



Morfologie orofaciálního systému

Anatomické poznámky



Svatá Apollonie

Apollonie žila ve 2.- 3. století. Byla pravděpodobně šlechtického rodu a dosáhla již vysokého věku, když nastalo v Alexandrii roku 249 velké pronásledování křesťanů. Zfanatizovaný dav usmrtil každého křesťana, který se mu dostal do rukou. Apolonii opakovaně bili do obličeje, vyrazili (nebo vytrhali kleštěmi) jí všechny zuby a pak rozbili čelisti. Chtěli, aby se zřekla své víry a vyhrožovali jí upálením zaživa. Apollonie se však po krátké modlitbě vrhla v nestřeženém okamžiku sama do plamenů a uhořela. Tehdejší alexandrijský biskup sv.

Dionýsius zachytil zprávu o umučení svaté Apolonie v dopise Fabiánovi z Antiochie. Je patronkou :

Proti bolesti zubů, proti nemocem v ústní dutině; zubních lékařů, zubních laborantů.

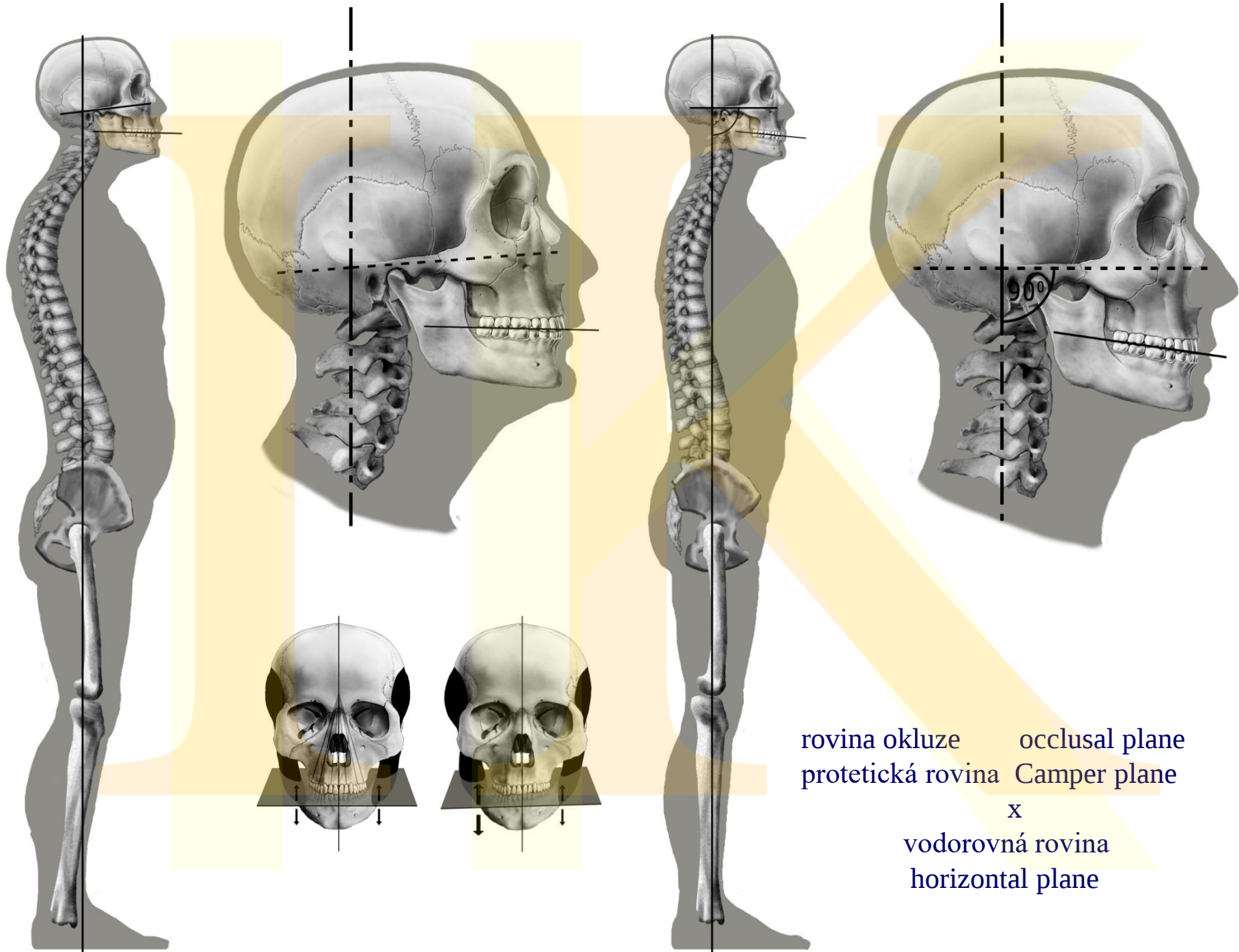
Atributy :

kleště, někdy se zubem, které drží v ruce; zuby, dláto, nůž, hořící hranice; kniha, palmová ratolest, mučednická koruna



Kostra obličeje, zesílená a zeslabená místa lebky. Utváření čelistí a zubních oblouků. Anatomický podklad rozštěpů obličeje a patra.

