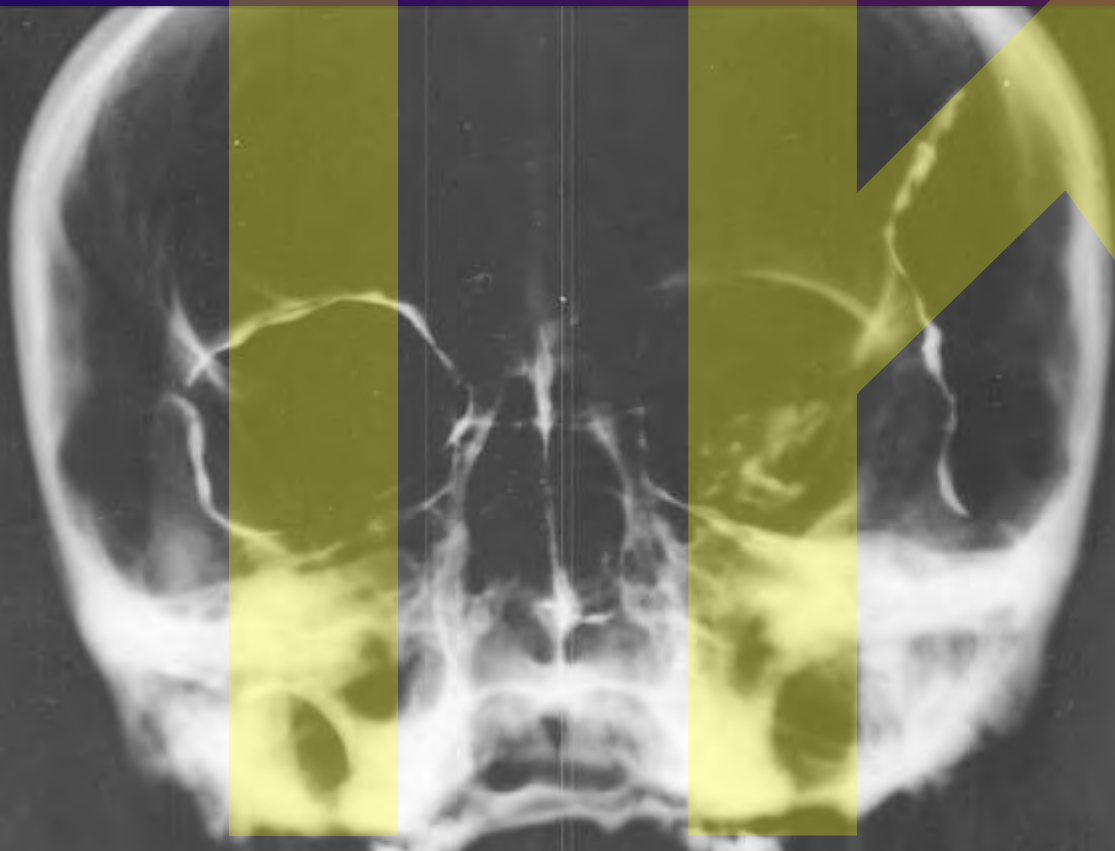
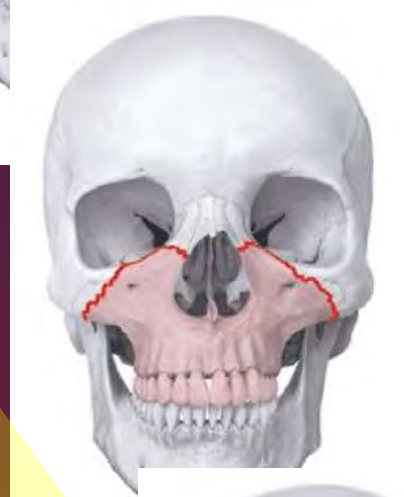


Tahové a tlakové
linie lebeční
base

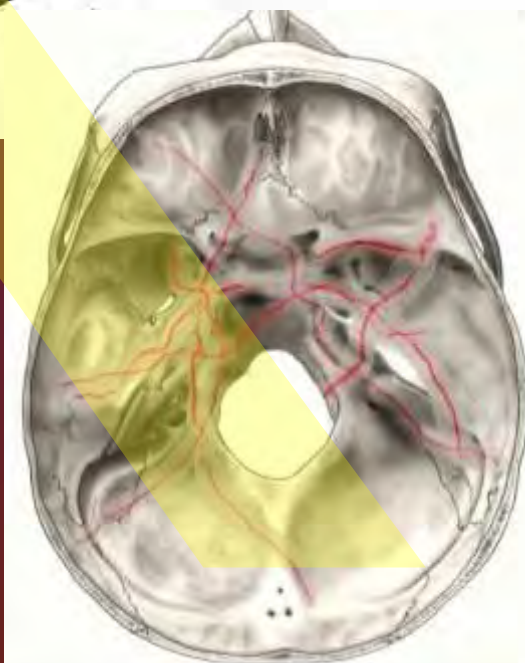
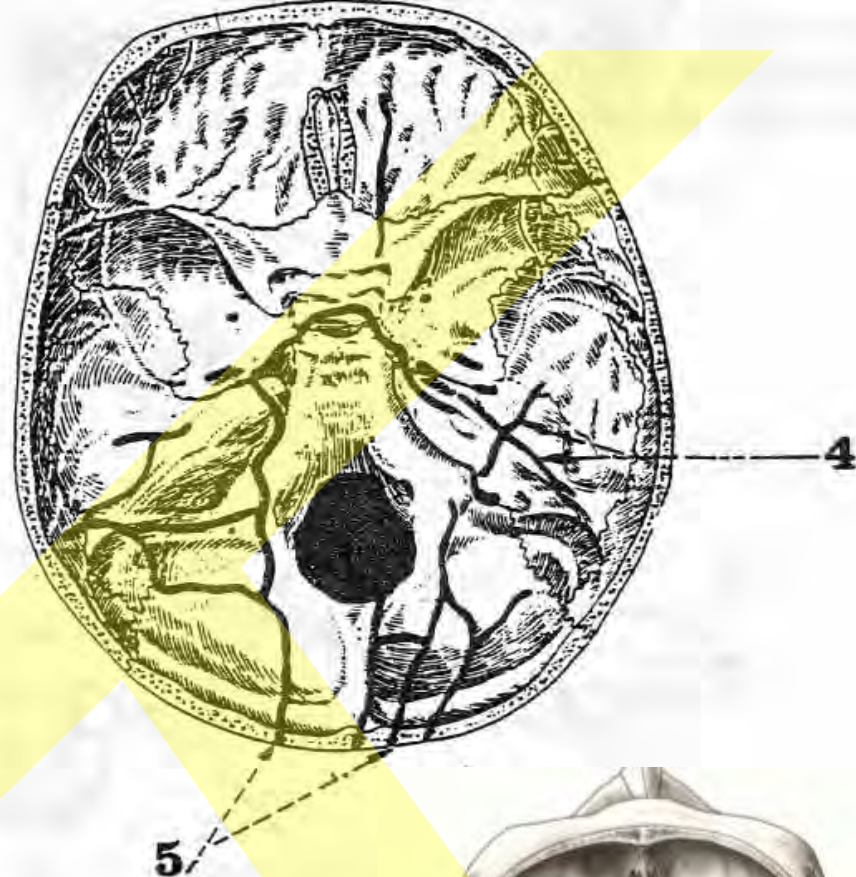
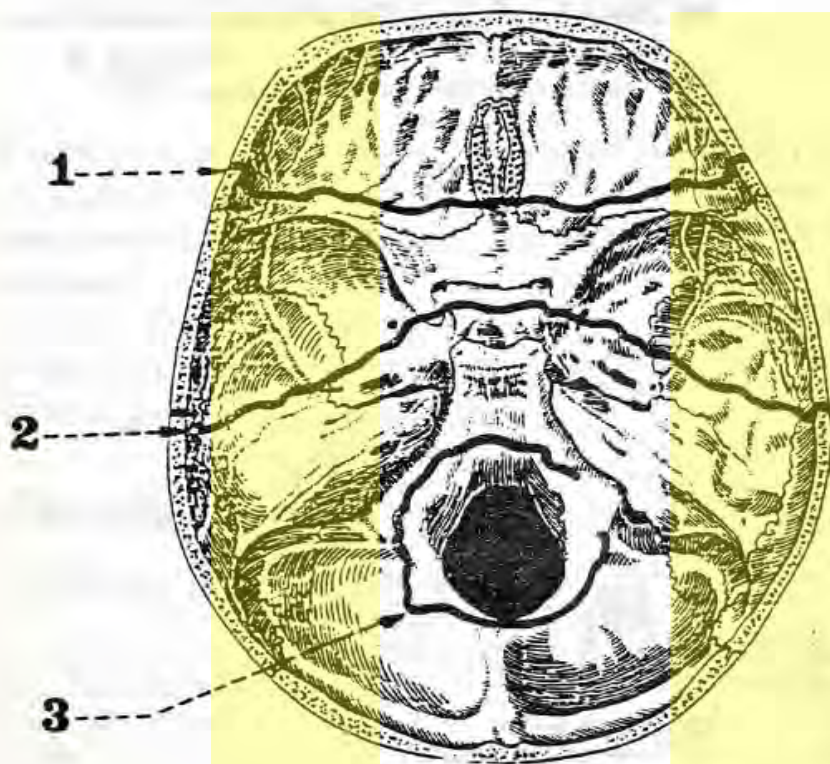
Traction
and
pressure lines
in skull base

Přerušeni označených kostních linií signalizuje zlomeninu podle le Forta

Interruption of the labelled osseous lines indicates Le Fort fractures



(René Le Fort 1902)



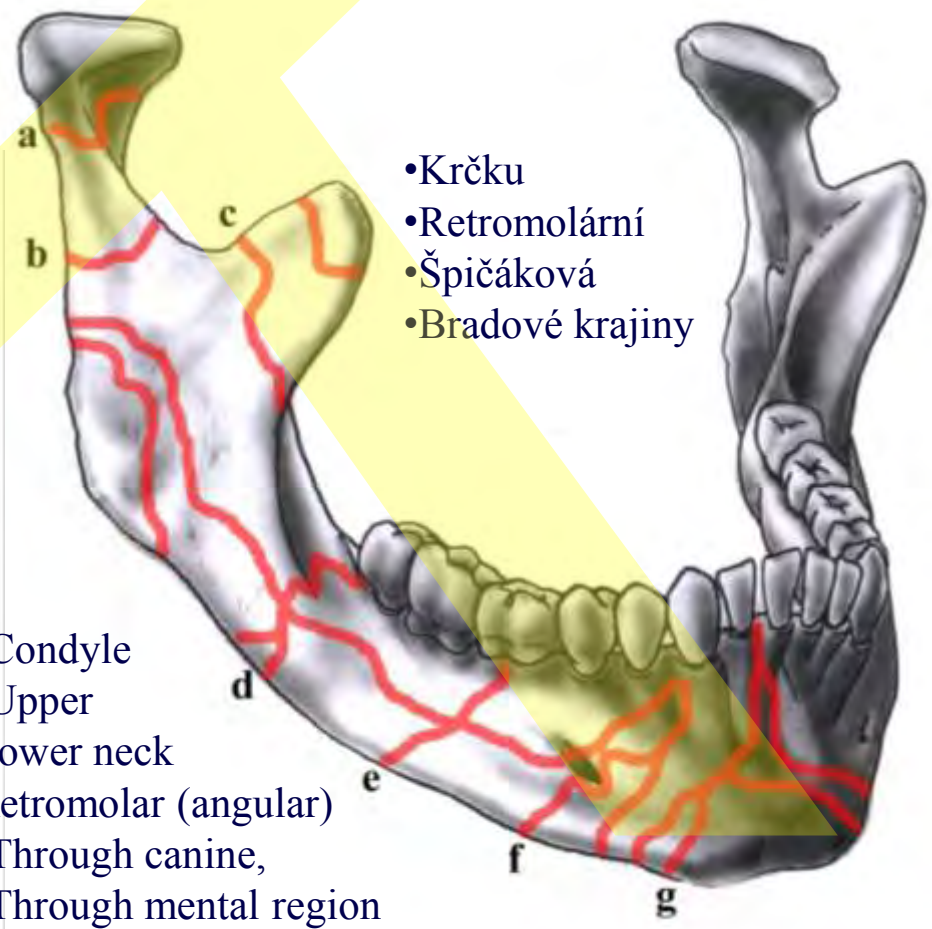
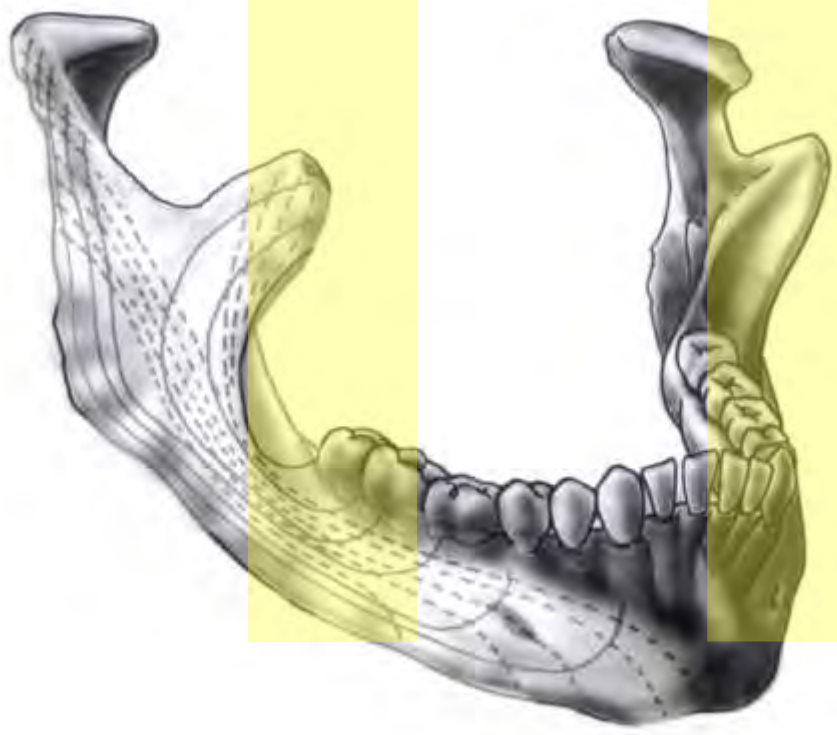
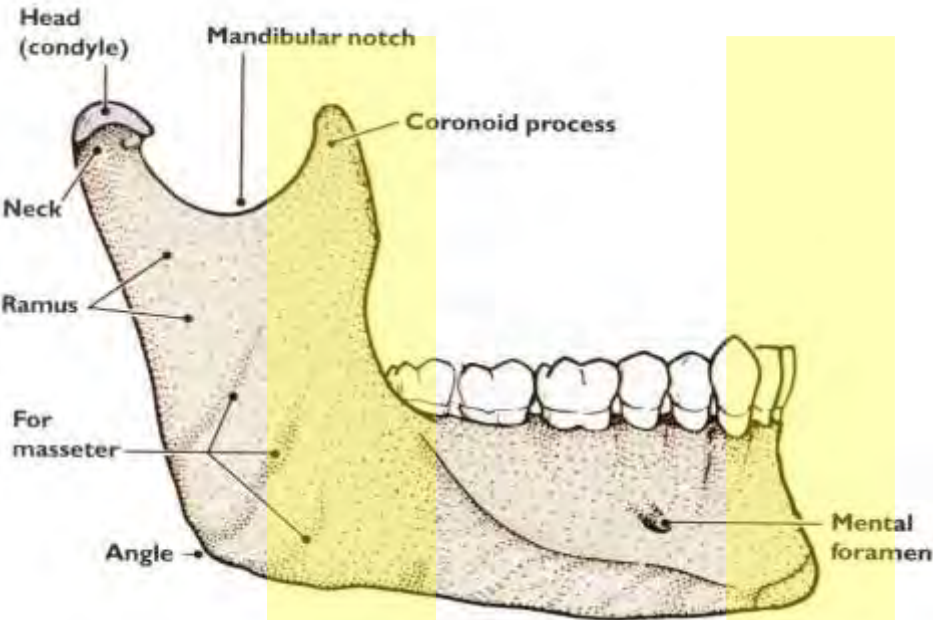
Topografie a průběh zlomenin base lební