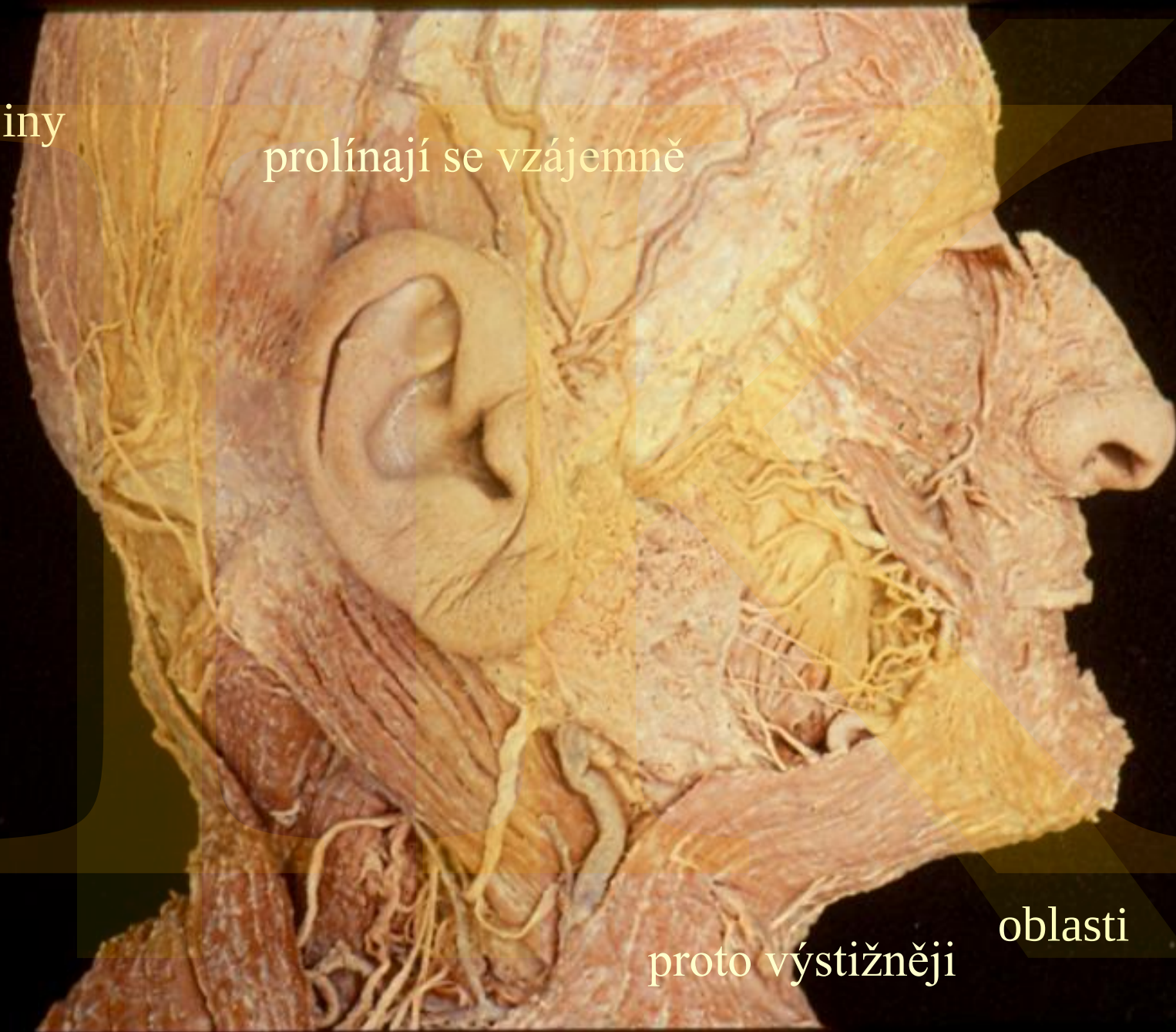
Ivo Klepáček

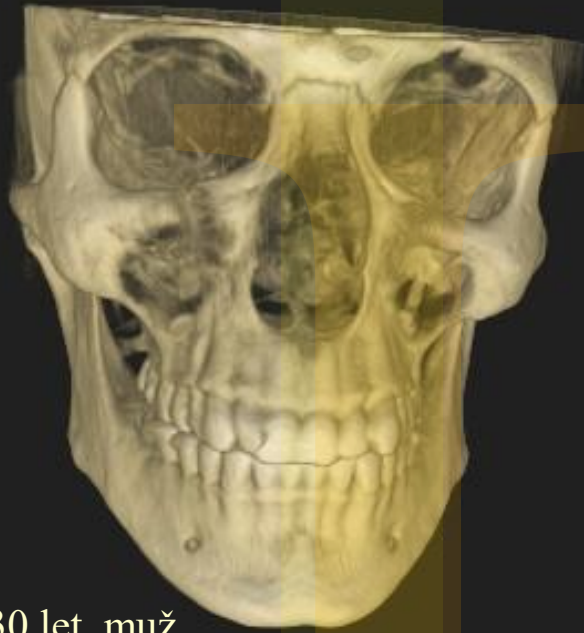


krajiny

prolínají se vzájemně

proto výstižněji oblasti

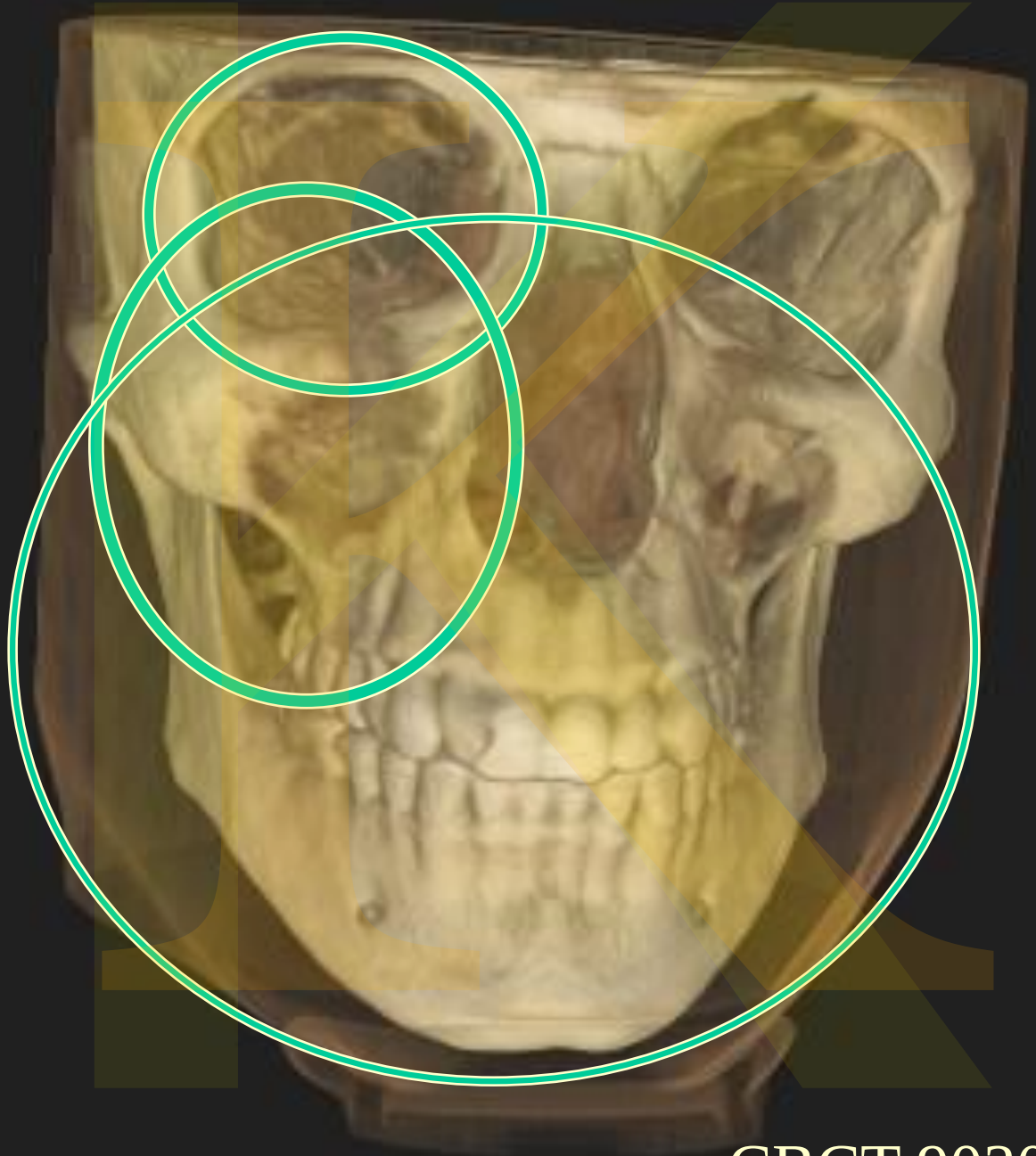




30 let muž

3D zobrazovací metody

Lebka s dutinami
Úpony šlach
a napojení vazů na kost
Výstupy nervů a cév
Topografické vztahy
mezi strukturami

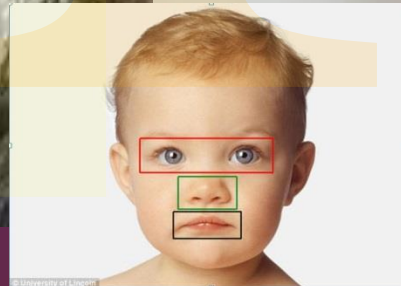
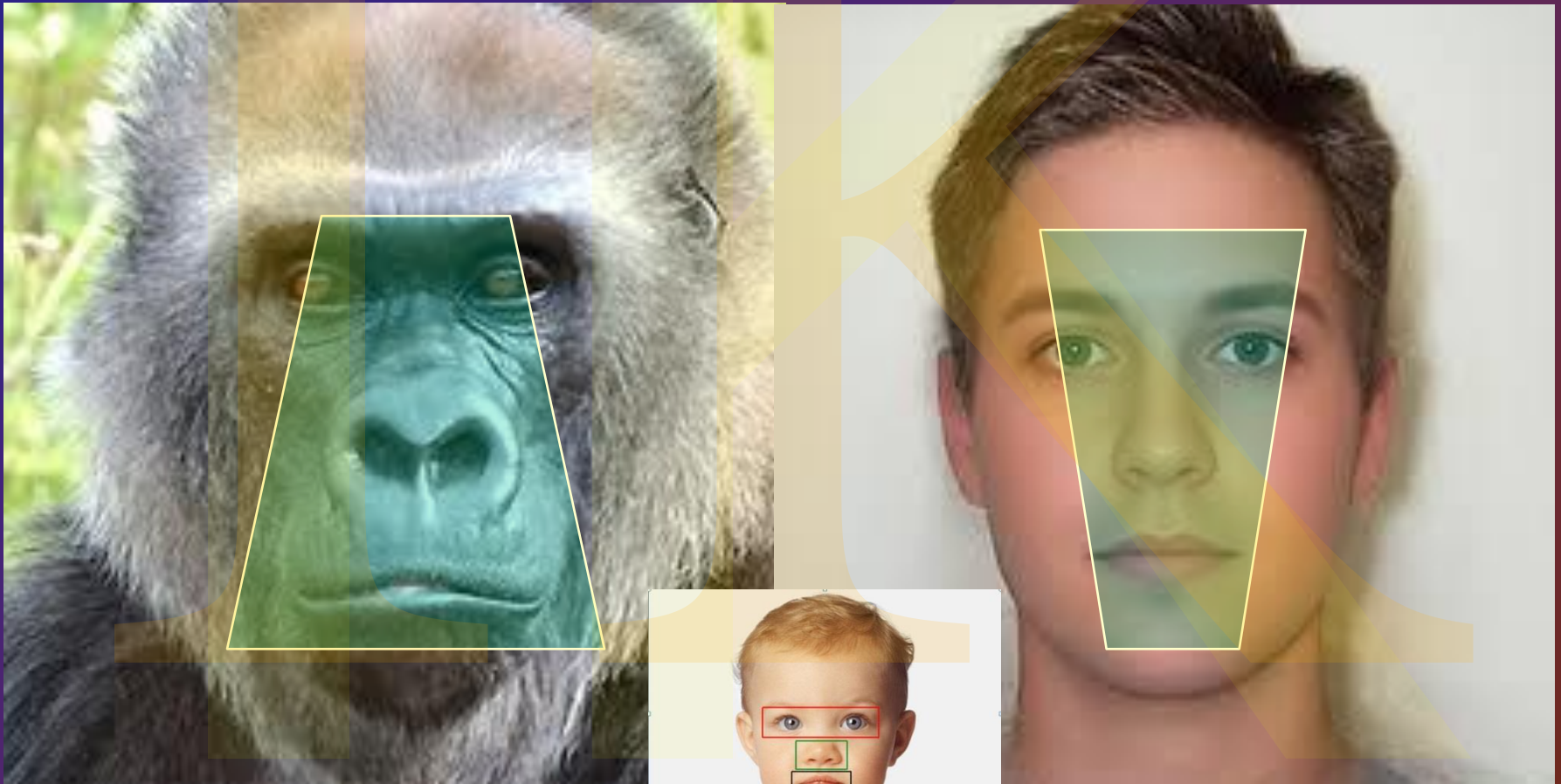


CBCT 90300



Fig. 7. Twins (natural age 61) with significant difference in sun exposure. Twin B (B) had approximately 10 hours per week greater sun exposure than twin A (A). Twin A had a body mass index 2.7 points higher than that of twin B. The perceived age difference was 11.25 years. Reprinted with permission from *Plast Reconstr Surg.* 2009;123(4):1321–1331.

Na co se soustředíme v obličejích ?

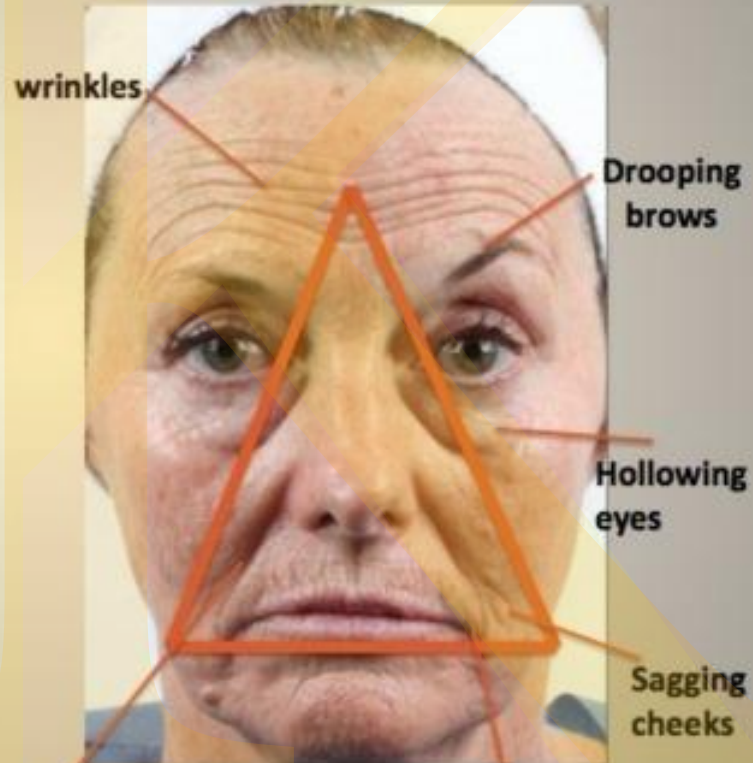
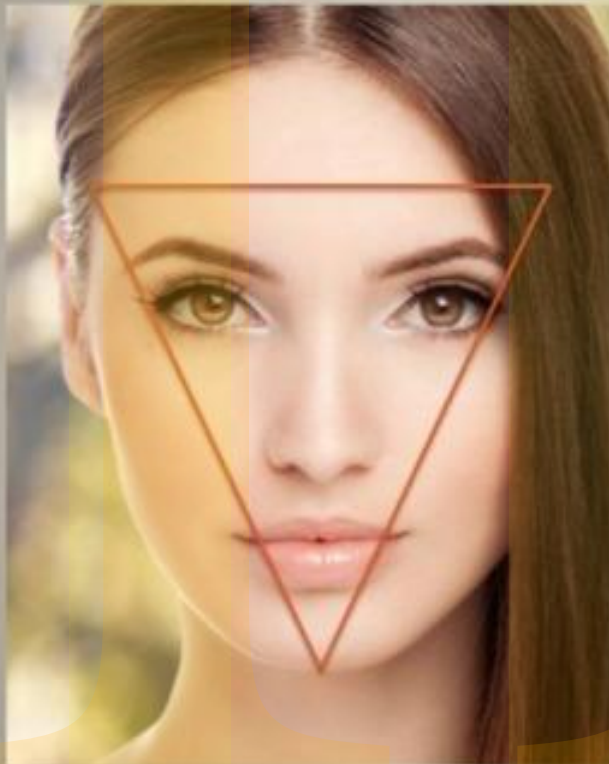


University of Liverpool

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This image shows the three 'areas of interest' focused on by the scientists. The researchers measured how long the babies focused on each area to determine the 'cuteness' of an image

Characteristics of aging



Rysy obličeje - vztah mezi tvrdými a měkkými tkáněmi

Face features - relation between soft and hard tissues



Prototypic female face of high attractiveness
("sexy face")

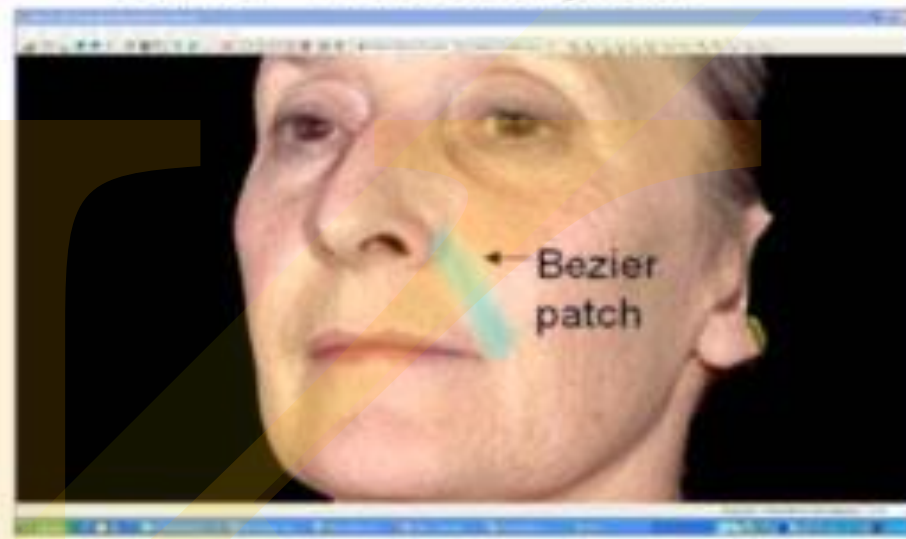


Prototypic female face of low attractiveness
("unsexy face")