- 1 – transversální zlomenina přední jámy lební
- 2 – transversální zlomenina střední jámy lební (velmi častá)
- 3 – zlomenina zadní jámy lební, obkružující foramen magnum
- 4 – příčná a podélná zlomenina pyramidy
- 5 – různé tvary podélných zlomenin v zadní jámě lební

Hlavní lomné linie v lebeční bazi
Main fracture lines in skull base

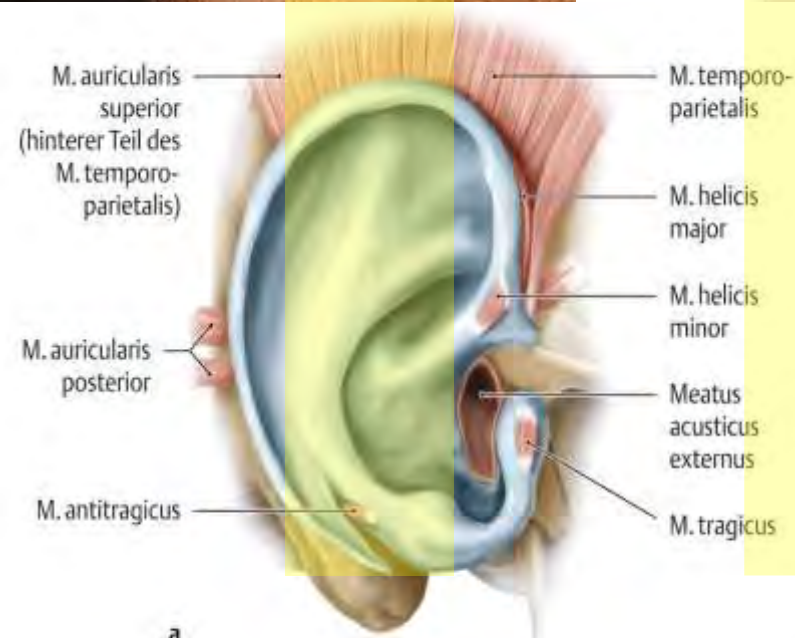
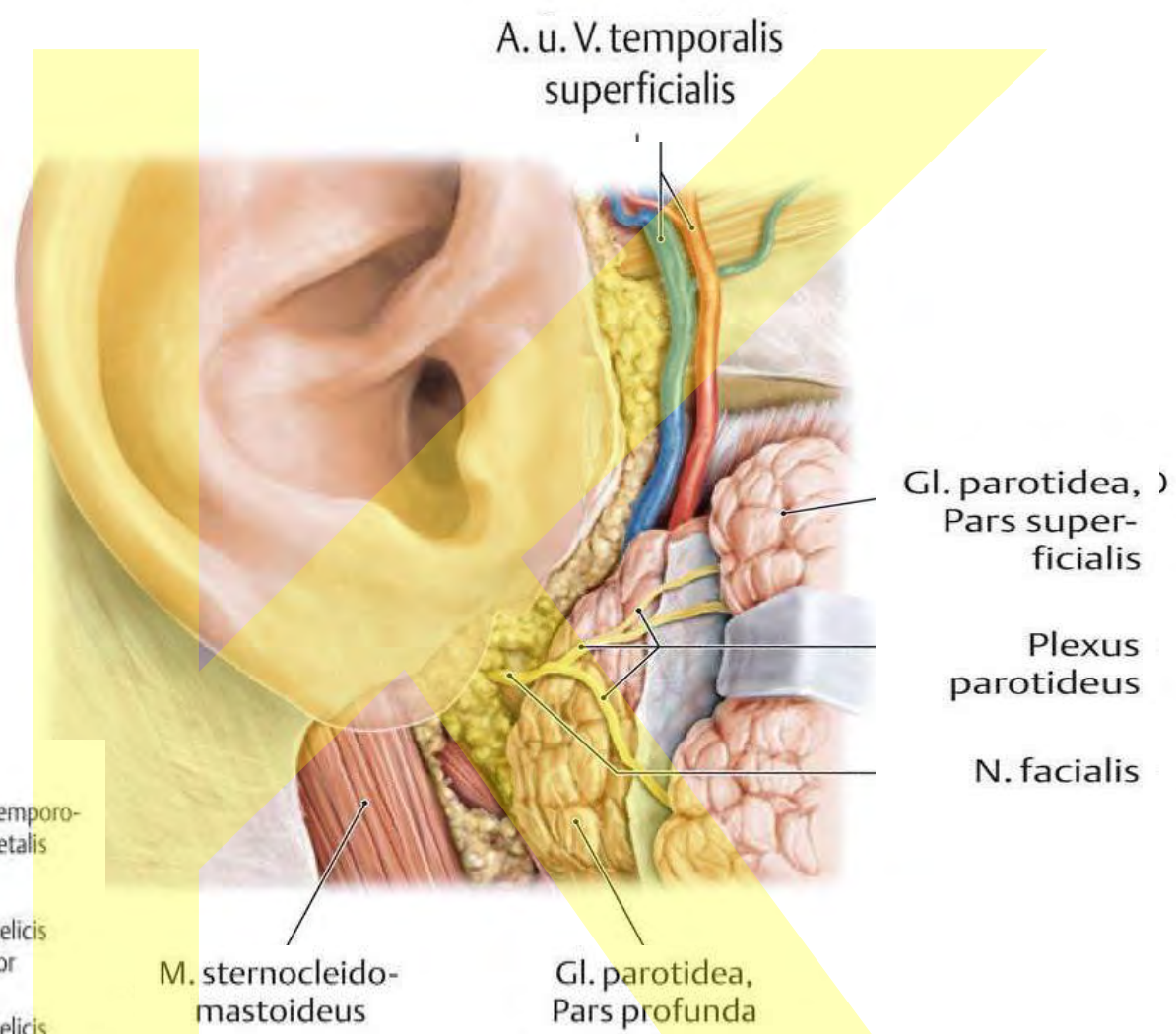
Traction and pressure lines

Fracture lines in mandible



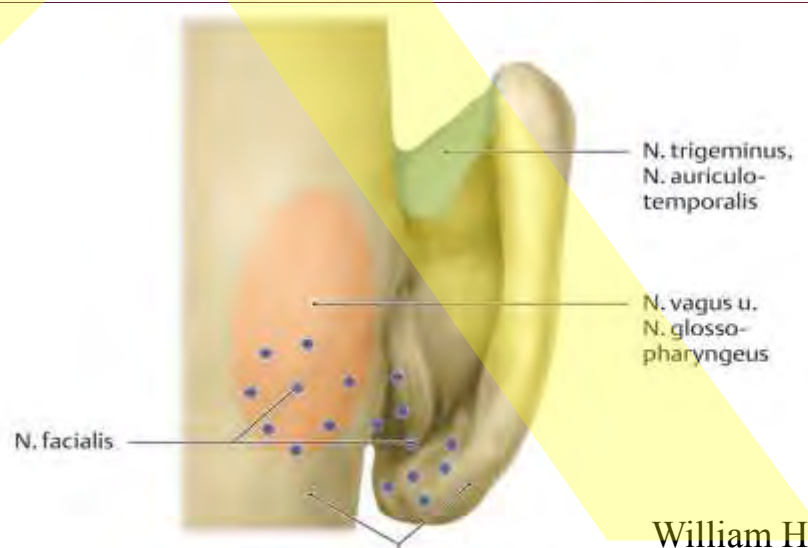
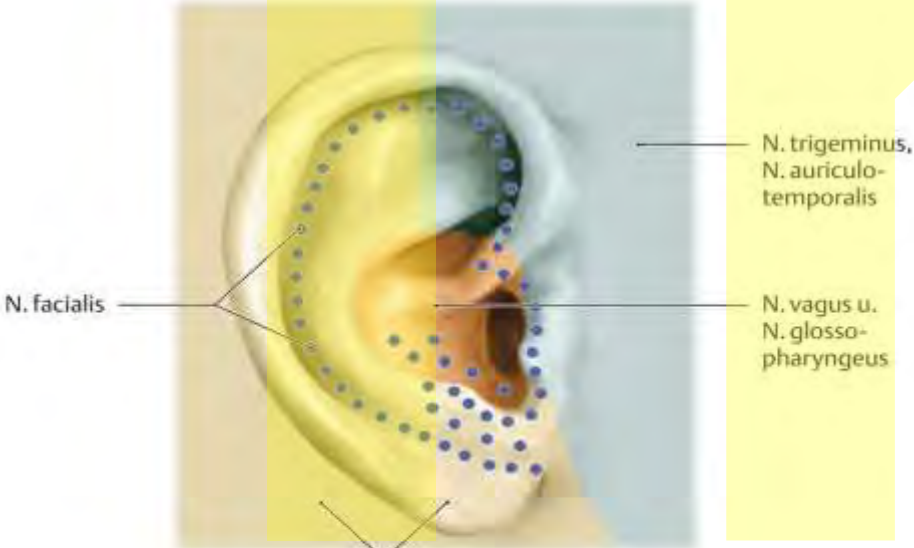
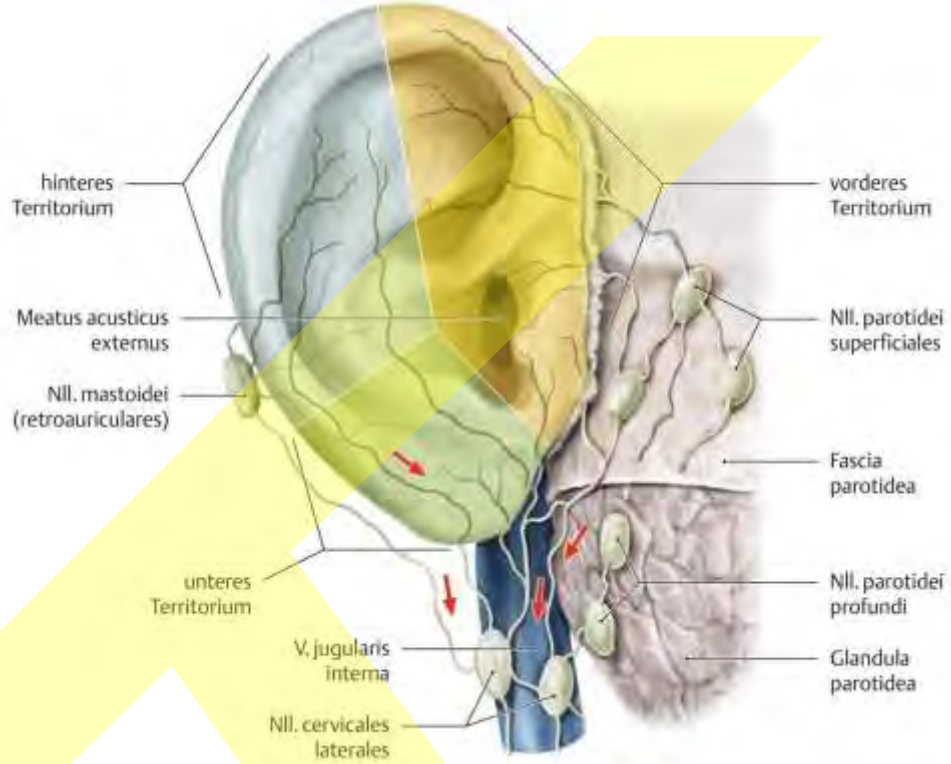
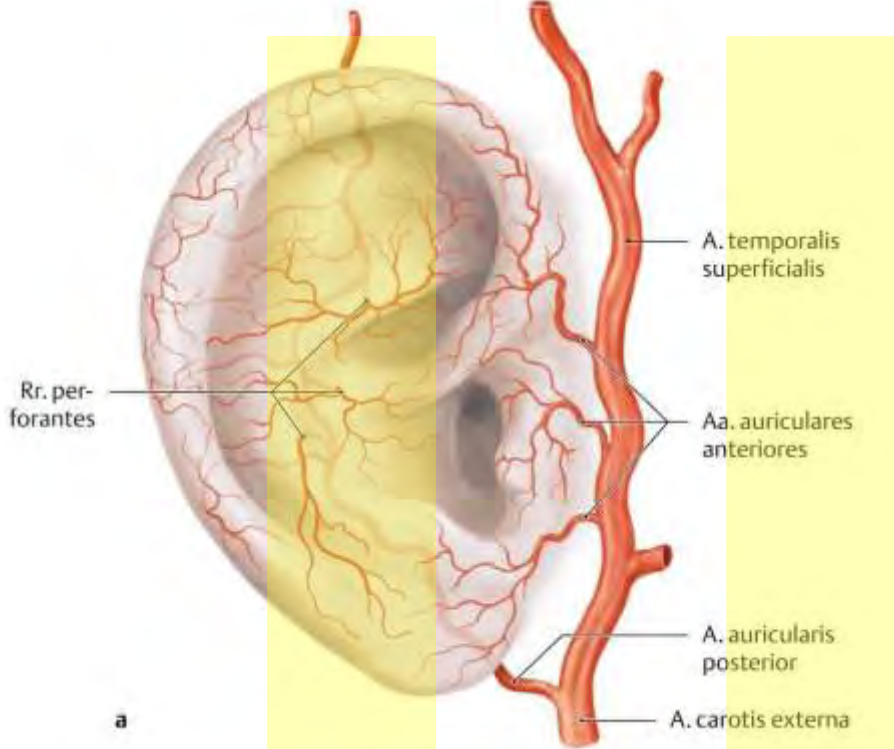
- Krčku
- Retromolární
- Špičáková
- Bradové krajiny