Right NLF with Bezier patch



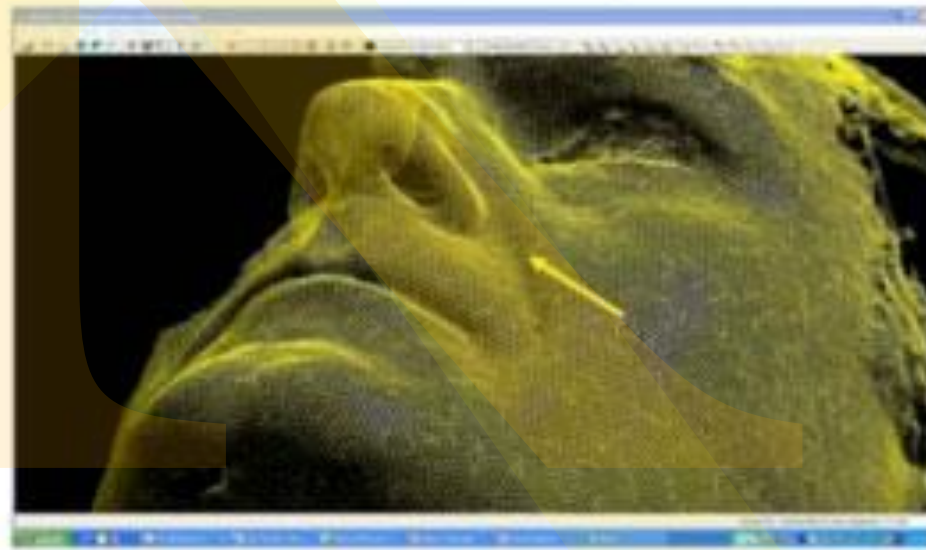
Left NLF with Bezier patch



Textured surface



Wire-frame image



A new classification of the nasolabial fold for use during facial reanimation surgery.
Bisarya K, Nduka C. Ann Royal Coll Surg 2009; 91: 535-536



18 týden

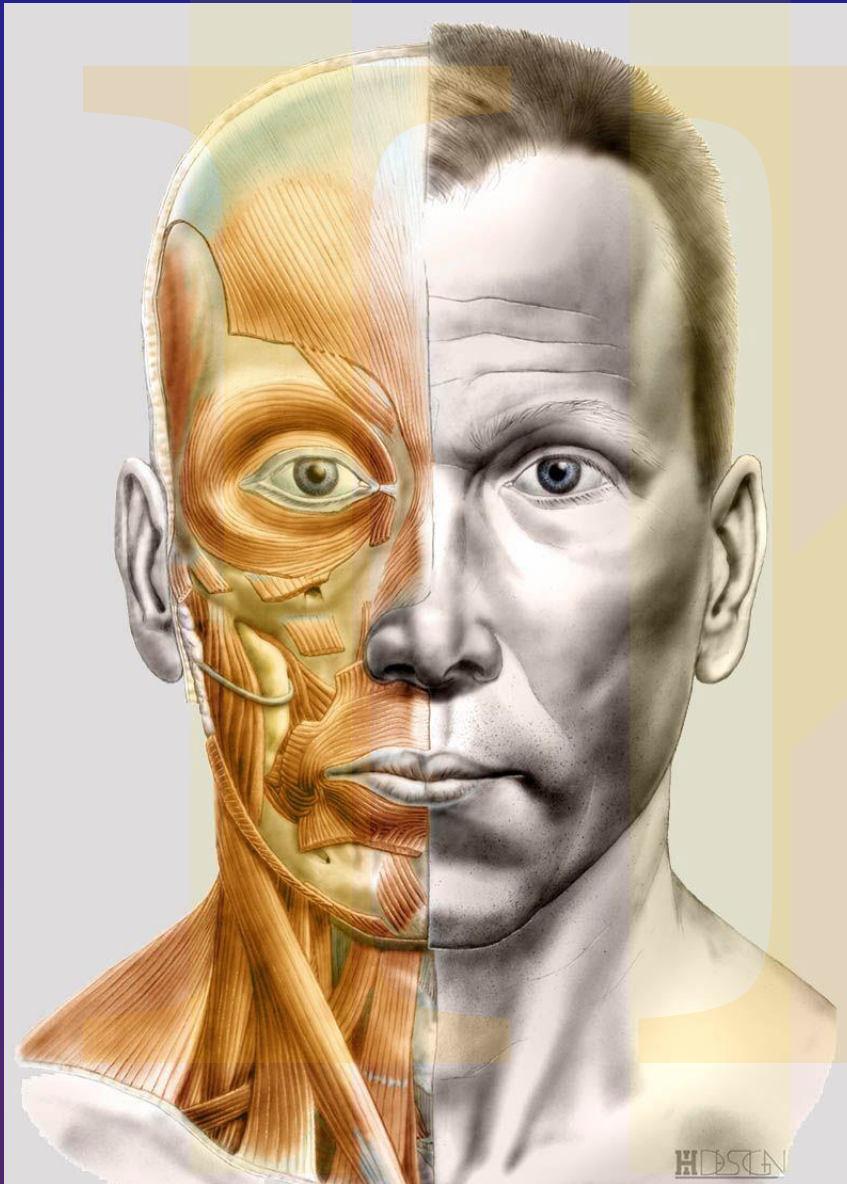
batole



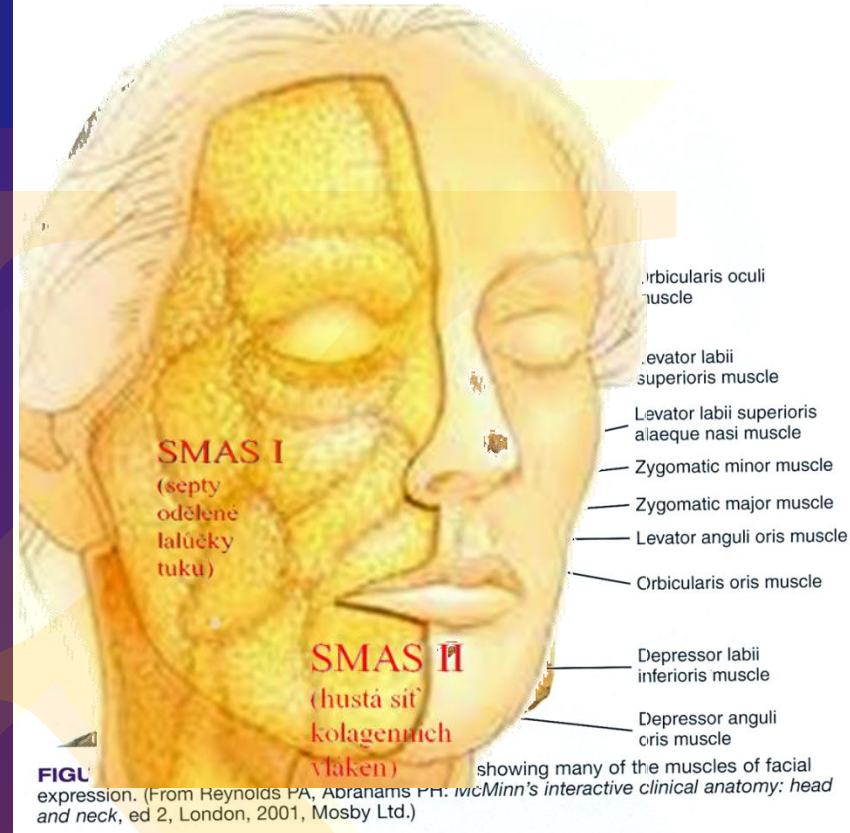
adultus



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



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 hlavy mm. faciales

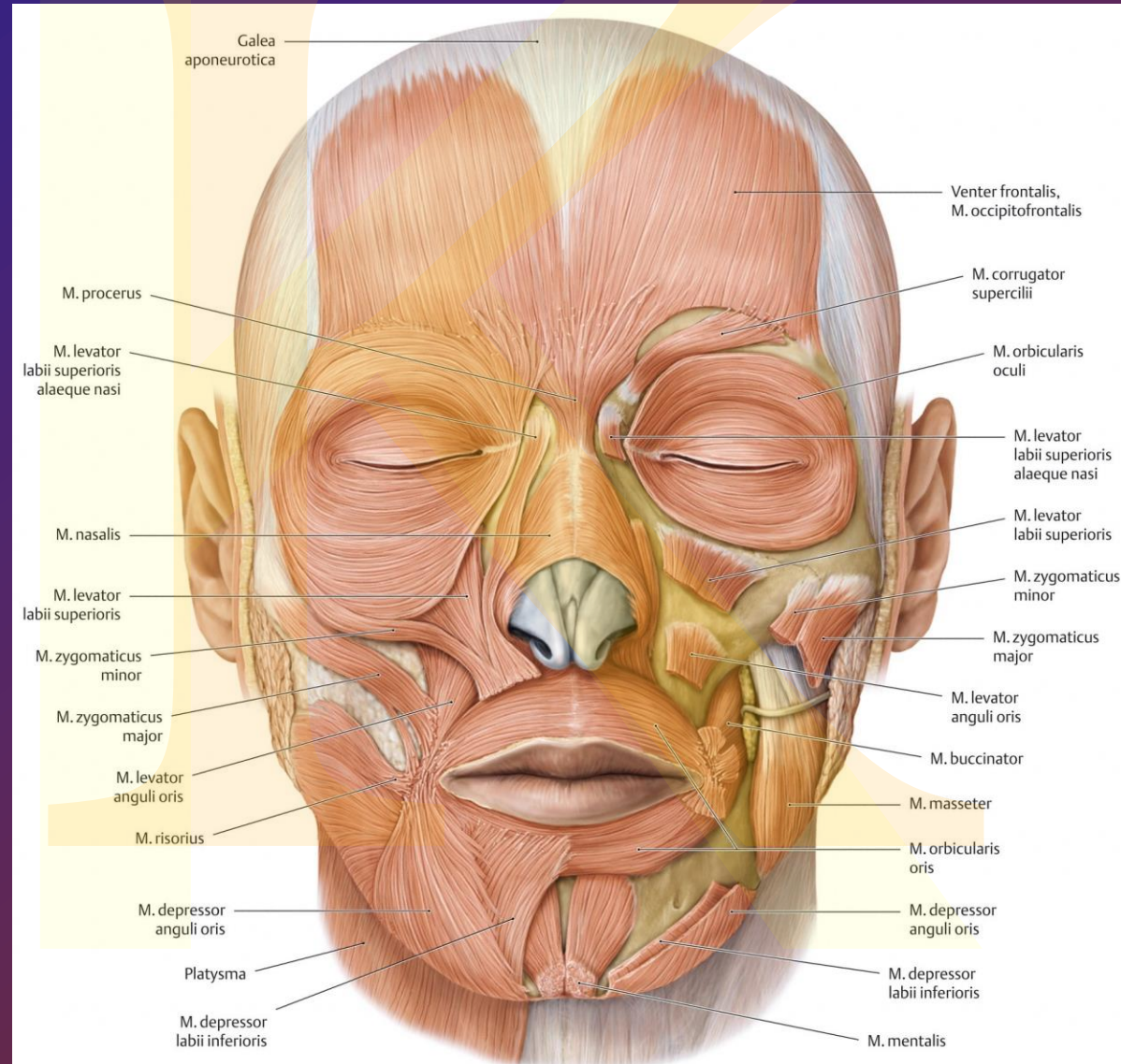
VII – FACIALIS

deriváty 2. žaberního oblouku

Inervace z n. facialis (nervus cranialis septimus; VII.)