- Condyle
- Upper
- Lower neck
- Retromolar (angular)
- Through canine,
- Through mental region



Zevní ucho

External ear



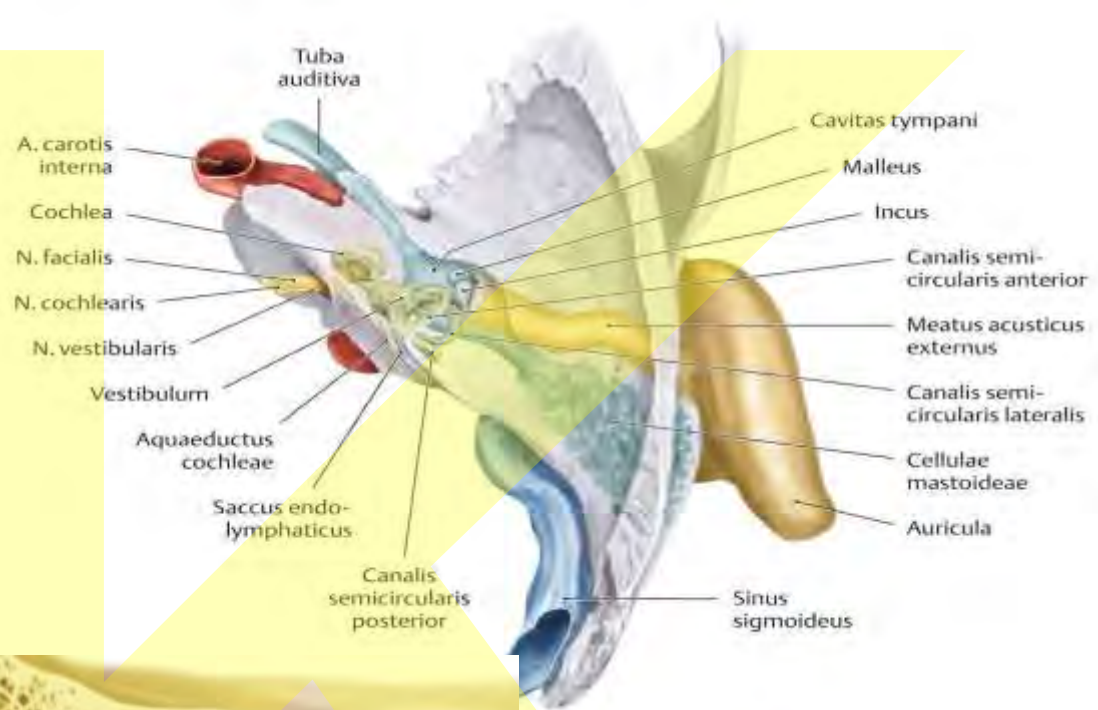
a Plexus cervicalis, Nn. occipitalis minor u. auricularis magnus

b Plexus cervicalis, Nn. occipitalis minor u. auricularis magnus

William H. Battle,
English surgeon,
1855-1936

Tvar zevního zvukovodu

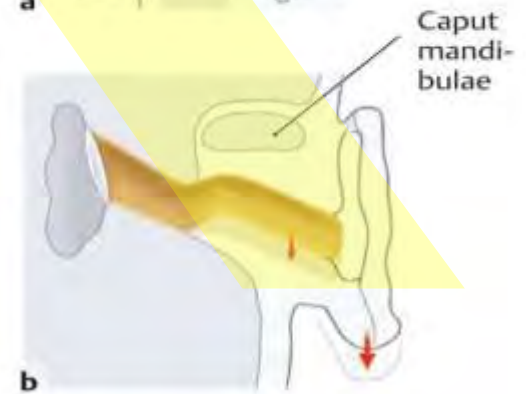
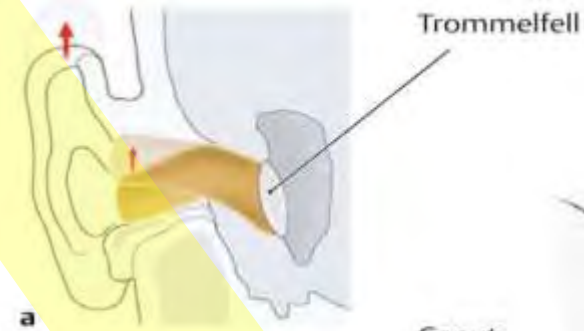
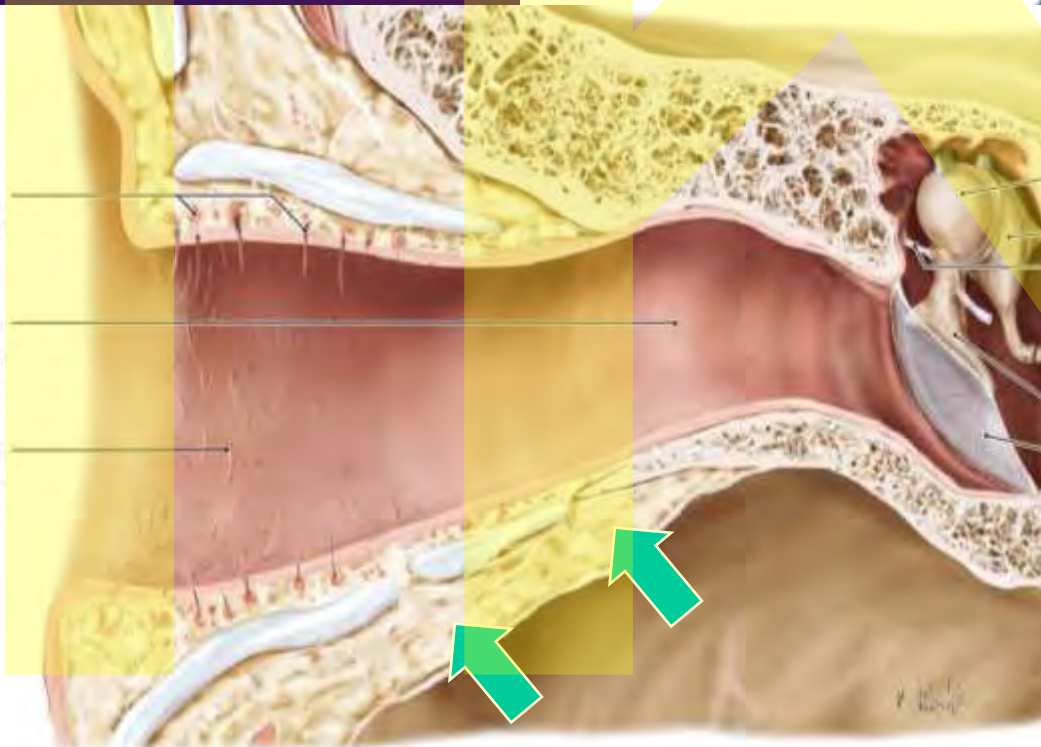
Form of the external acoustic meatus



Gll. sebaceae u.
ceruminosae

Meatus acusticus
externus osseus

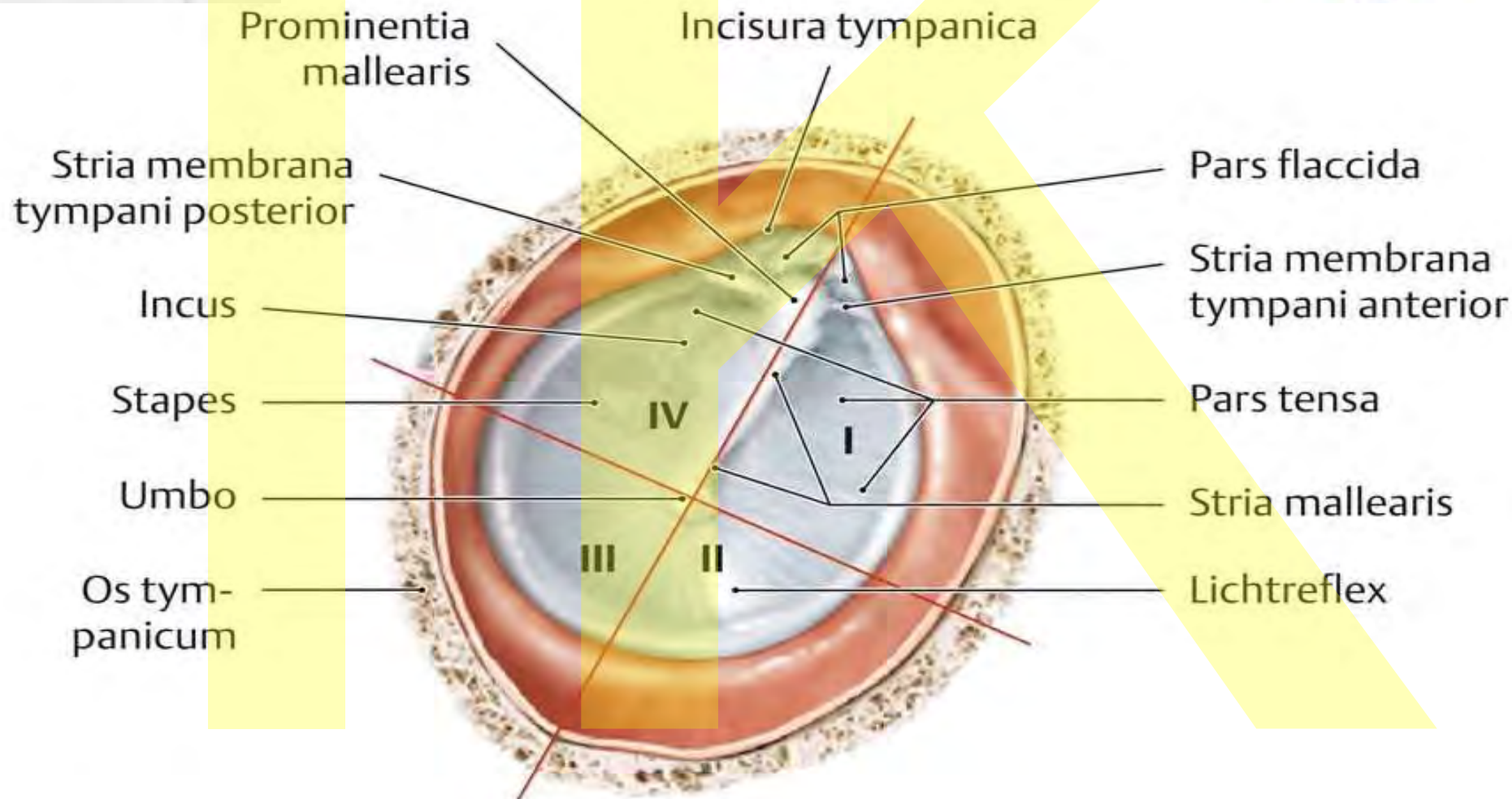
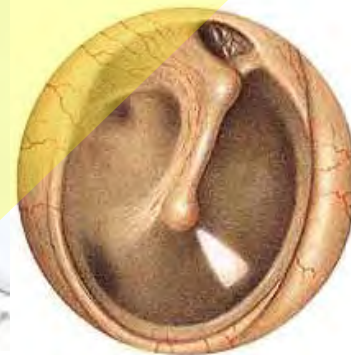
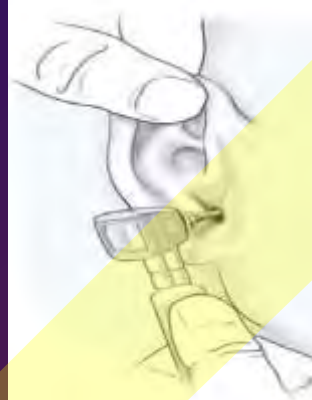
Meatus acusticus
externus cartilagineus



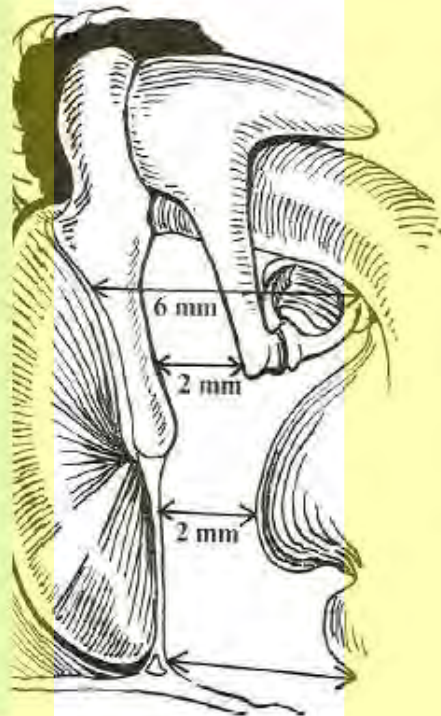


Otoskopický pohled

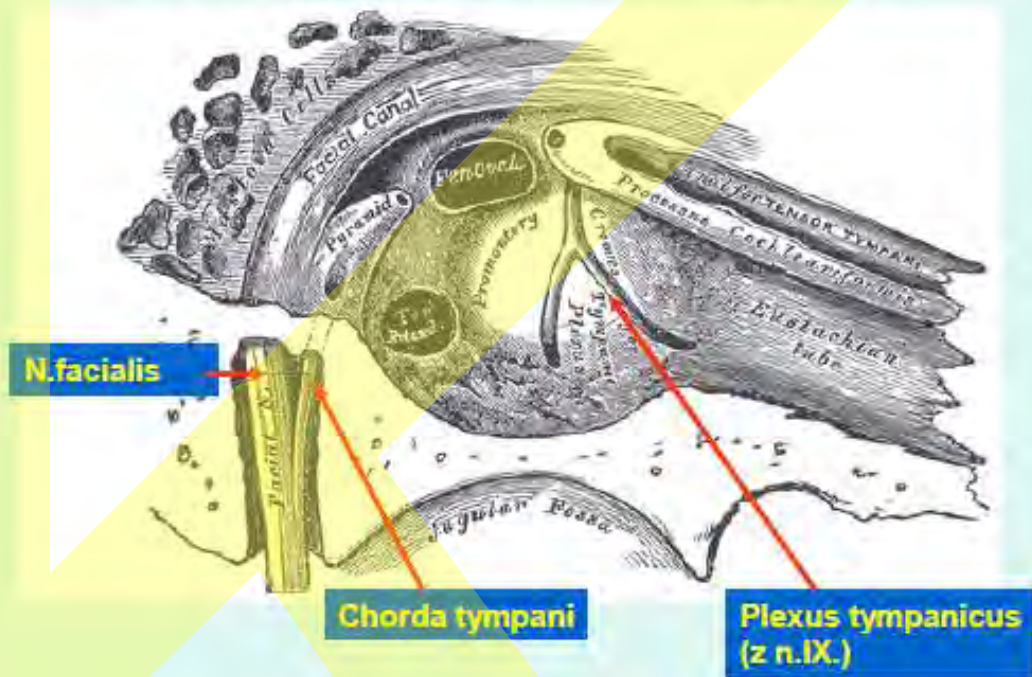
Otoscopic view



Cavum tympani – vnitřní rozměry



Cavum tympani mediální stěna



Tuba Eustachi 1/3 kost 2/3 chrupavka

Děti

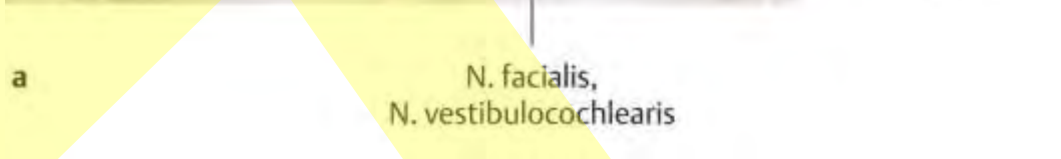
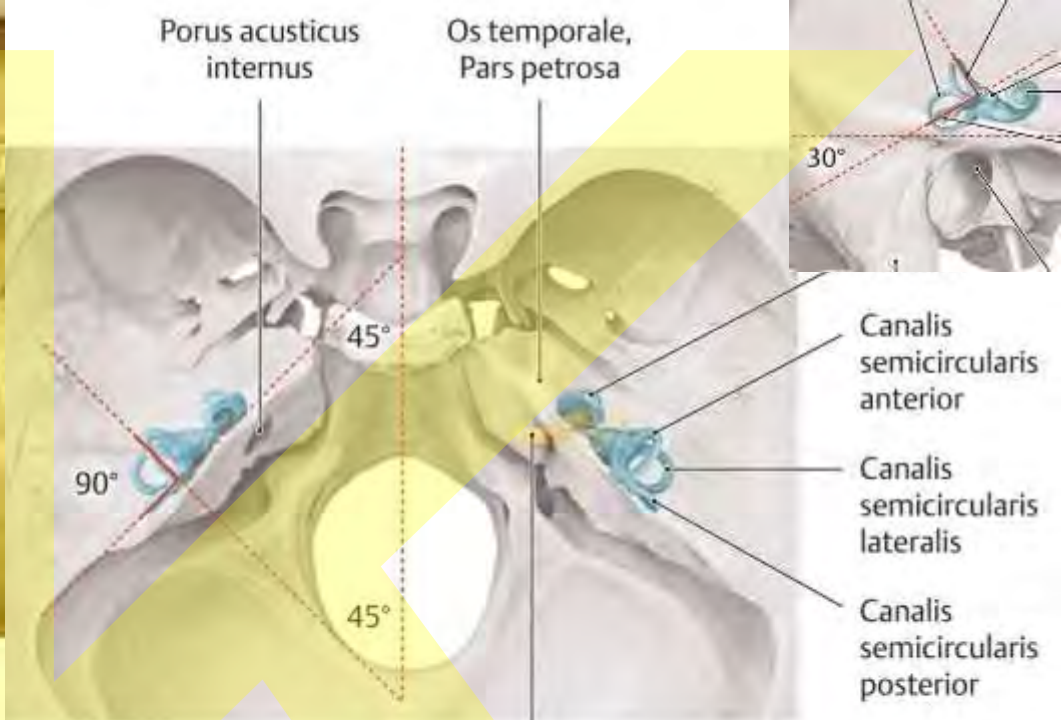
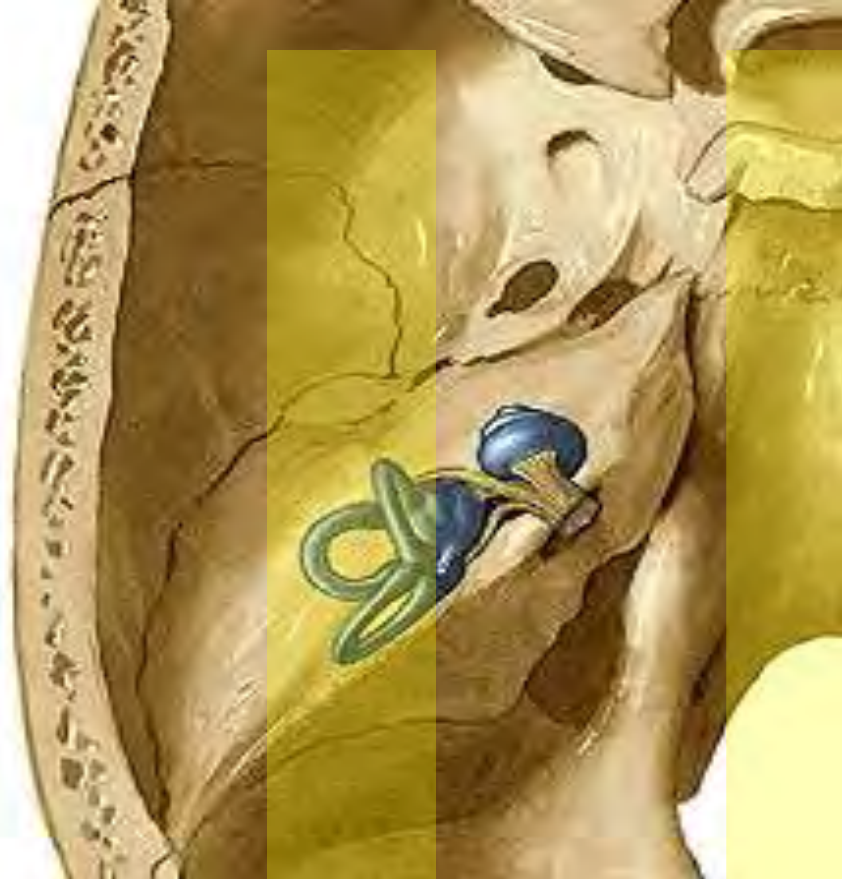
1. krátká 3cm
2. široká 2,5mm
3. otevřená
4. rovná



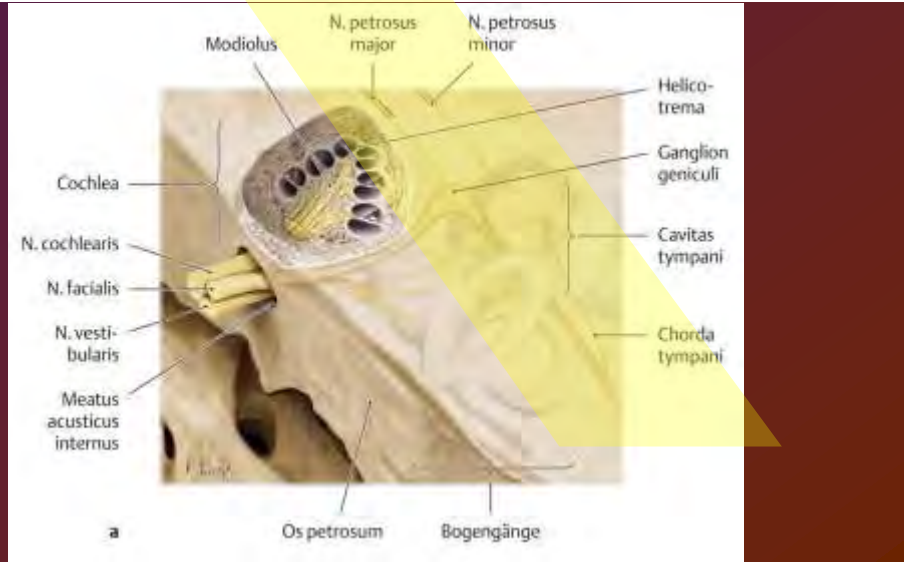
Dospělí

1. dlouhá 3,8cm
2. úzká 1 mm
3. otevírá se při polykání
4. ohnutá





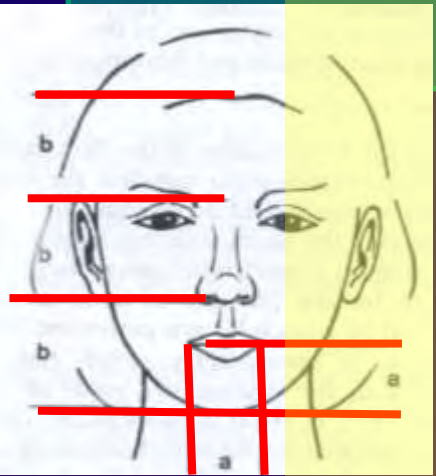
a



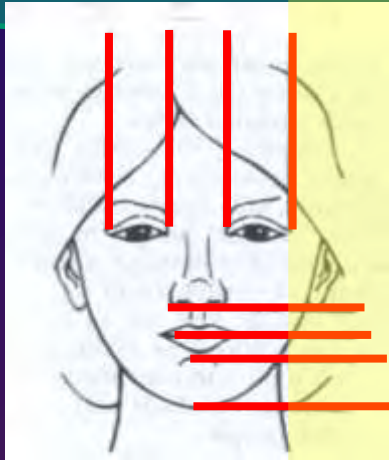
a

? Esteticky a proporčně vyhovující obličej ?

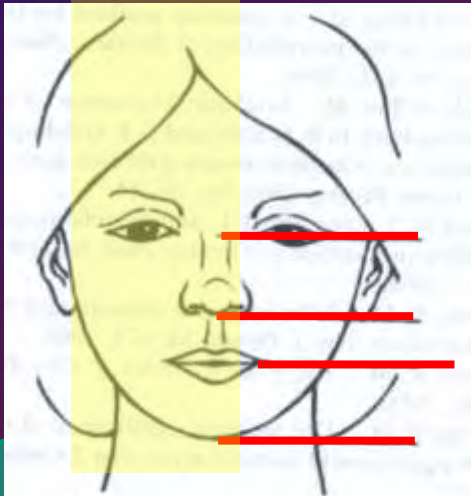
Pythagoreans → Euclid → Egyptians → Greeks → up to date



Leonardo da Vinci
1452-1519



Albert Dürer
1471-1528



R.M. Ricketts

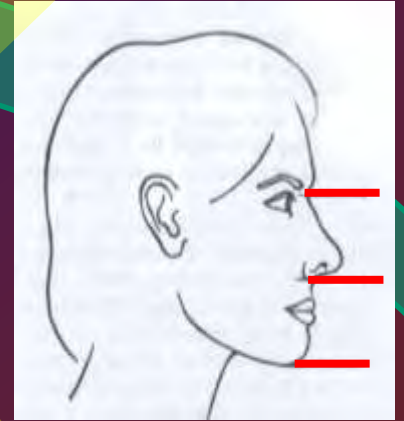
Petrus Camperus
(Pieter Camper)
1722-1789