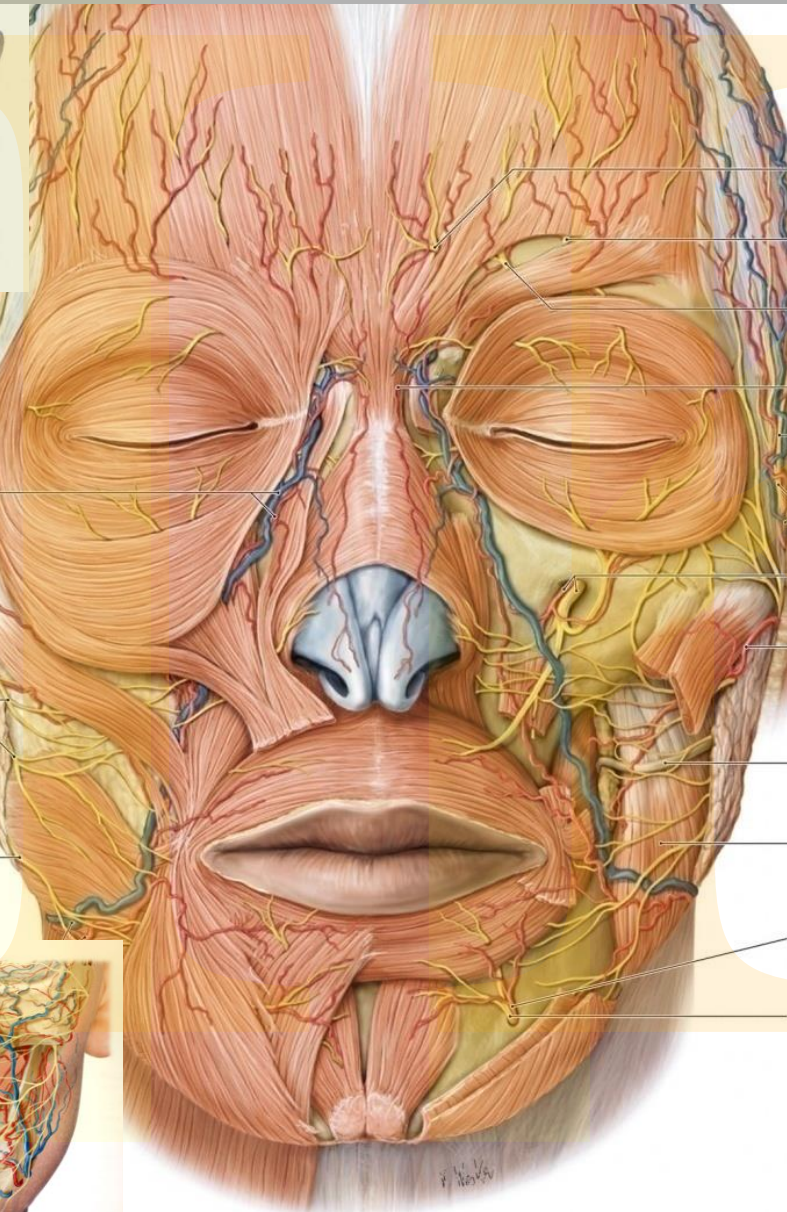
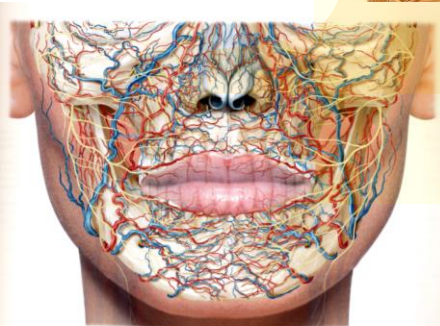
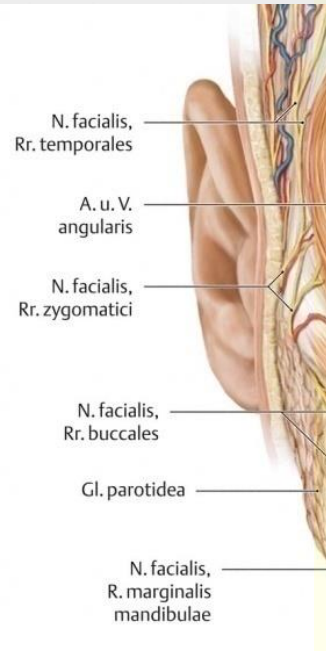
Svaly:

- ❖ Klenby
- ❖ Vlastní svaly obličeje
 - ❖ Svaly kolem oka
 - ❖ Svaly kolem nosu
 - ❖ Svaly kolem dutiny ústní
 - ❖ Svaly kolem boltce ušního



Mimické svaly cévy obličeje

Mimic muscles face vessels



A. dorsalis nasi
Aa. palpebrales laterales
A. angularis

A. facialis

N. auriculo-temporalis

A. u. V. temporalis superficialis

A. u. N. infra-orbitalis

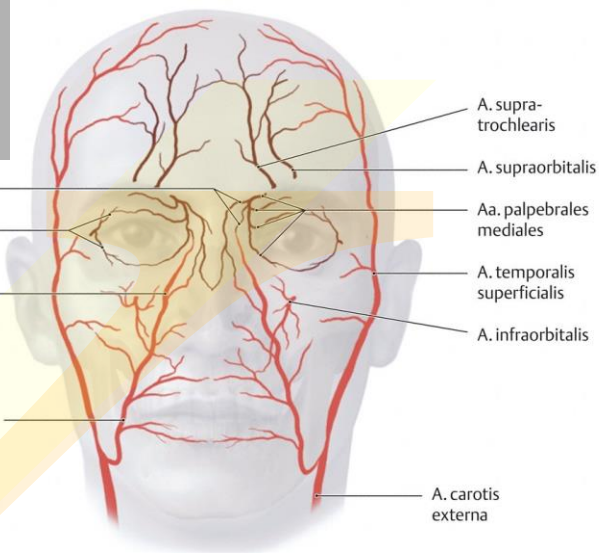
A. transversa faciei

Ductus parotideus

M. masseter

R. mentalis, A. alveolaris inferior

N. mentalis



A. supra-trochlearis

A. supraorbitalis

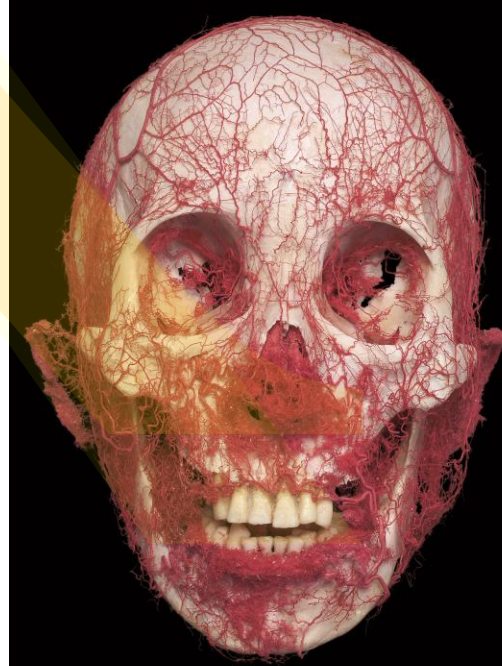
Aa. palpebrales mediales

A. temporalis superficialis

A. infraorbitalis

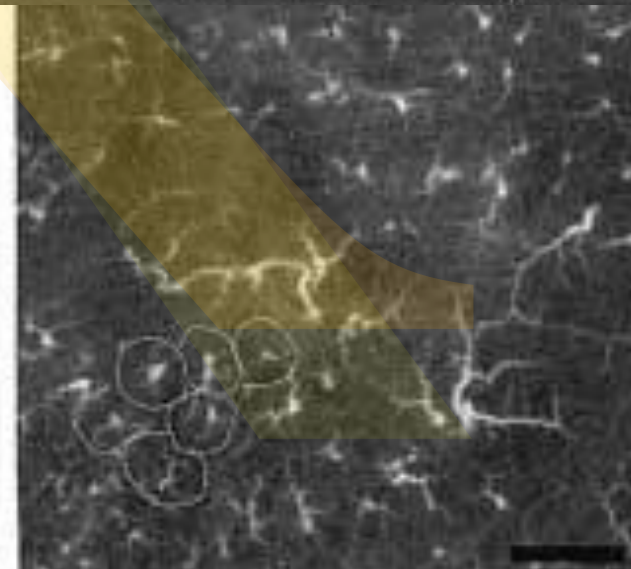
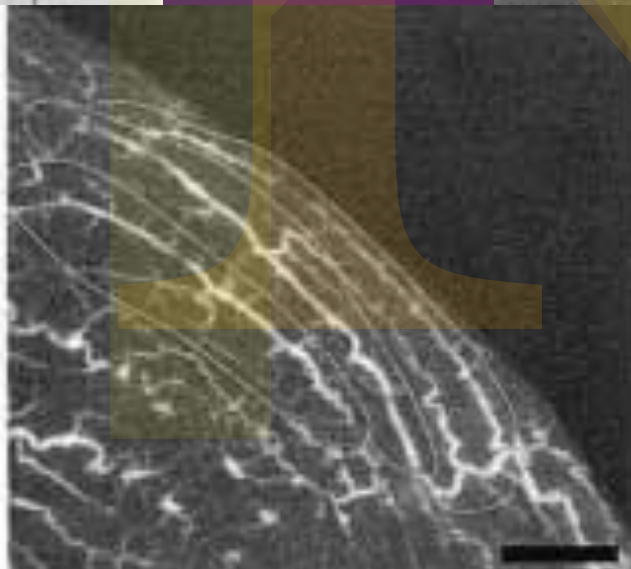
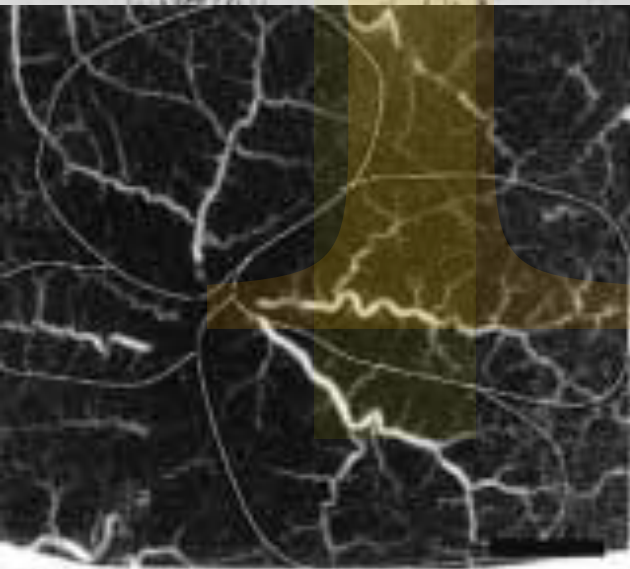
A. carotis externa

trigonum mortis

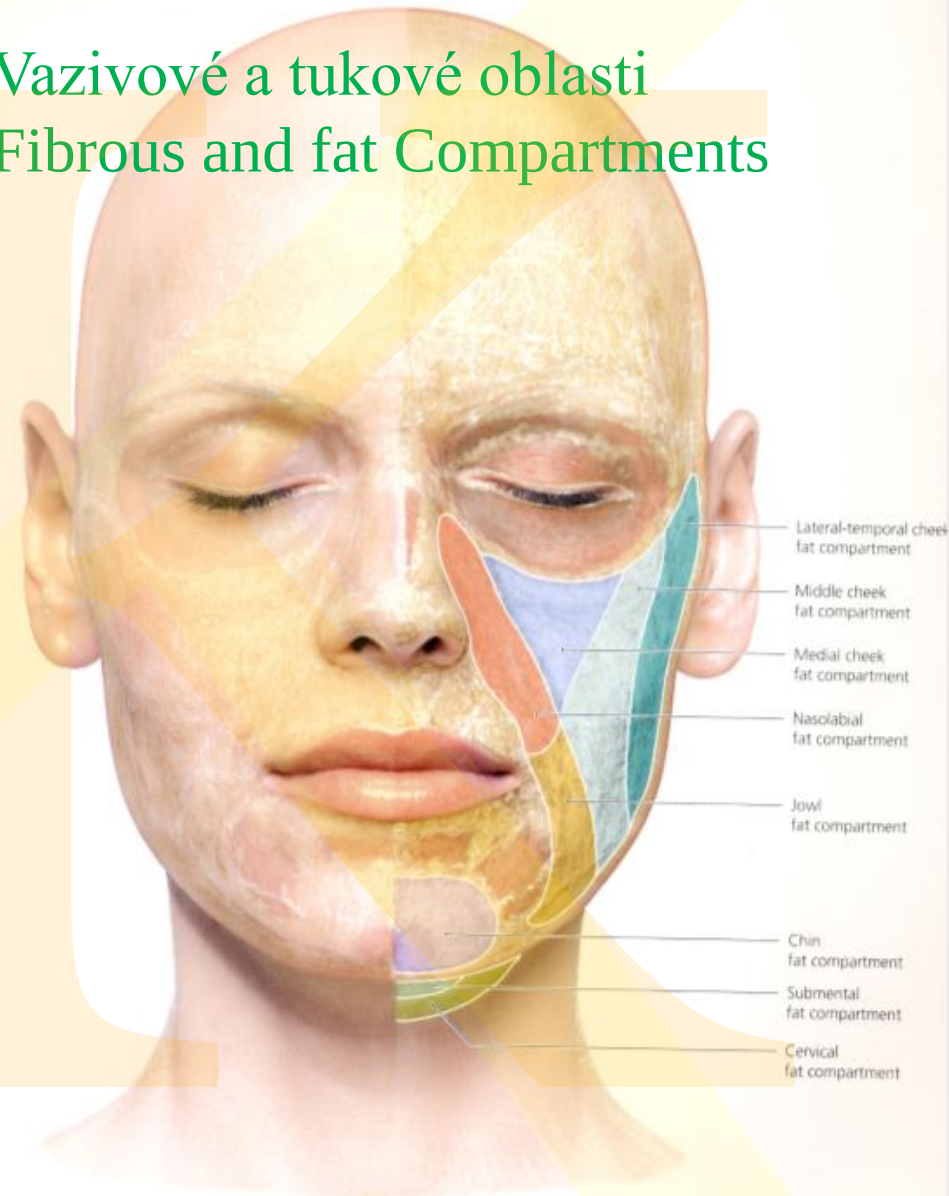




H.Chang:Arterial
anatomy of
subdermal plexus
of the face. Keio J
Med 50: (1)31-34