Joseph A. de Gobineau
1816-1882

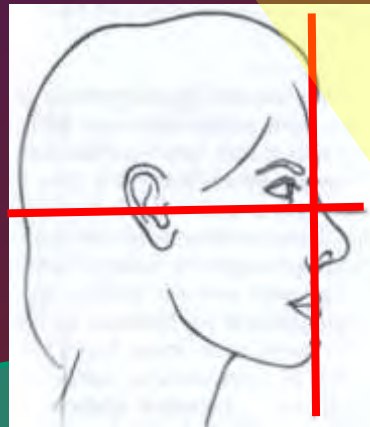
Paul Broca
1824-1880

Paul Topinard
1830-1911

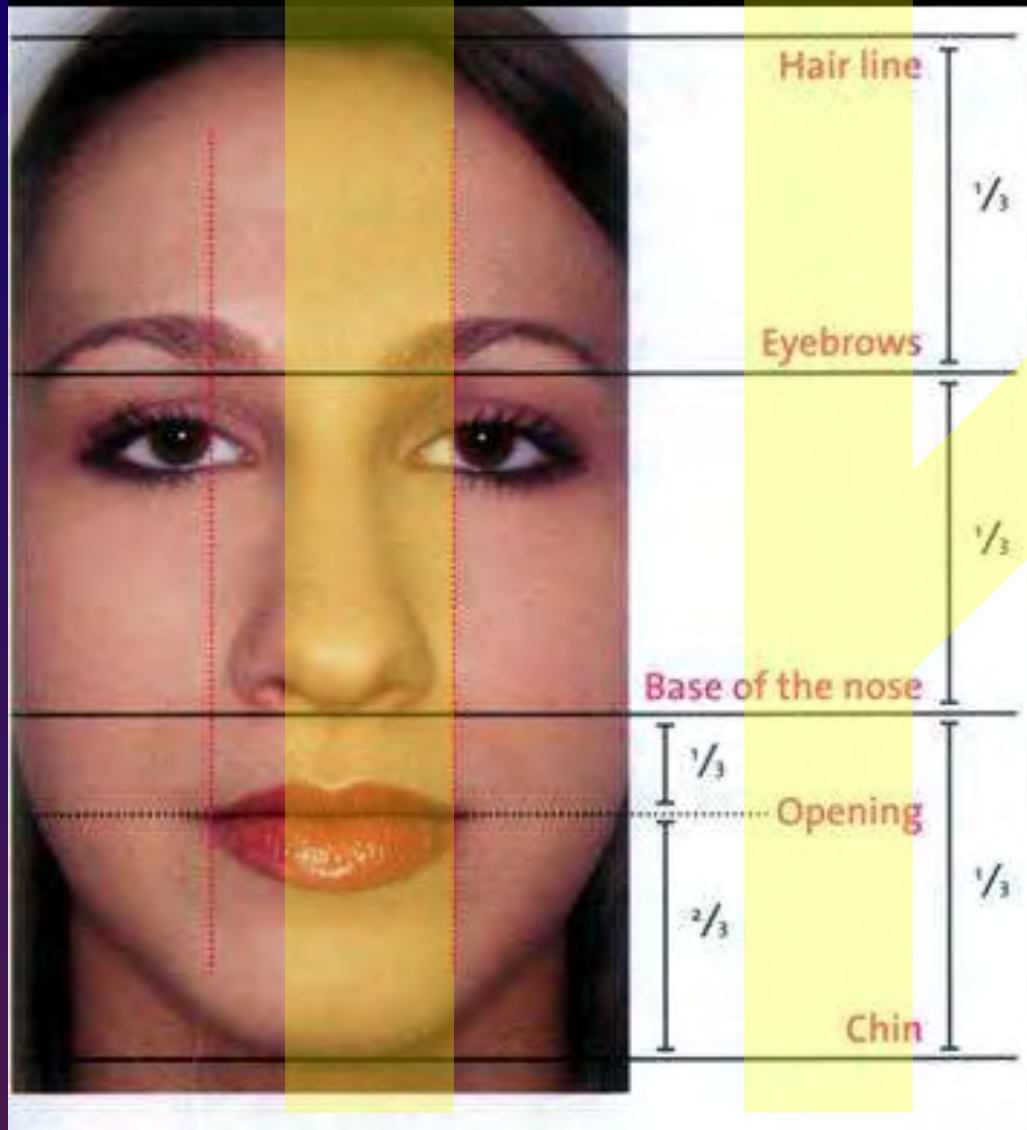
Cesare Lombroso
1836-1909



Jacques Joseph
1865-1934



Mario González-Ulloa
1913-1995

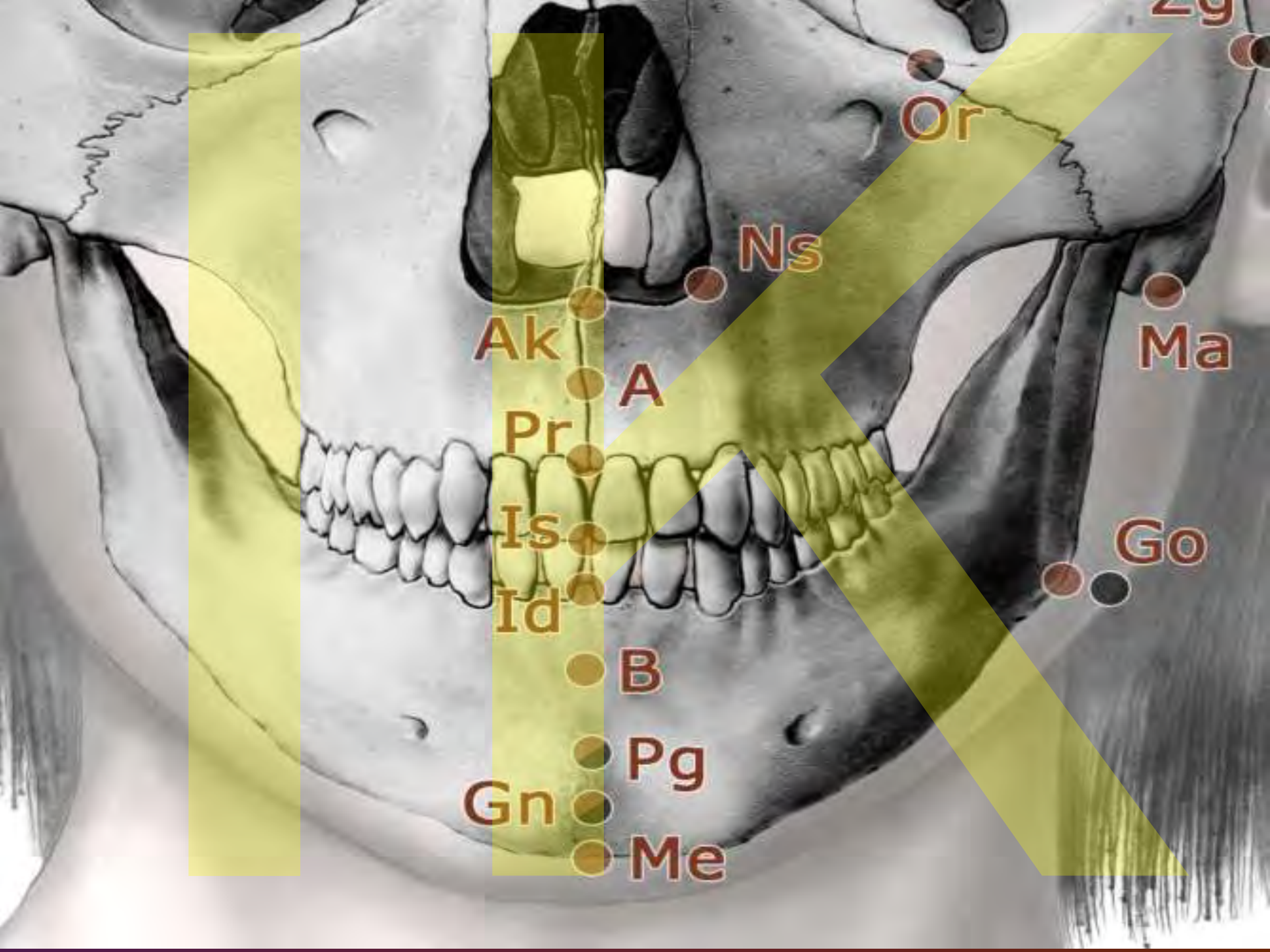




Horní ret u chlapců roste v prvních šesti letech pomaleji než u dívek

Dolní ret roste více a déle

Obličej u dívek dosahuje dospělých hodnot cca o dva roky dříve než u chlapců



Zg

Or

Ns

Ma

Ak

A

Pr

Go

Is

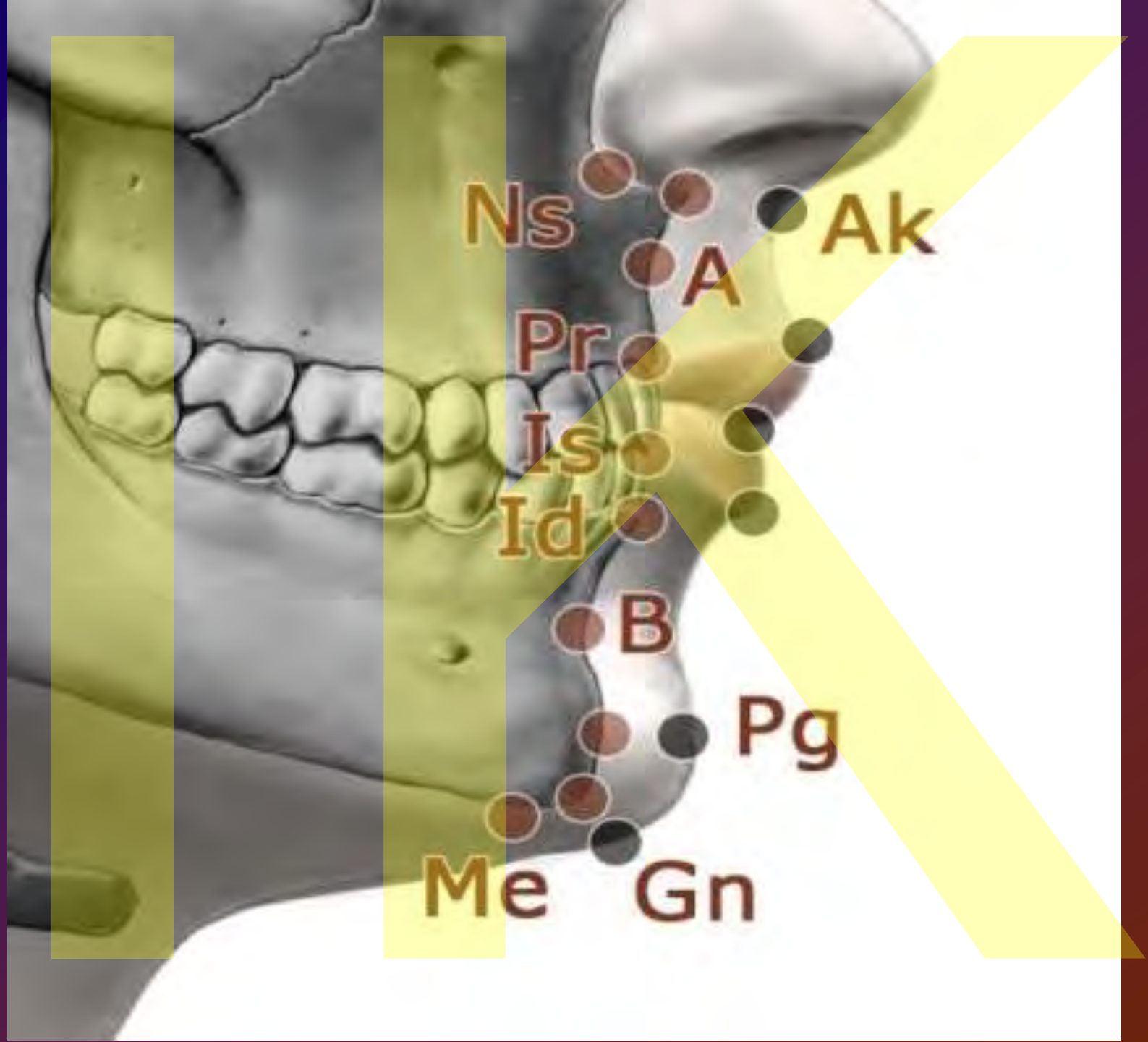
Id

B

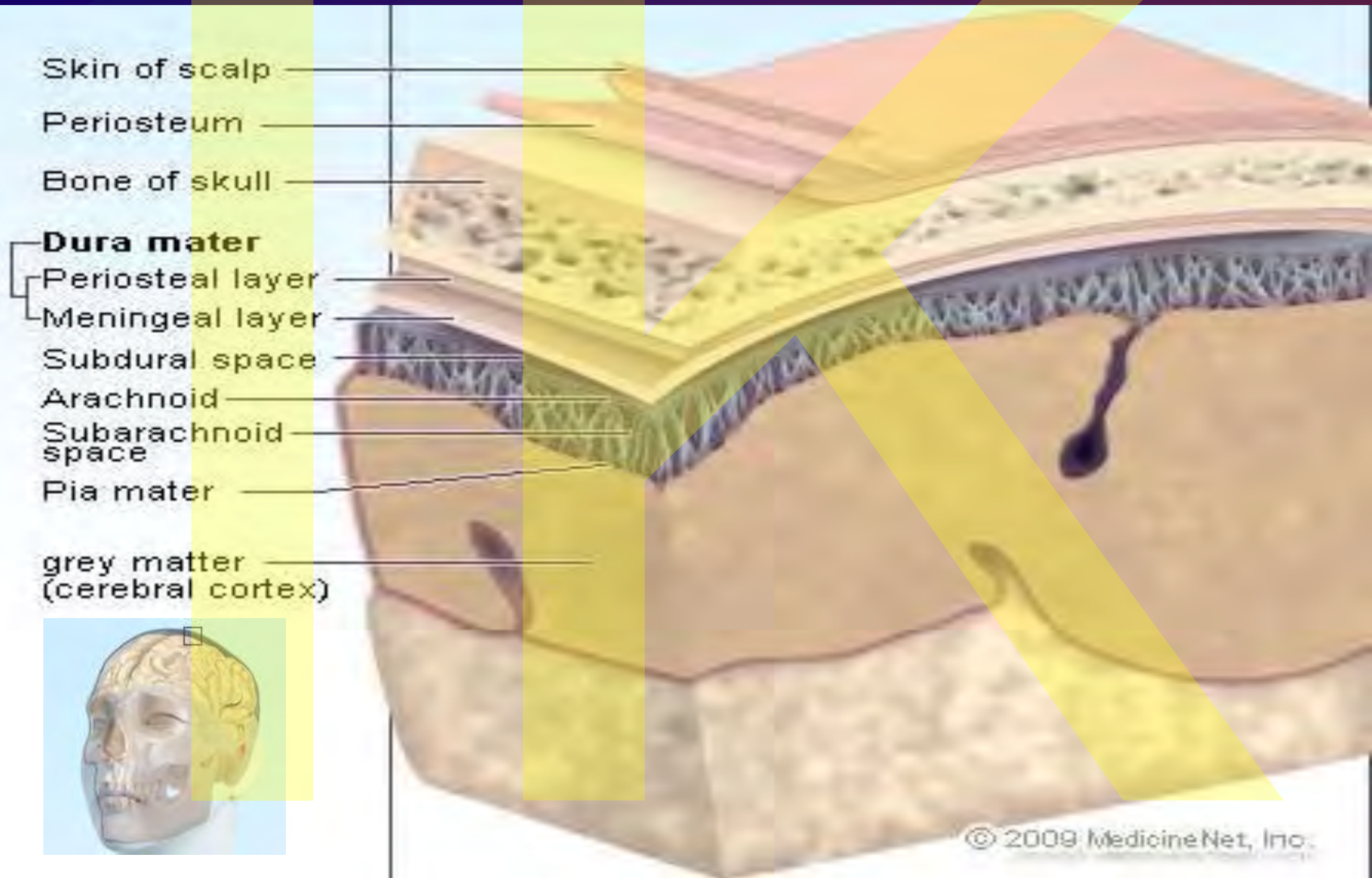
Pg

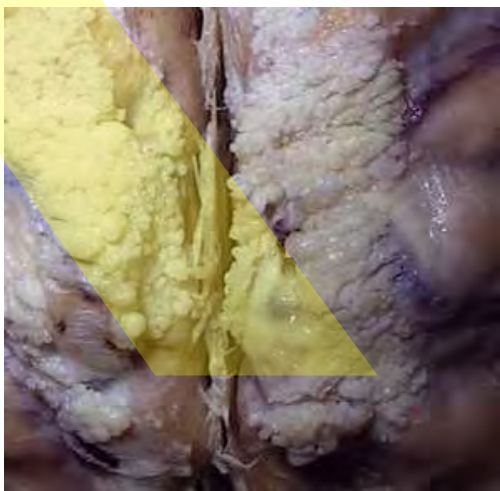
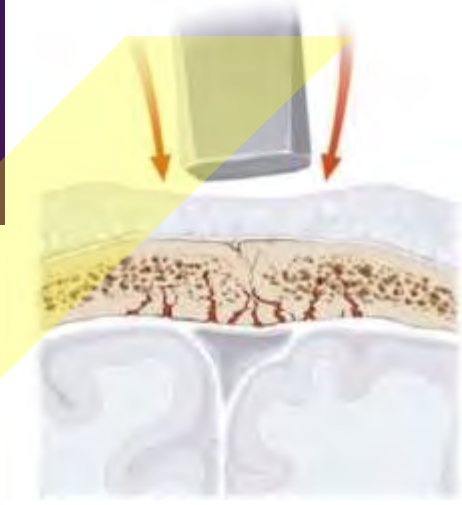
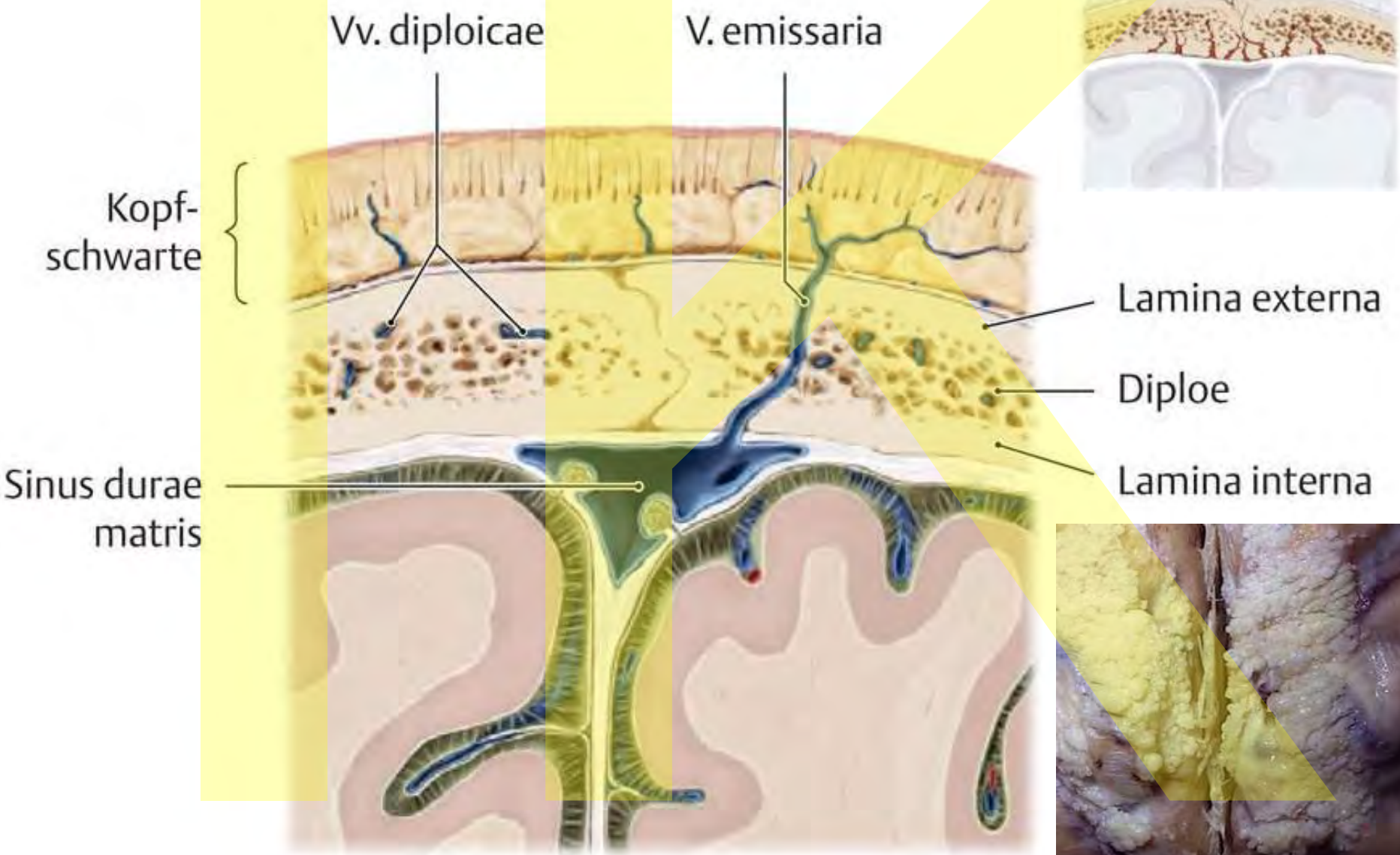
Gn

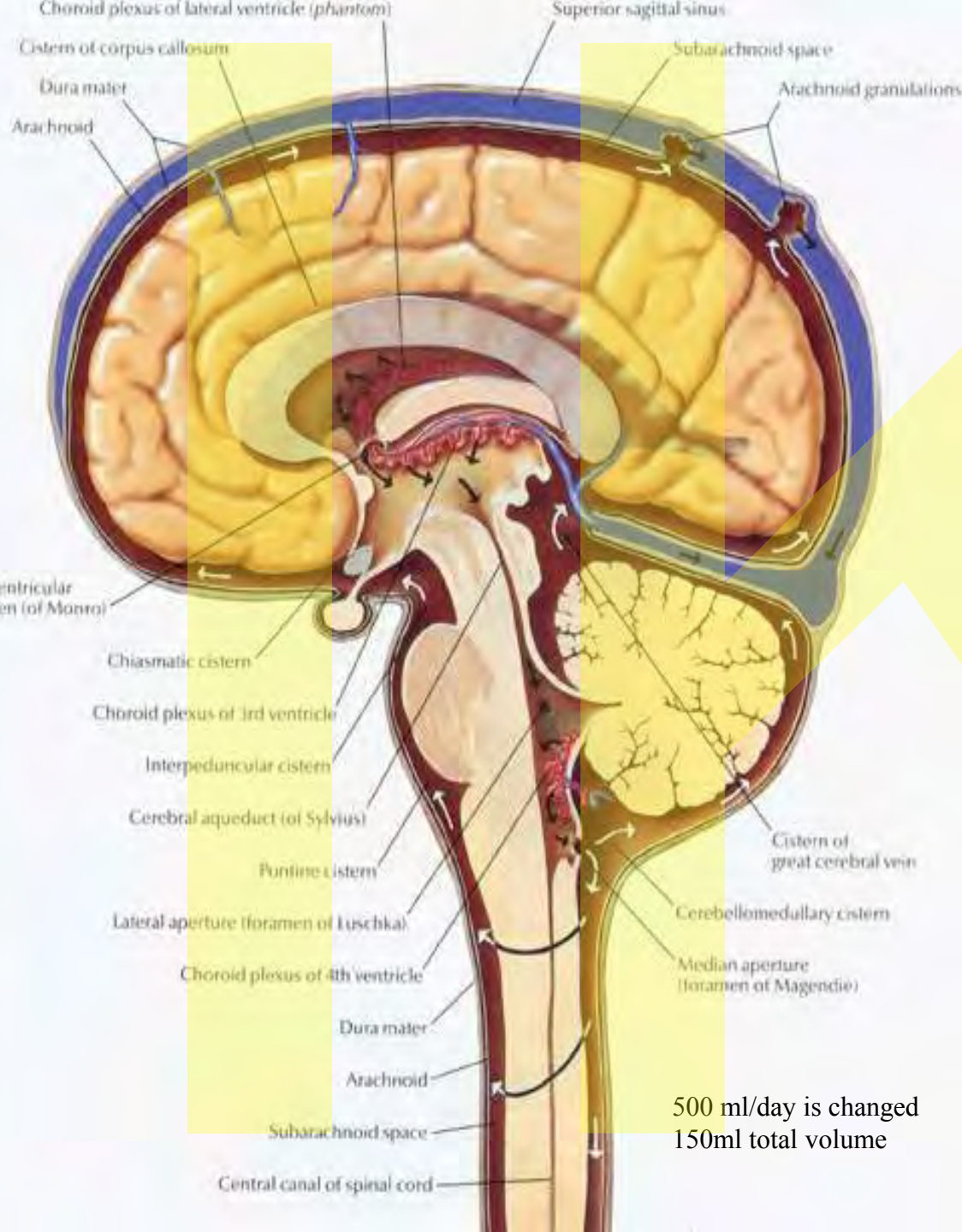
Me



Dura mater, Arachnoid membrane, Pia mater
Epidural space, Subdural space, Subarachnoid space



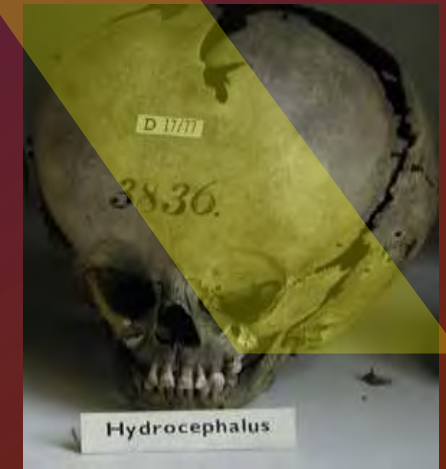




500 ml/day is changed
150ml total volume

Cirkulace mozkomíšního moku Circulation of the CSF (cerebrospinal fluid)

From the choroid plexus –
ventricle I.,II. – interventricular
foramina – ventricle III. -
- aqueduct cerebri – ventricle
IV. – cerebellomedullar cistern
– subarachnoid space –
arachnoid granulations –
sagittal sinus