Vazivové a tukové oblasti Fibrous and fat Compartments



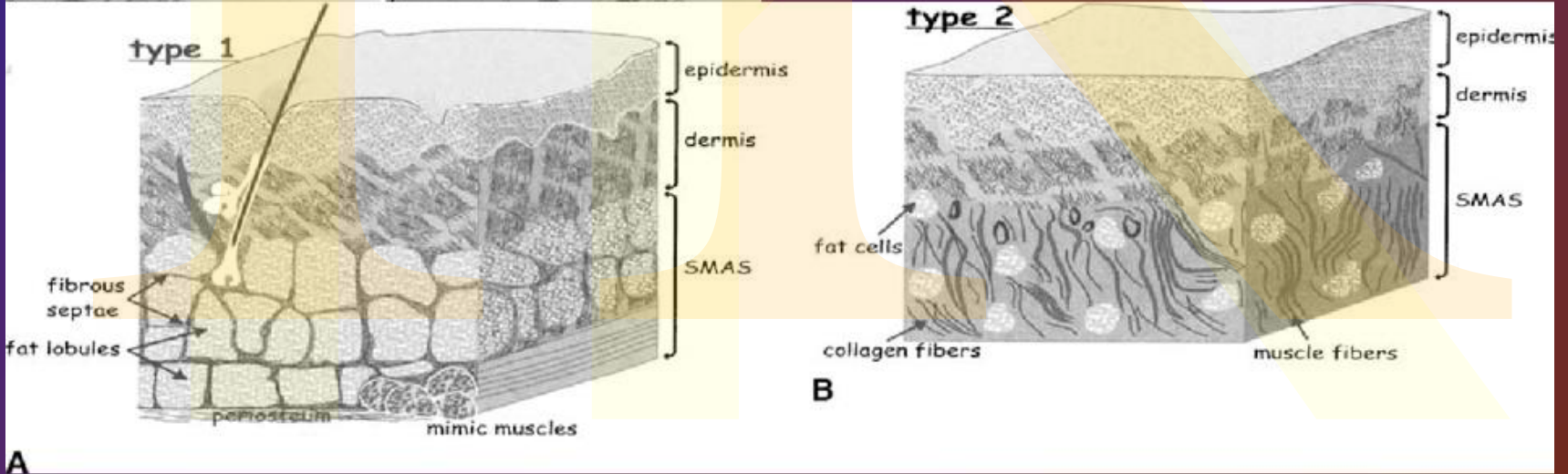
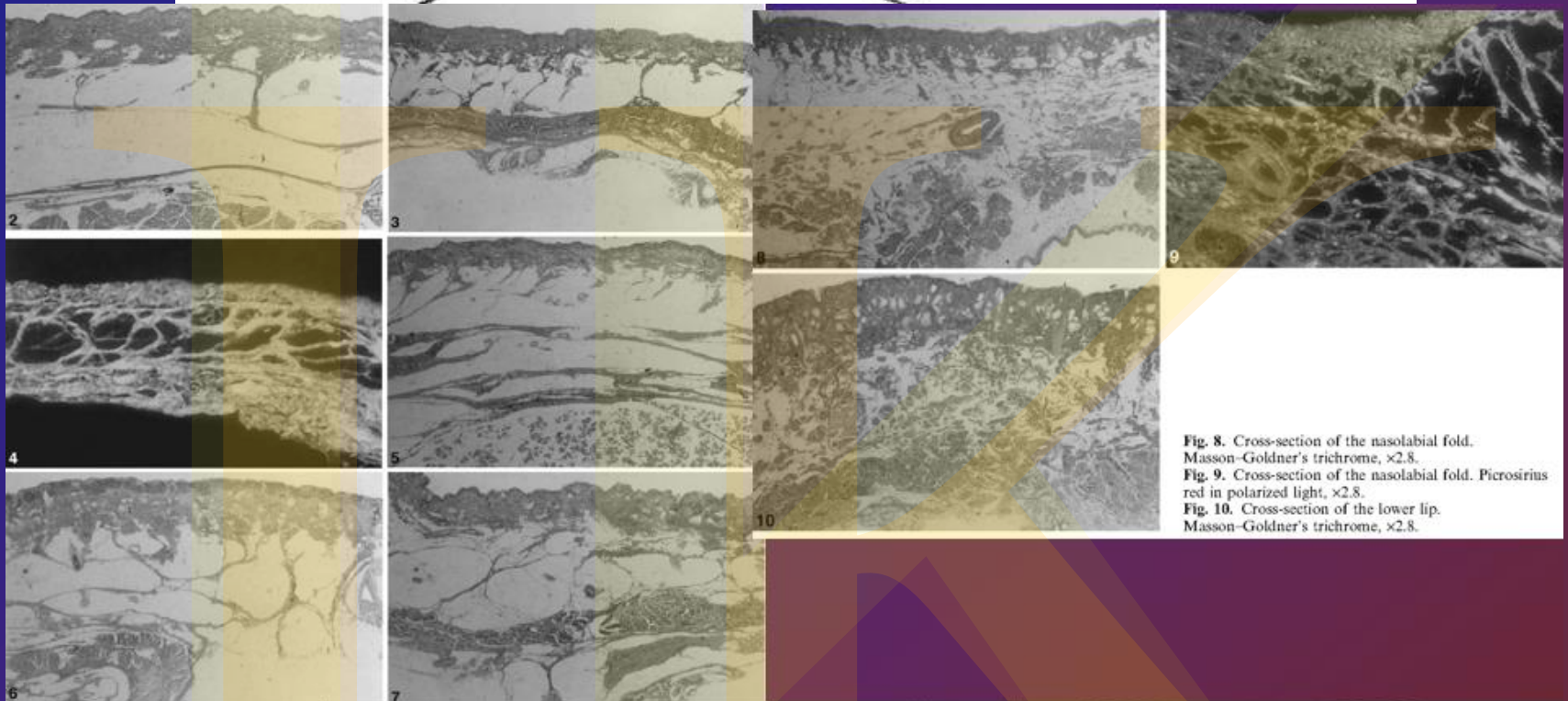
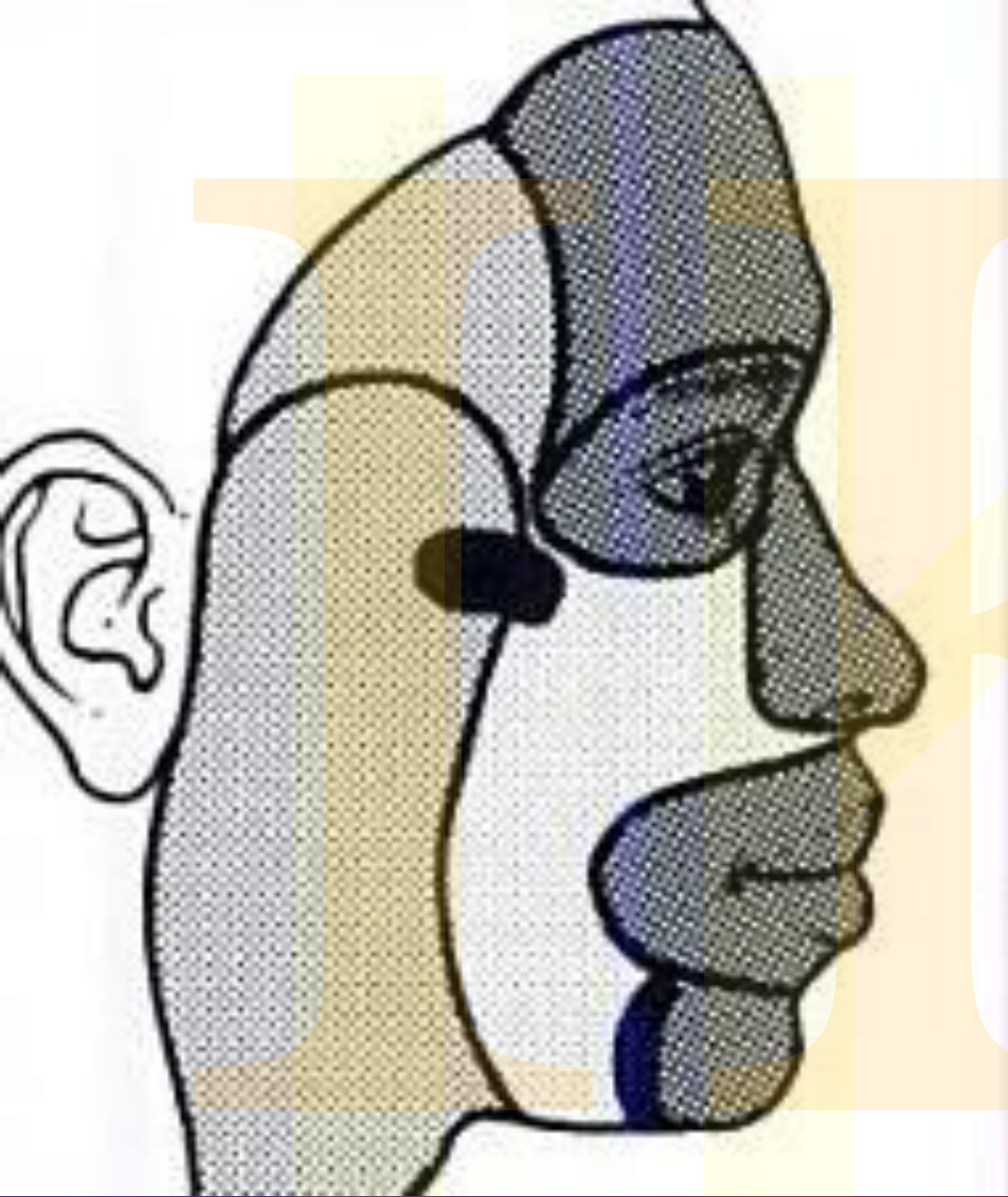