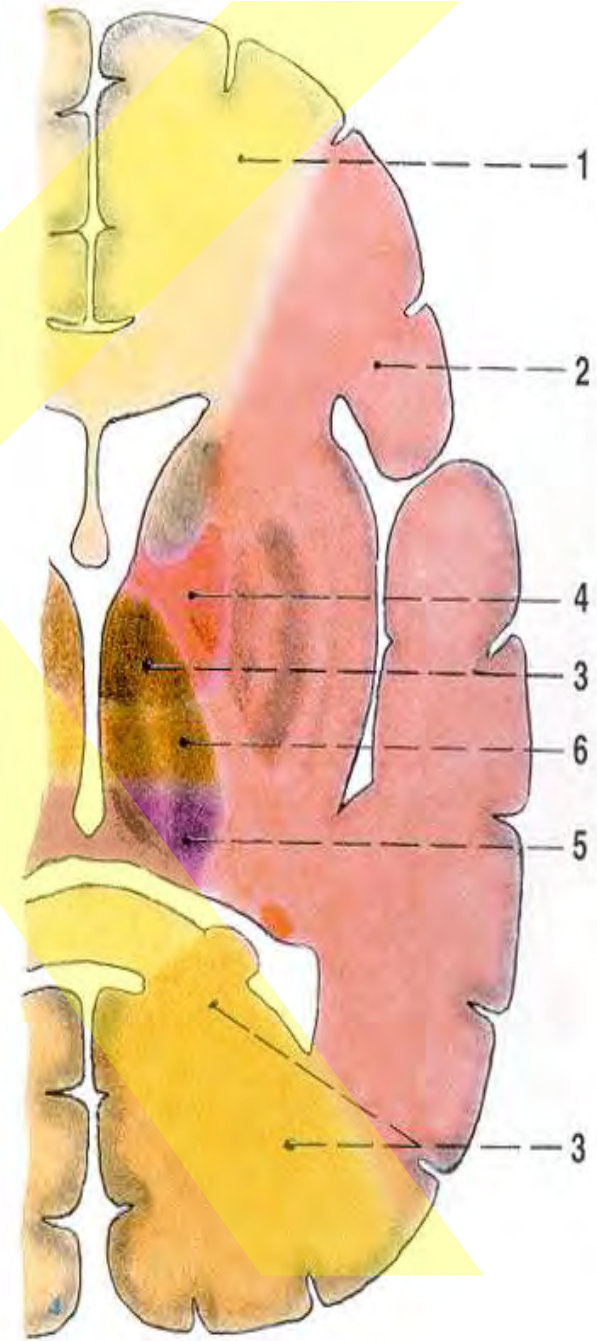
ZDROJE CÉV PRO JEDNOTLIVÉ ČÁSTI MOZKU

- a. cerebri anterior ●
- a. cerebri media ●
- a. cerebri posterior ●

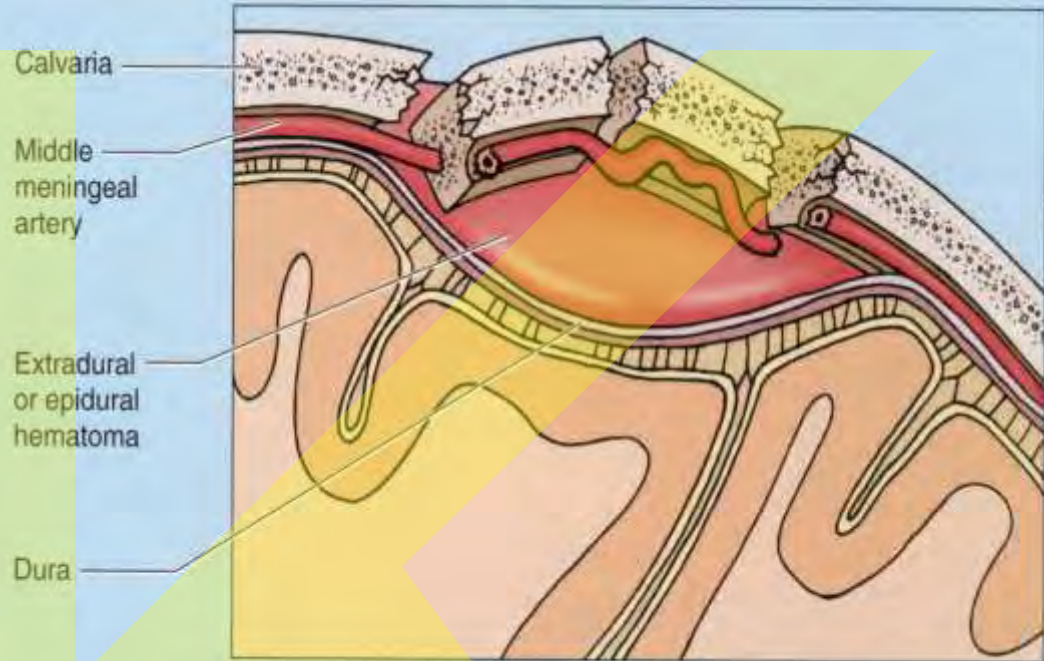


ZDROJE CÉV PRO JEDNOTLIVÉ ČÁSTI MOZKU

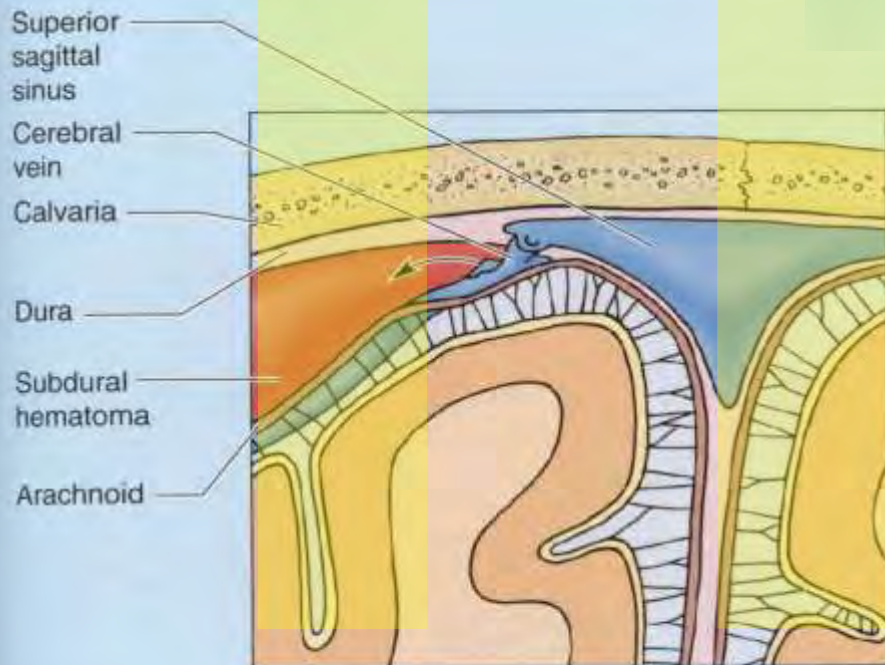
- a. cerebri ant. (1)
- a. cerebri media (2)
- a. cerebri post. (3)
- a. choroidea ant. (4)
- a. choroidea post. (5)
- a. communicans post. (6)



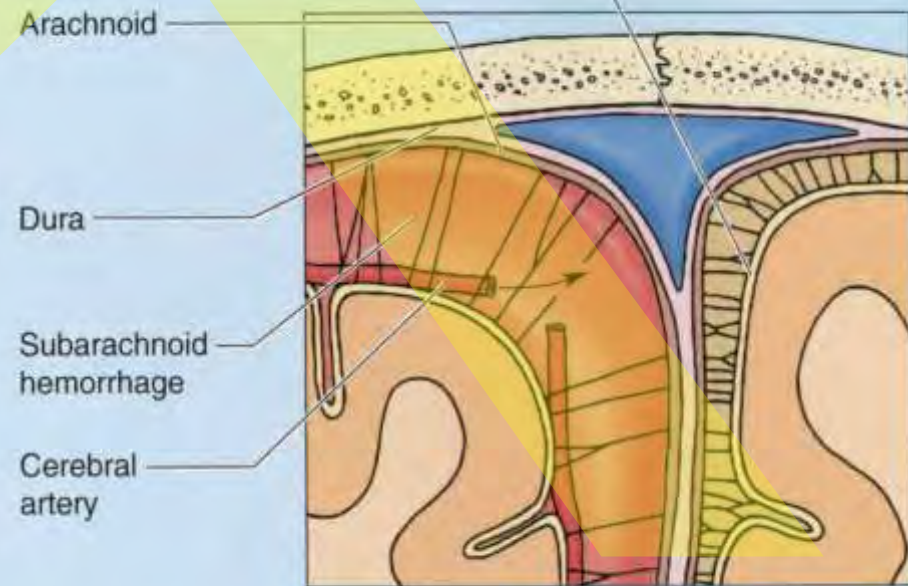
Hematoma, hemorrhage:
 extradural (epidural) -
 from the middle meningeal artery
 dural border (subdural)
 - from the cerebral veins
 subarachnoid -
 is usually arterial



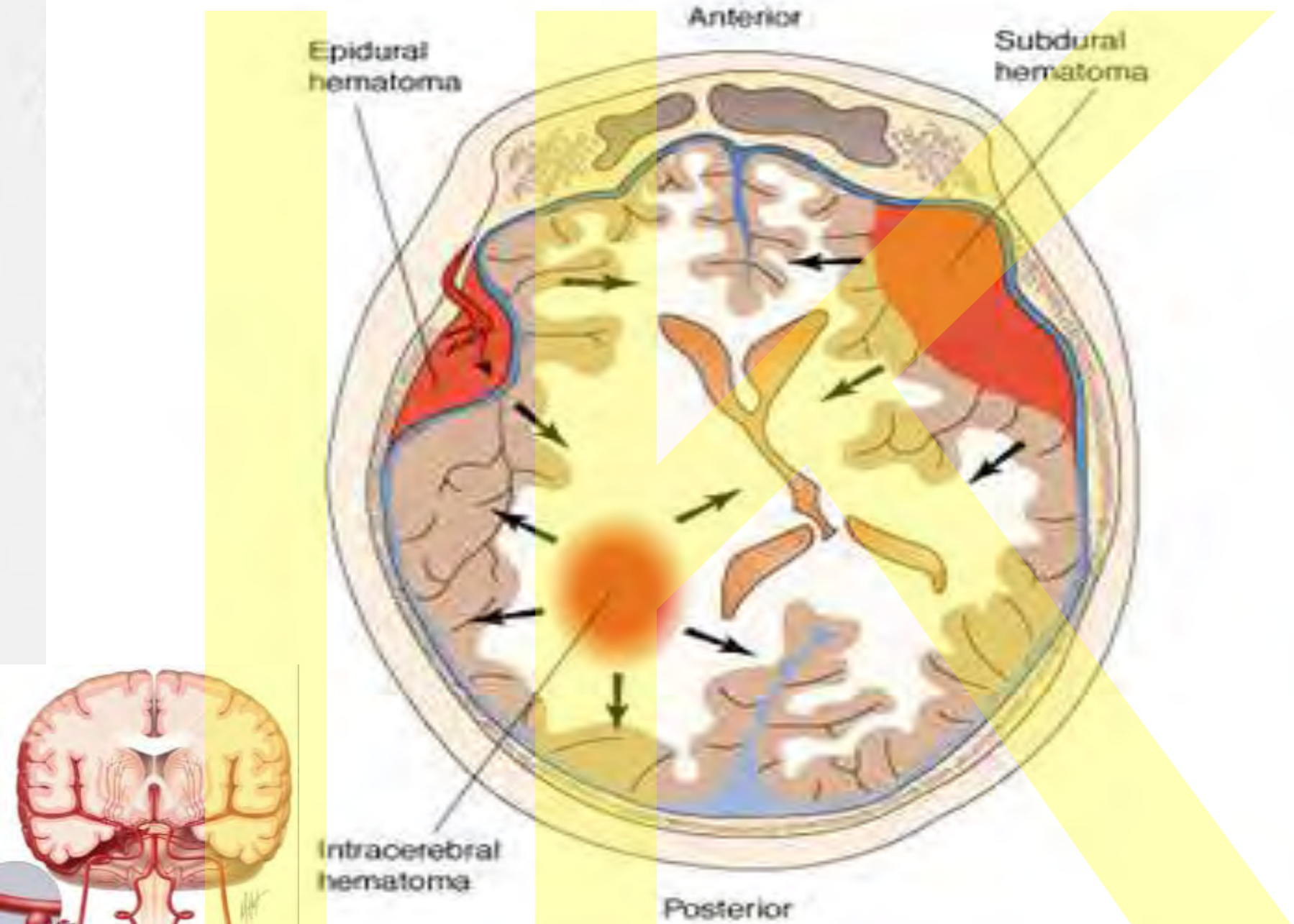
Extradural or epidural hemorrhage



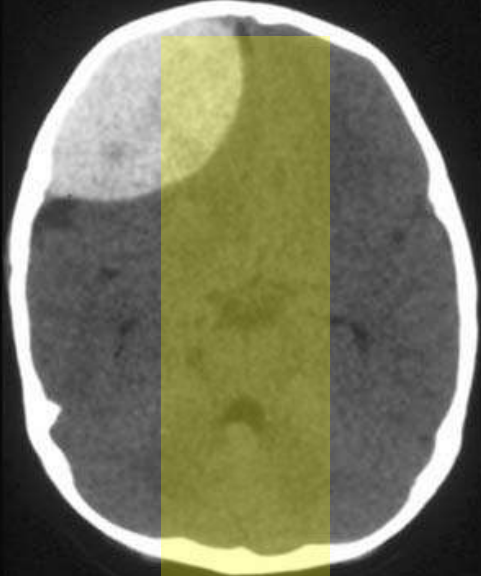
Dural border (subdural) hematoma



Subarachnoid hemorrhage

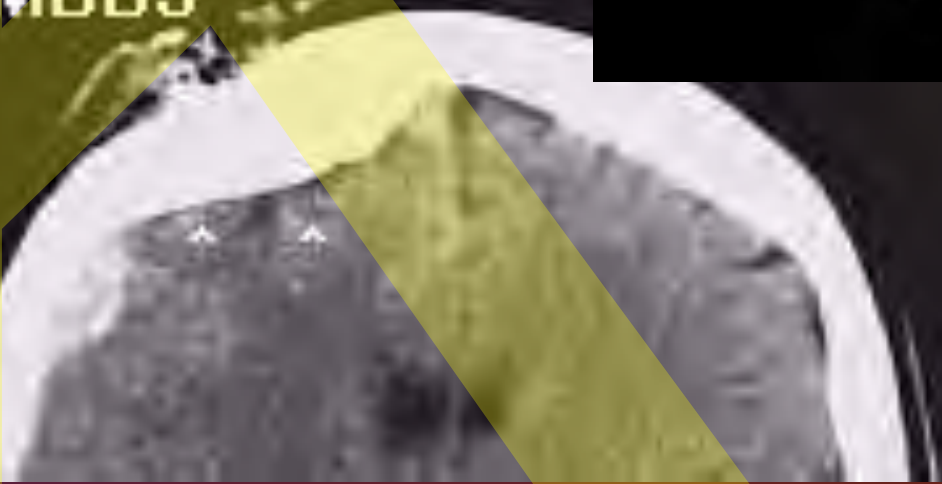
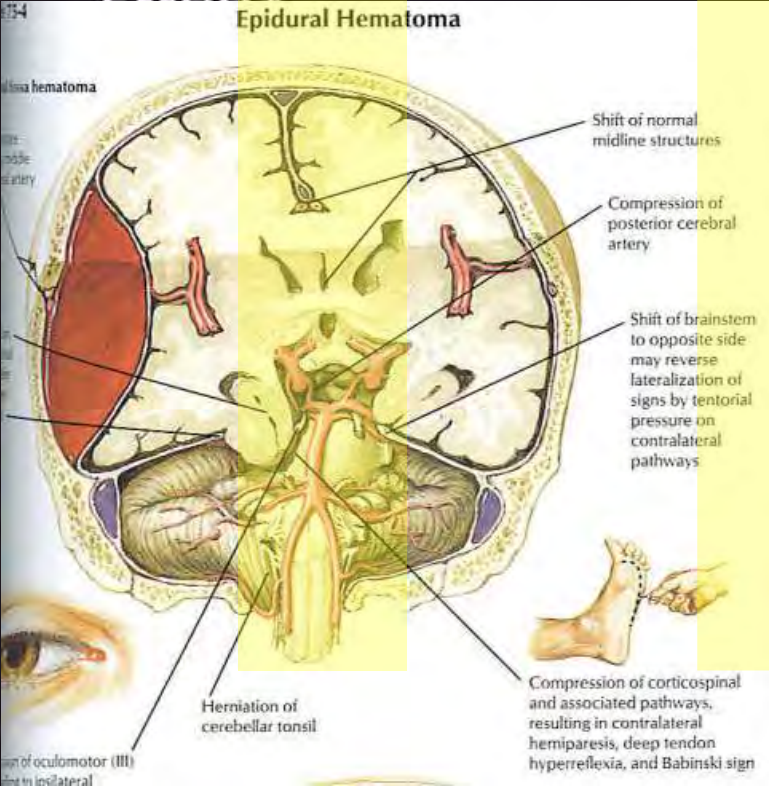


§ Location of epidural, subdural, and intracerebral hematomas.