Fig. 1. Six locations of cross-sections for histological



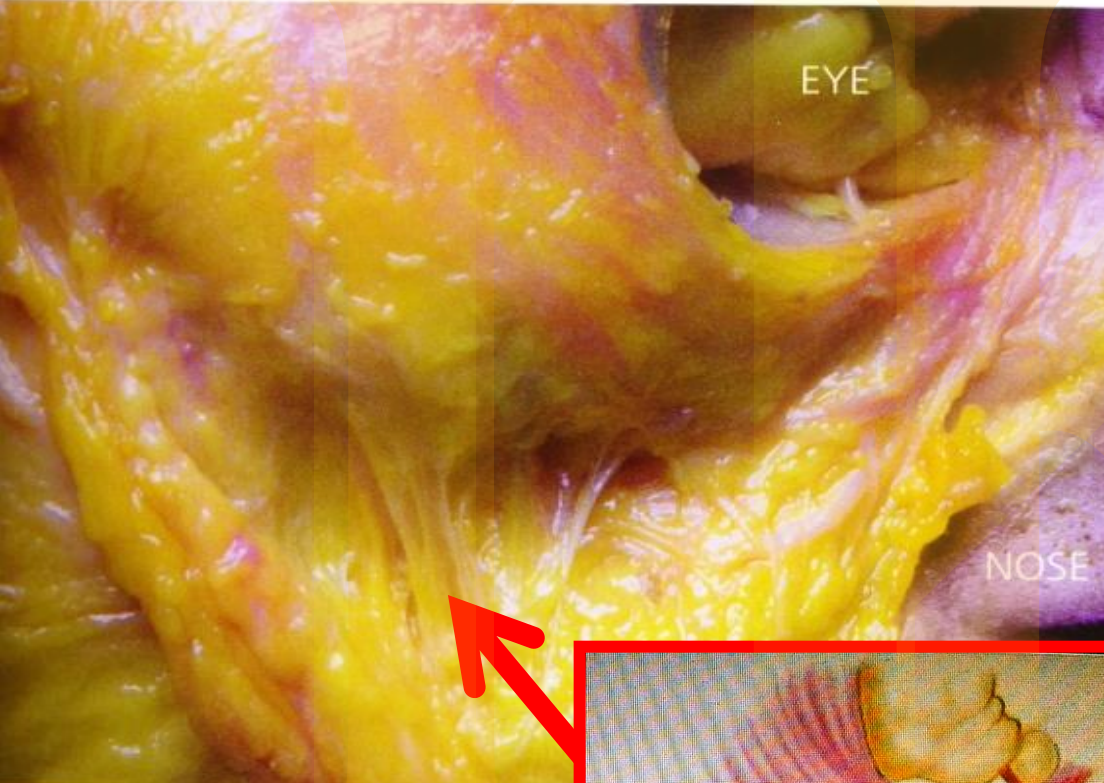
Fasciocutaneous
ligg. –
stippled areas

Osteocutaneous
ligg. –
in black

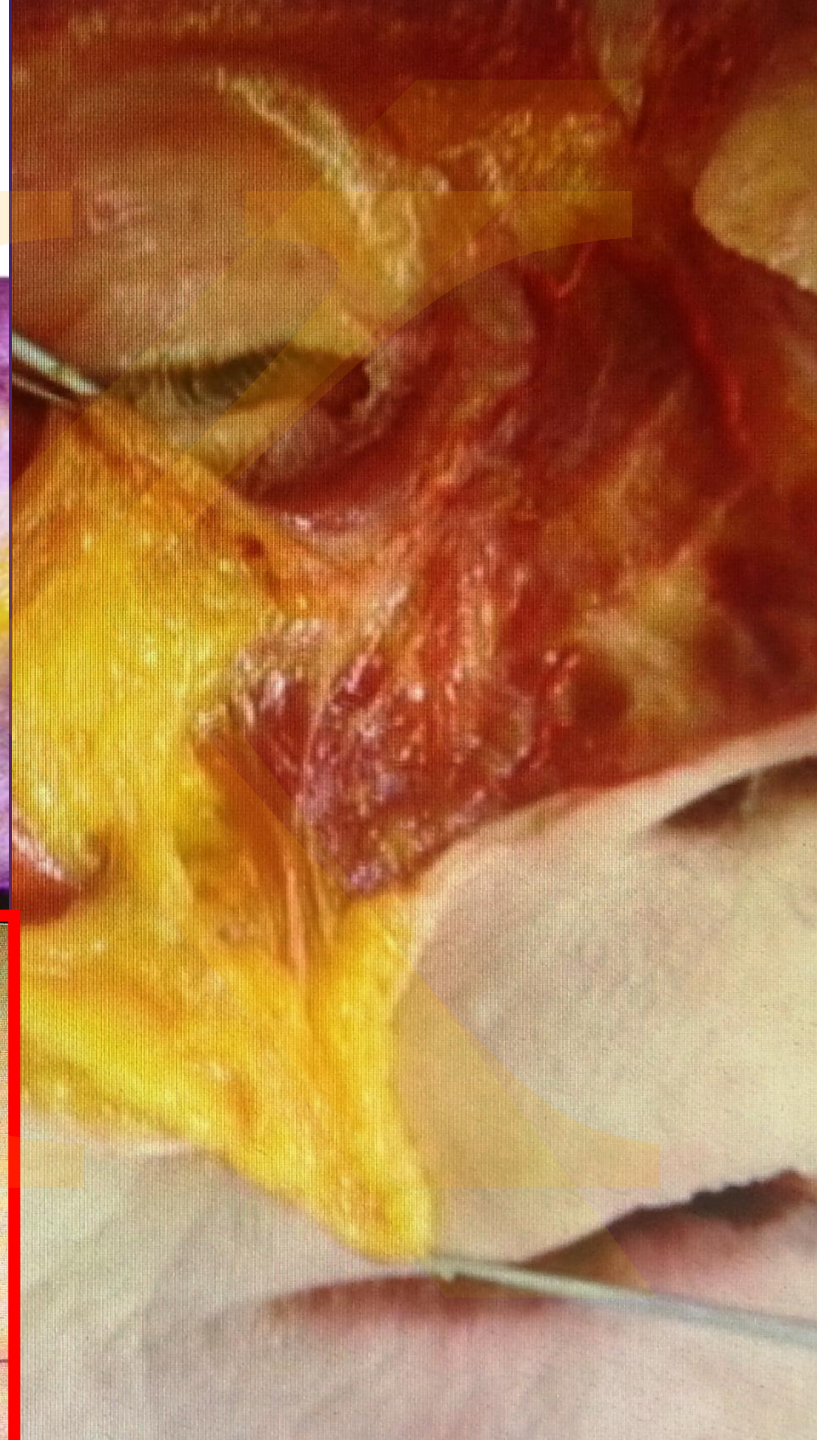
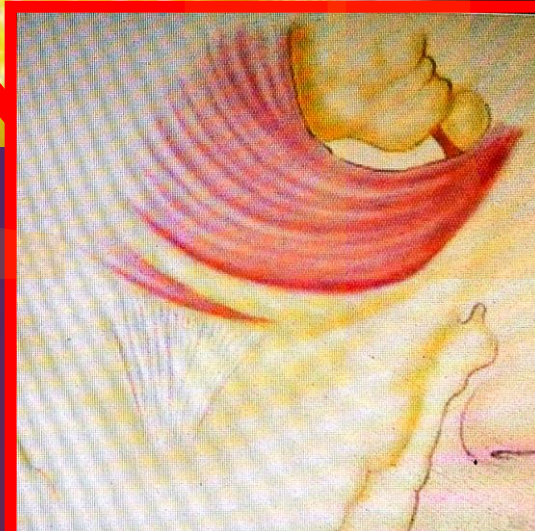
(From Larrabee WF, Makielski KH, Sykes J: Surgical anatomy for endoscopic facial surgery. In: Keller GS, ed. *Endoscopic facial plastic surgery*. St. Louis: Mosby, 1997: 4, with permission.)

The relative strengths of these attachments are shown: loose (*light stipple*), intermediate strength (*medium stipple*), stronger (*dark stipple*), strongest (*heavy lines*).

Fig. 6 The zygomatic ligaments along the lower edge of the *orbicularis oculi* muscle. They are inserted close to the *zygomaticus major* and *zygomaticus minor* muscles.



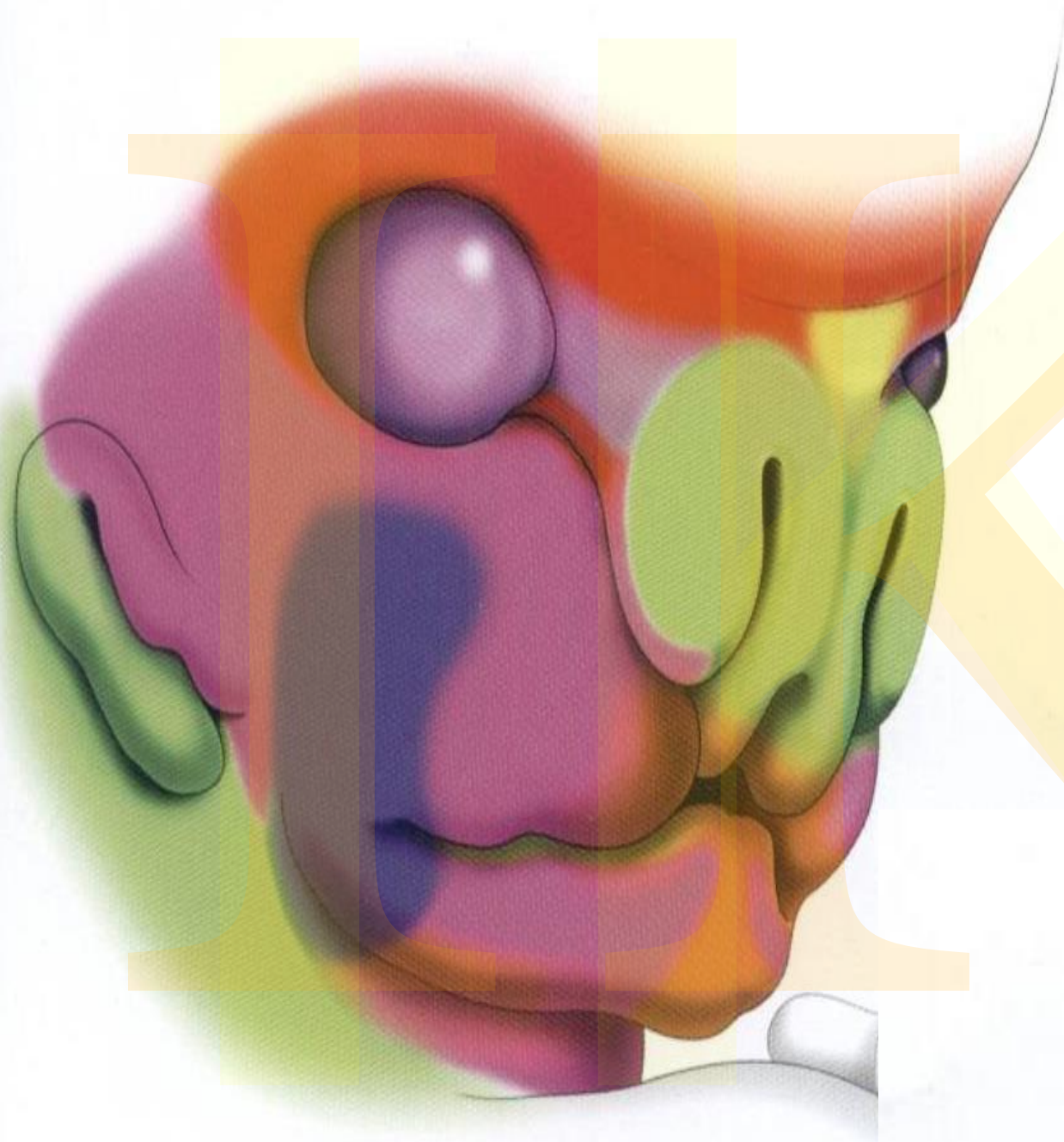
Zygomatico
- cutaneous
ligament



ligamentum mandibulare



Zony
genové
aktivity ve
tváři
Expression
of the main
genetically
active genes
in face

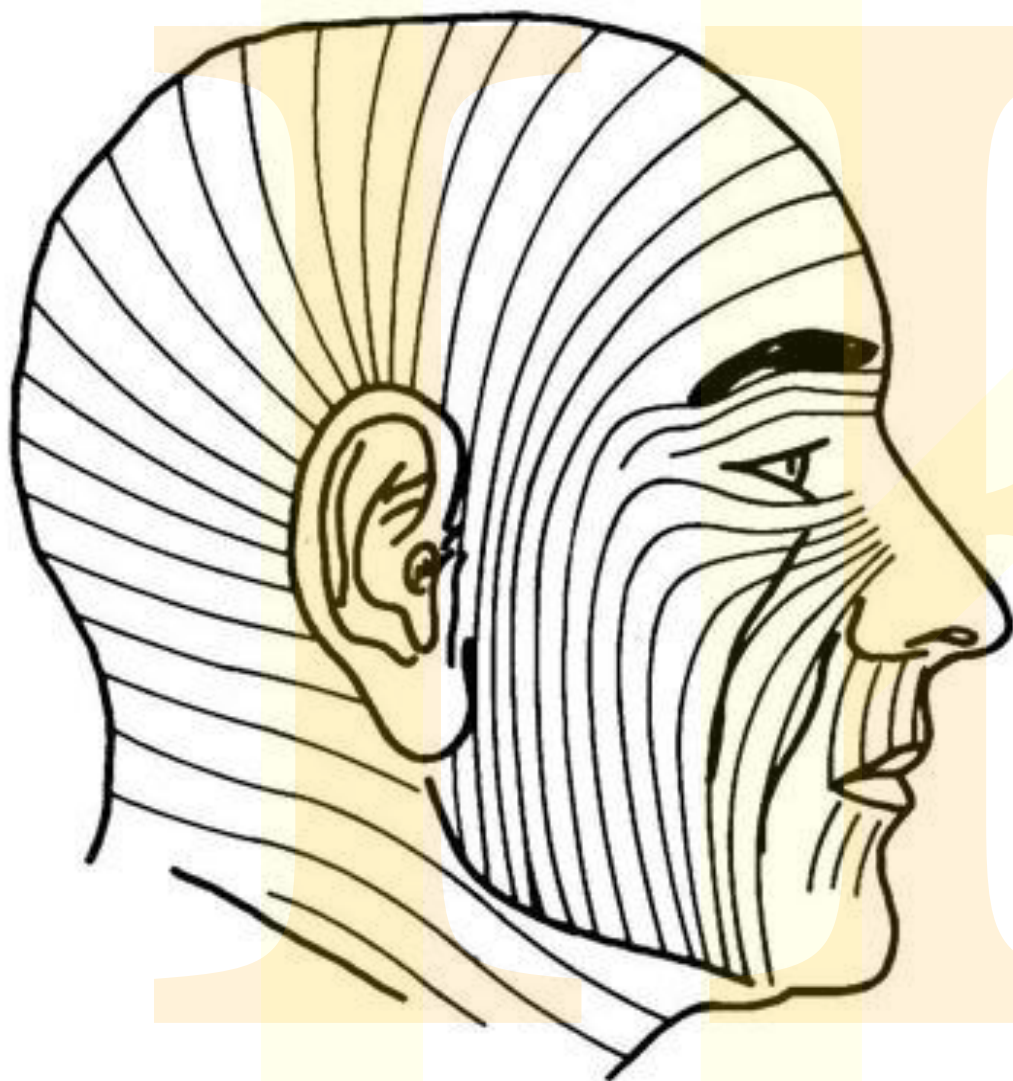


-  WNT: Wingless type
-  PAX6: Paired box 6
-  DLX: Distal-less homeobox
-  BARX: Barx homeobox
-  GSC: Goosecoid homeobox
-  BMP: Bone morphogenetic protein
-  FGF8: Fibroblast growth factor 8
-  PAX9: Paired box 9

- Adipocire changes follow generally facial parts rich by fat



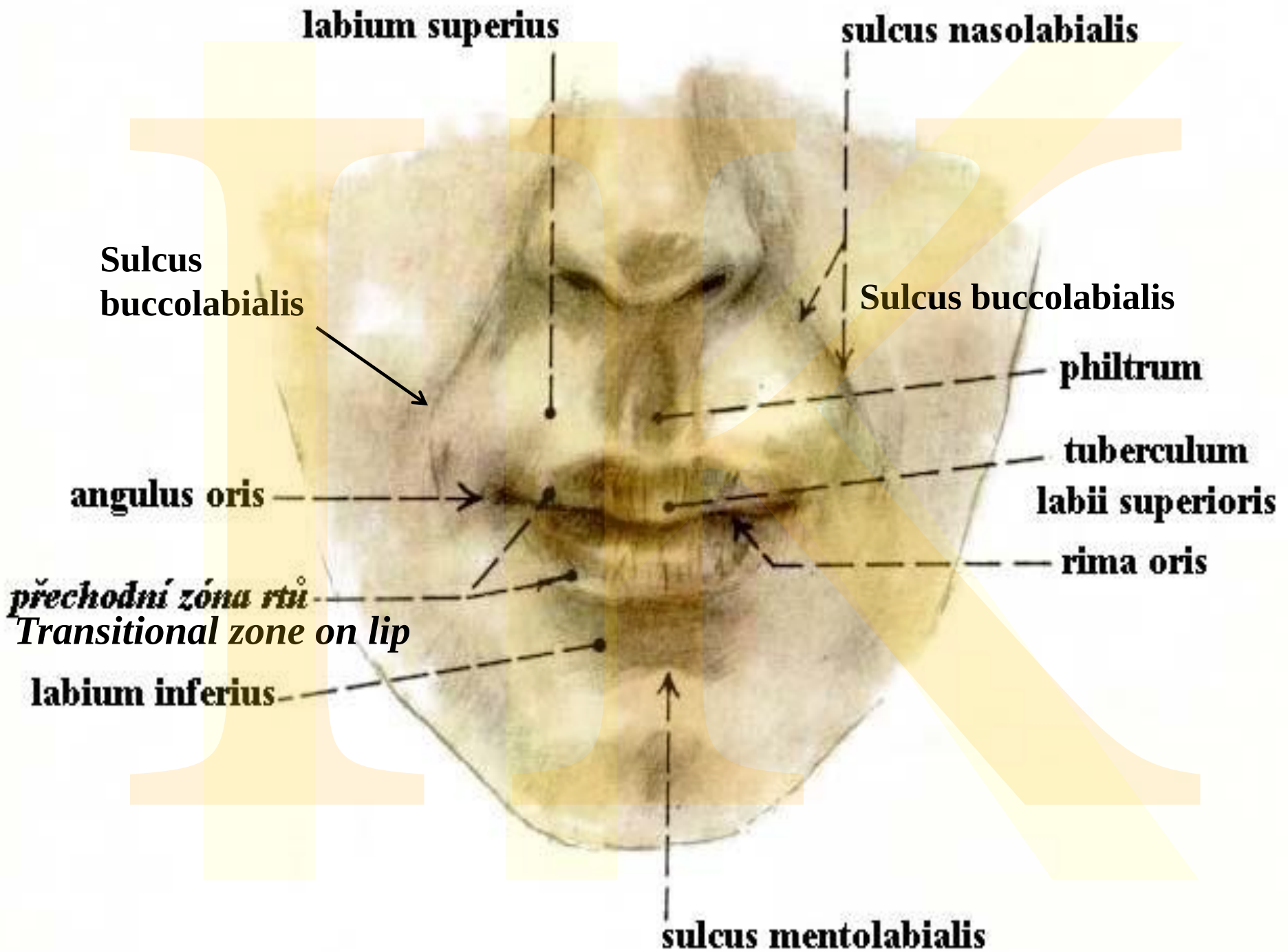
Adipocire na obličejových partiách lebky.



Mrtvý ležící
Dead horizontal
position

Živý stojící
Erectile position

Fig. 1



Určení vrstev ?
Determination
of layers ?

Prvé
pokusy

First
attempts

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

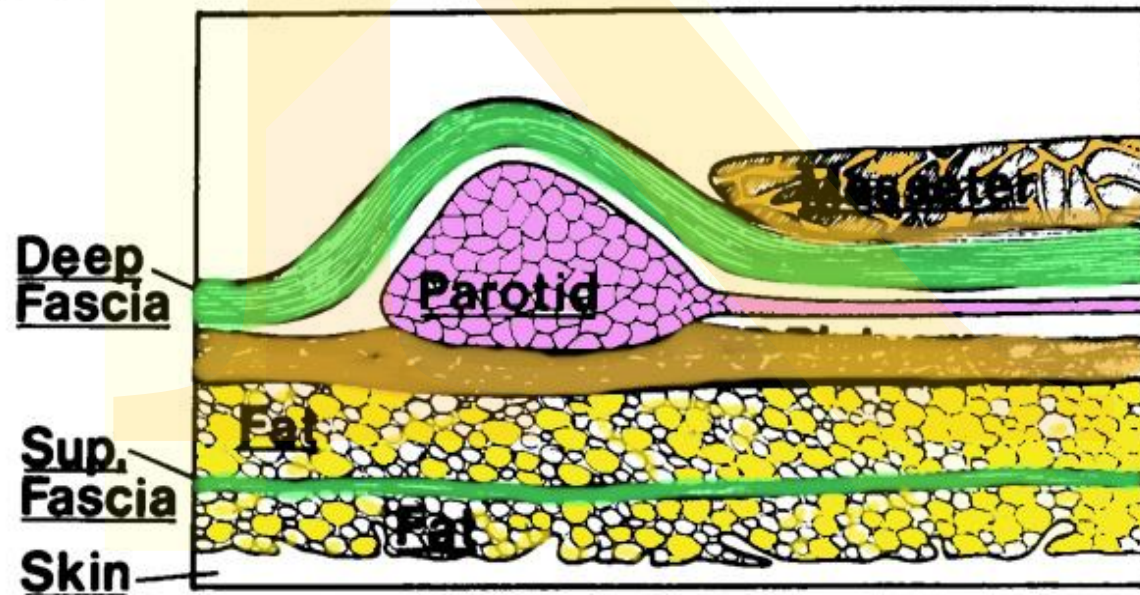
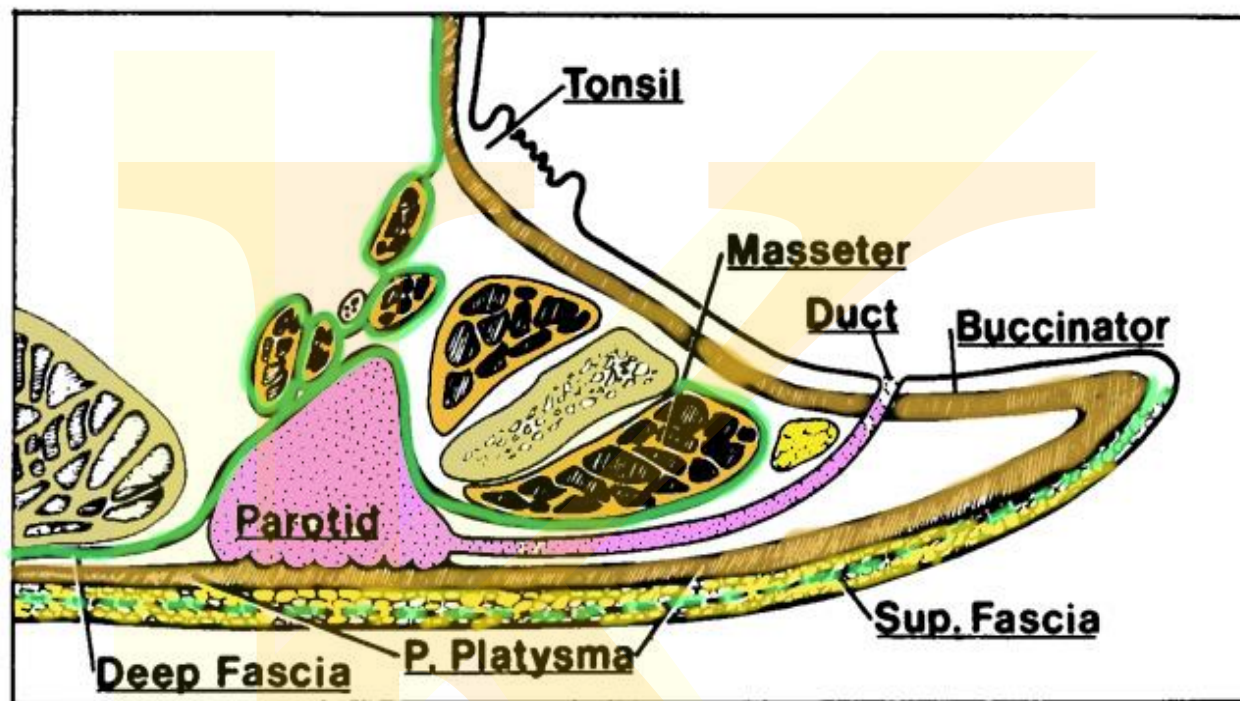
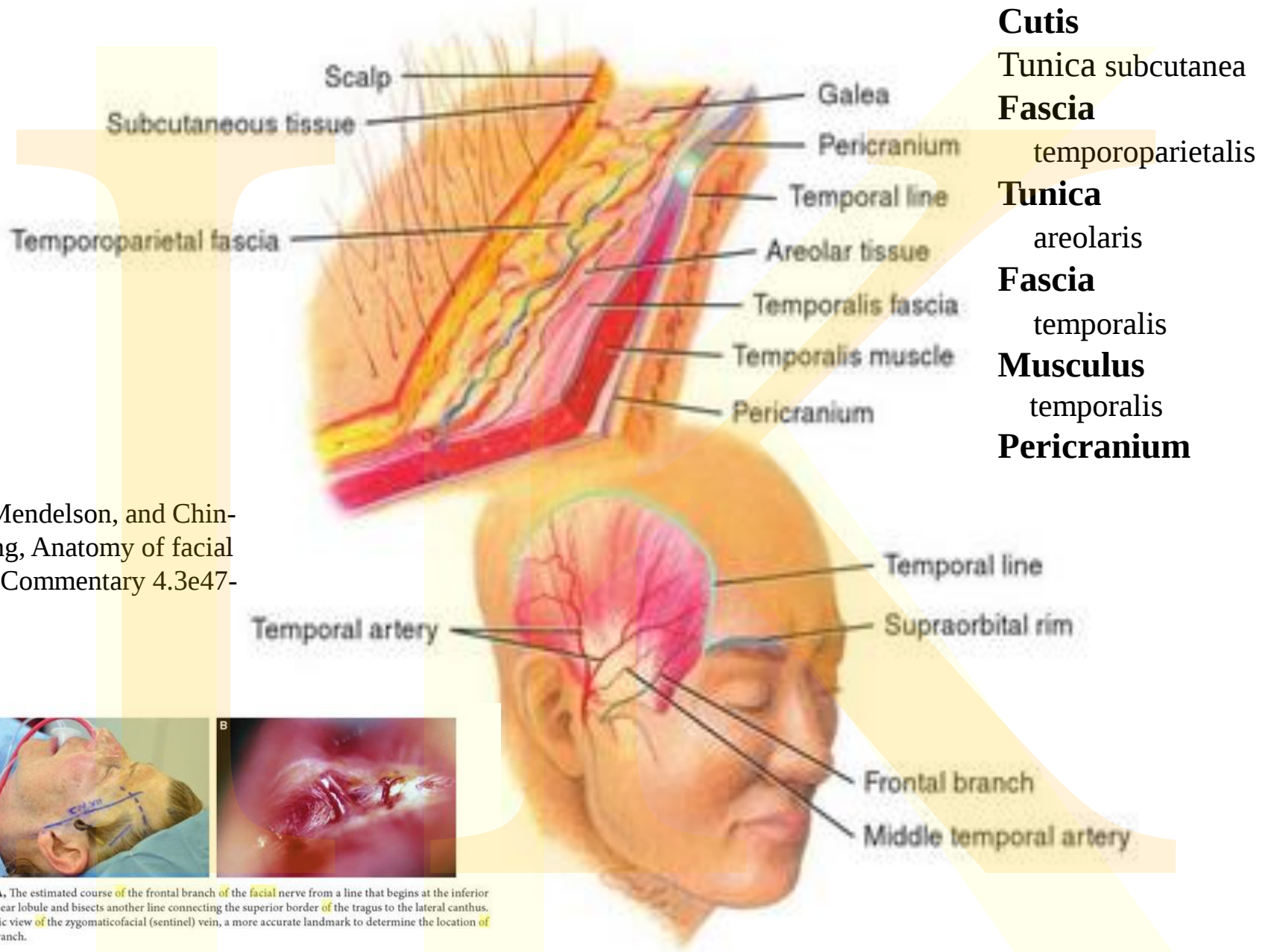