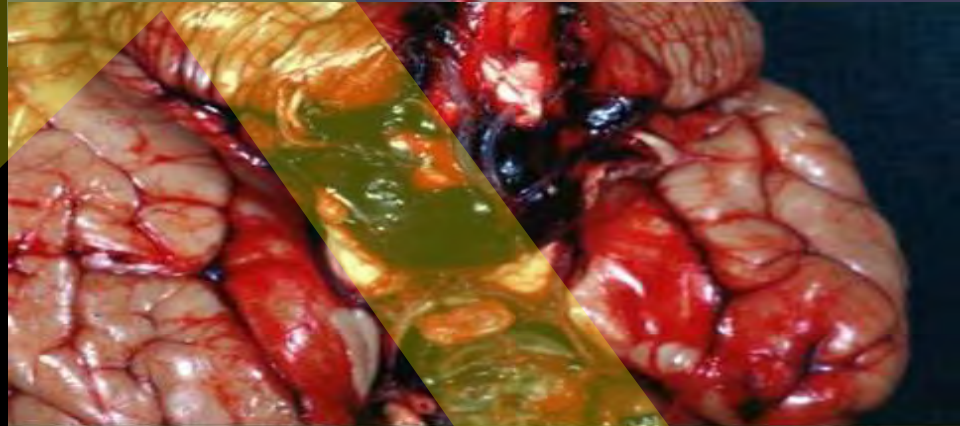
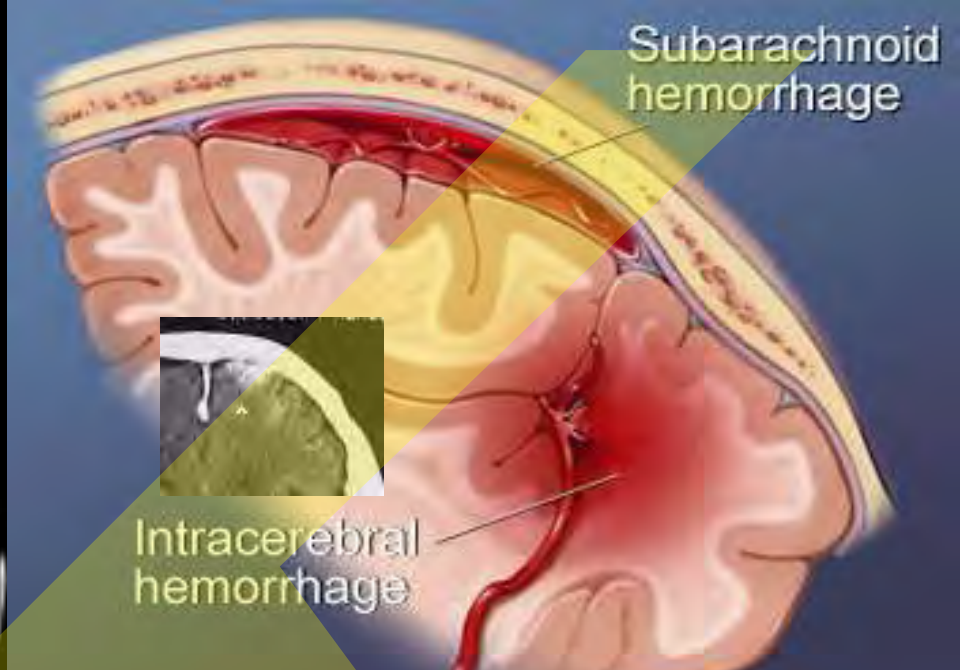
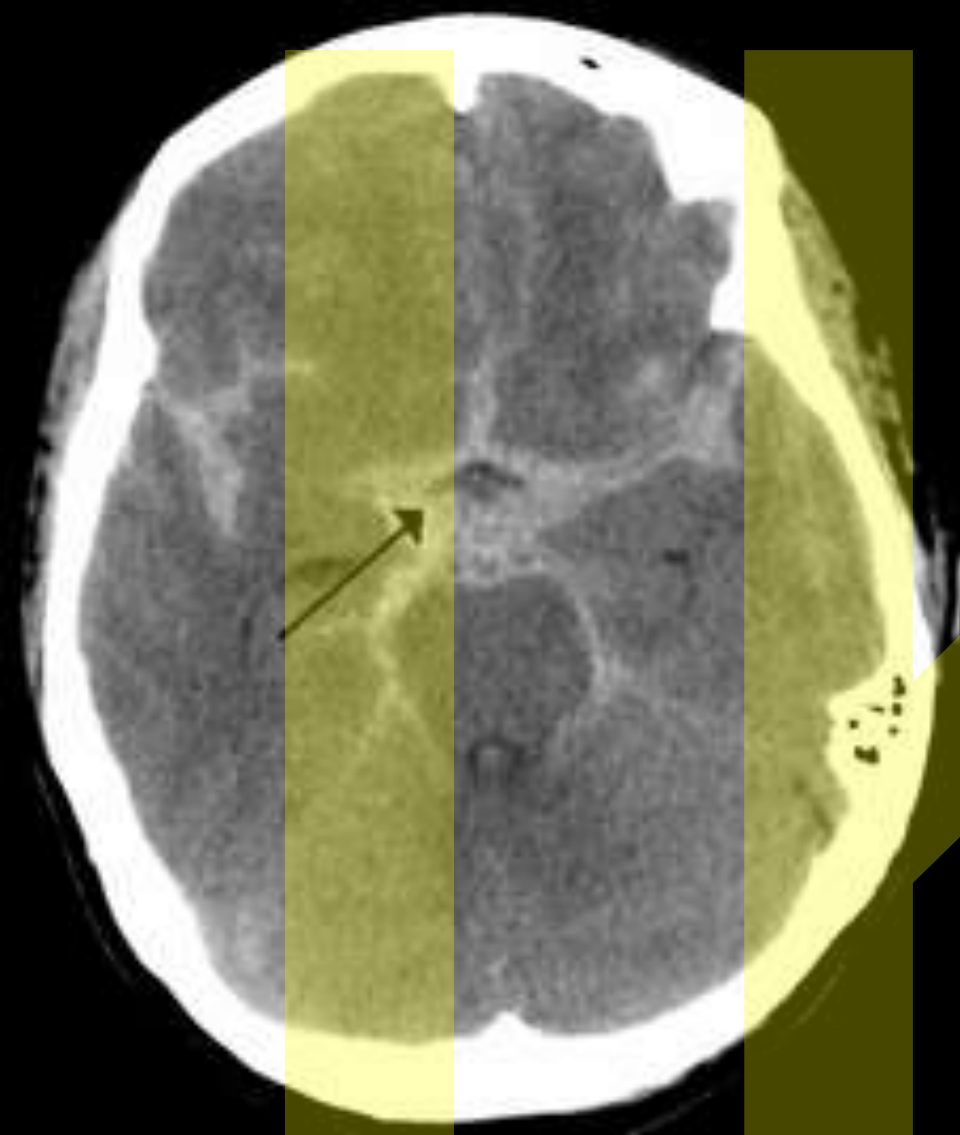


EMBBBS

EMBBBS



Epidural haematoma -
aa. meningeae, very often from middle meningeal a.



* Restricted use. PEIR; University of Alabama at Birmingham, Department of Pathology

Subarachnoid leakage

aa. cerebri - aneurysm

Intraparenchymatous leakage

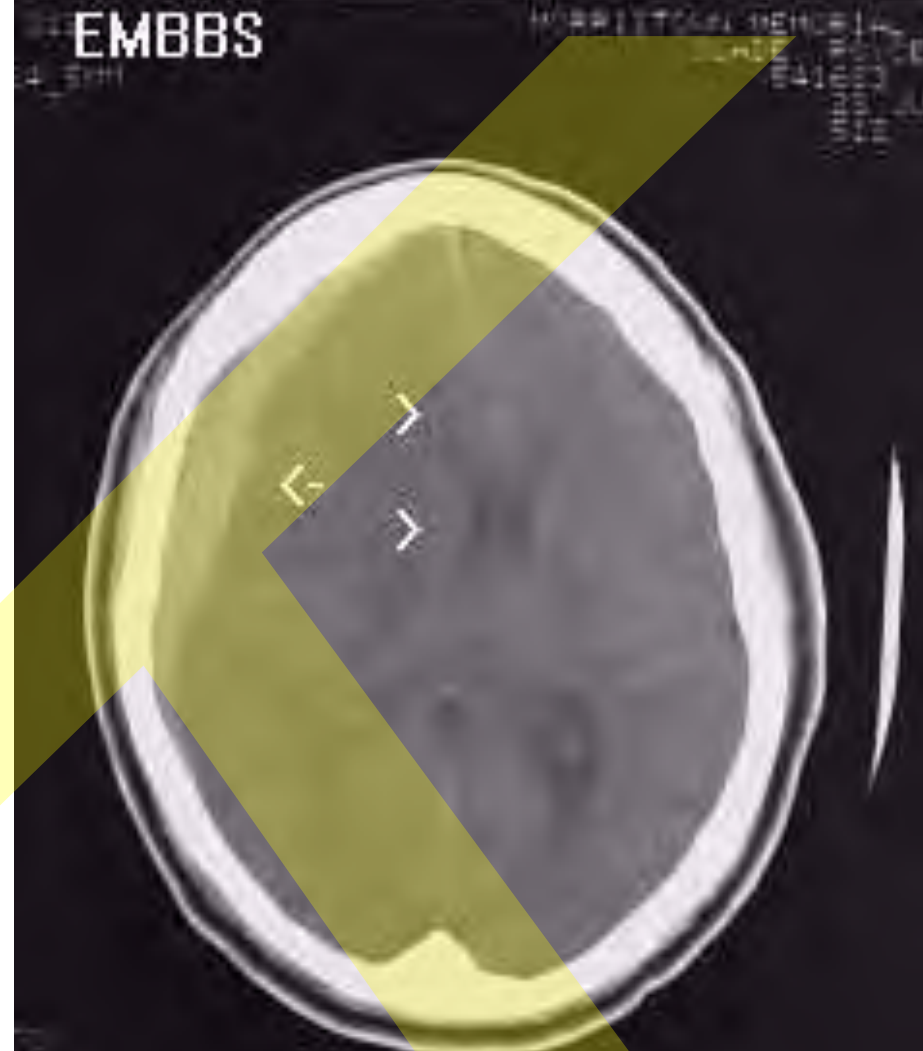
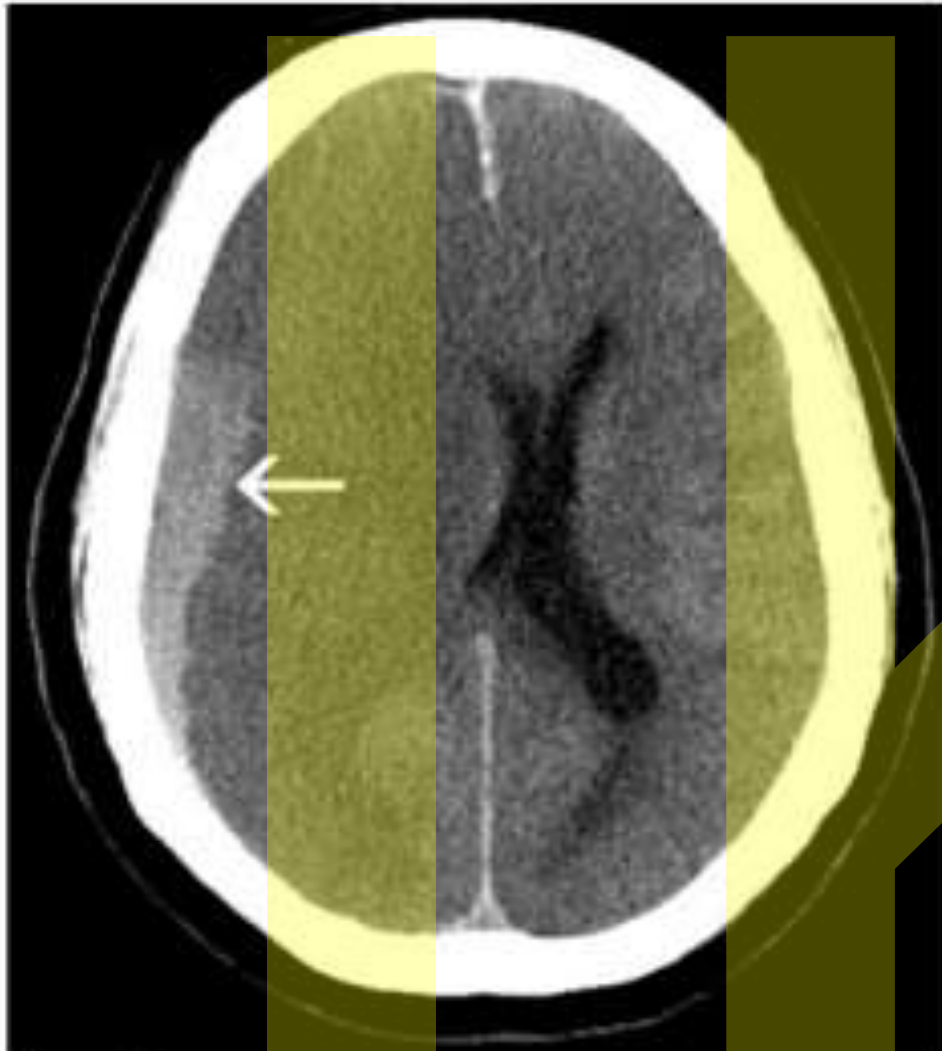


Figure 1.

Subdural hematoma – leakage from the „bridging“ veins slowly develops, it is insidious, malicious