FIG. 4. Diagrammatic representation of the true anatomy of the masseter and parotid regions.



Bryan Mendelson, and Chin-Ho Wong, Anatomy of facial ageing. Commentary 4.3e47-e51

Fig. 9-5 A, The estimated course of the frontal branch of the facial nerve from a line that begins at the inferior aspect of the ear lobule and bisects another line connecting the superior border of the tragus to the lateral canthus. B, Endoscopic view of the zygomaticofacial (sentinel) vein, a more accurate landmark to determine the location of the frontal branch.

Fig. 9-4 Fascial planes over the temporalis muscle, the temporal line, and the superior orbital rim.

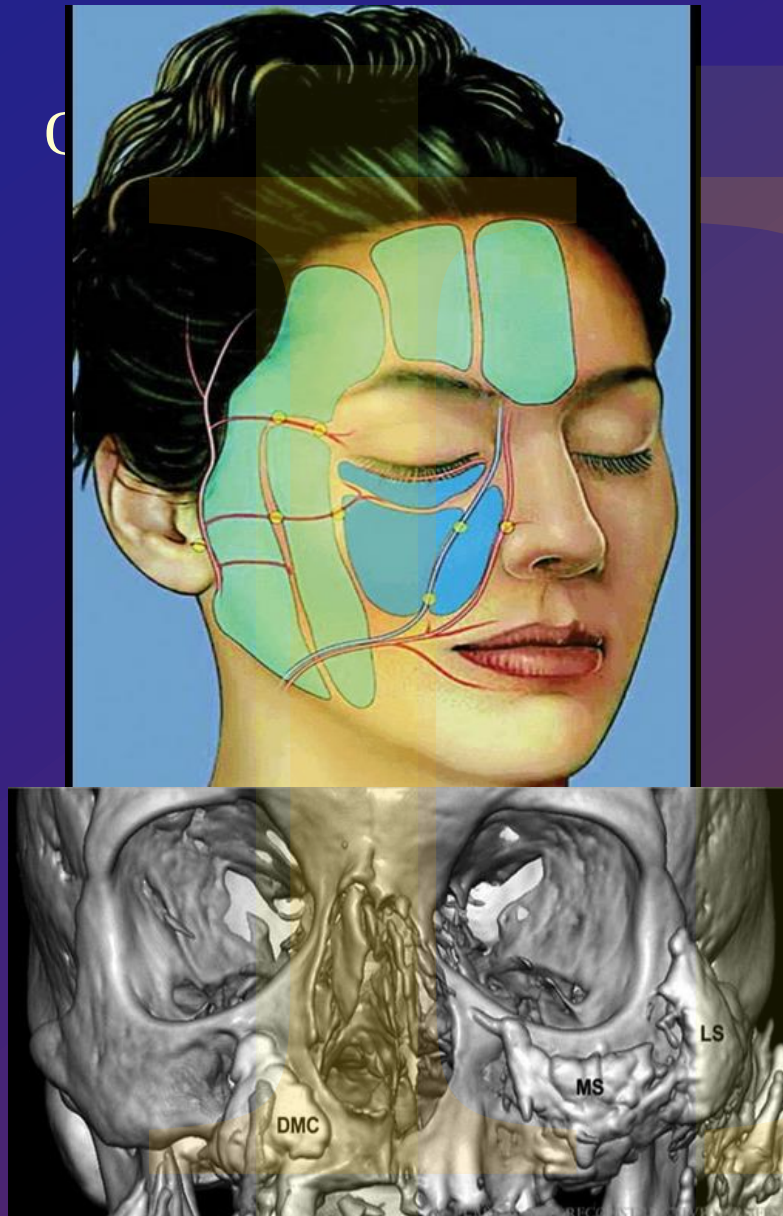
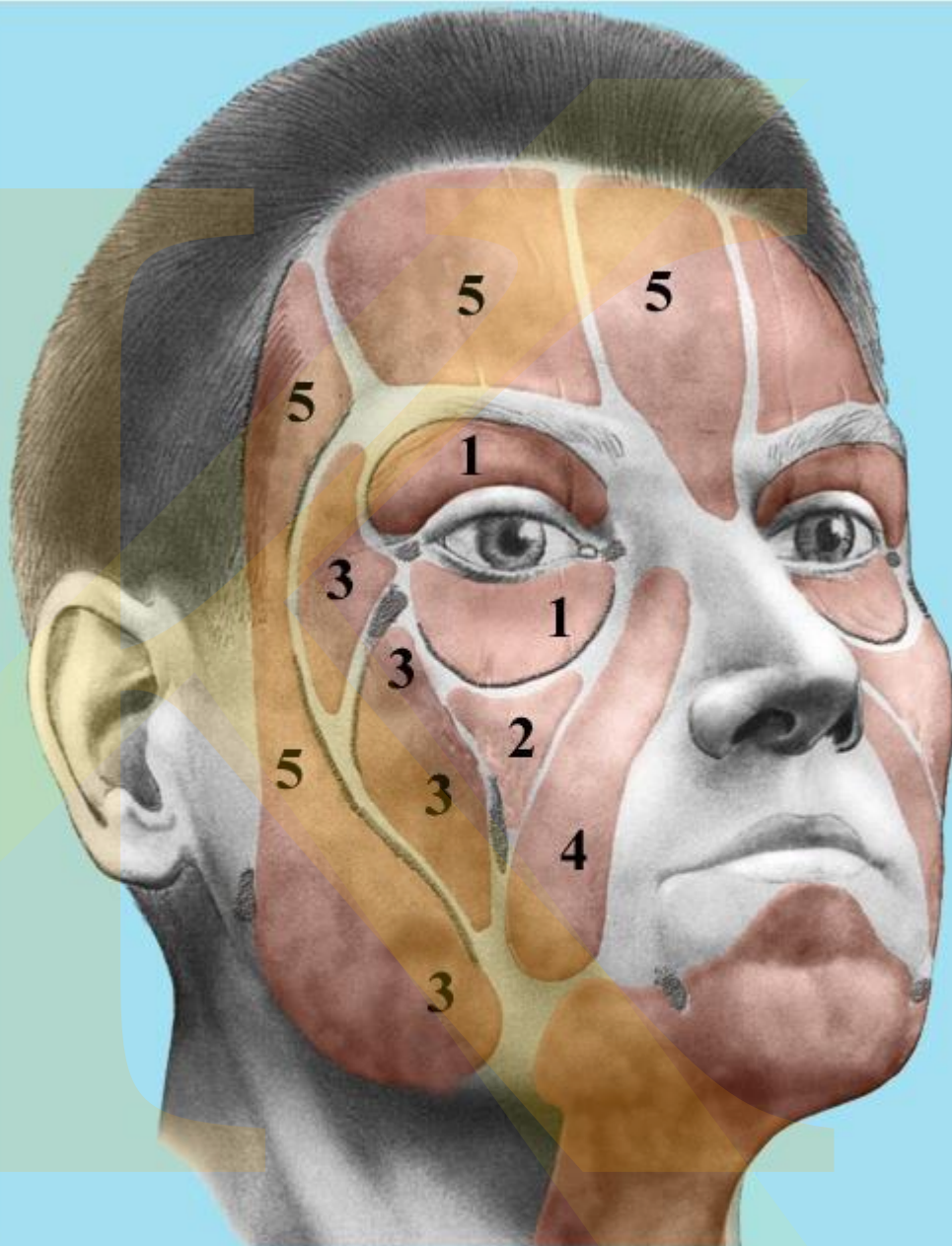


Fig. 3. The deep midfacial fat compartments. The deep medial cheek fat is composed of a medial part (DMC) and a lateral part (not shown). The medial part extends medially almost to the lateral incisor tooth. Augmentation of the deep medial cheek fat will consequently elevate and efface the nasolabial fold. The sub-orbicularis oculi fat is composed of a medial part (MS) and a lateral part (LS). With aging, an inferior migration occurs. Reprinted with permission from *Plast Reconstr Surg.* 2012;129(1):263–273.



*Ubývání tukových deposit v obličejí;
přibližné pořadí*

- Podkožní tuk se dá rozdělit do anatomicky rozpoznatelných úseků.
- Sulcus nasolabialis je zřetelný žlábek s definovanou anatomickou strukturou.
- Tuk tváře (nikoliv hluboký Bichatův polštář) je možné rozdělit do tří částí: vnitřní, střední a vnější.
- V oblasti čela jsou tři rozlišitelné tukové oblasti: vnitřní, střední, boční a vmezeřená mezi nimi.
- Tuk v oblasti očníce lze rozdělit do tří úseků oddělených septy.
- Oblast tváře obsahuje nejméně řídkého tuku ze všech částí obličeje.
- Lze rozeznat některé části vazů mezi kůží a povrchem periostu; především v oblastí kosti lícni a přibližně v polovině těla dolní čelisti



+

11. Lips lose substantial volume and get thinner

Platysma

velikost: 8x12 cm

počátek: Fascia na horní části mm. pectoralis major a deltoideus

dosah: kůže a podkožní vrstva v dolní části obličeje.

! Není přímé spojení s periostem lebky !

Cévní zásobení:

Hlavní zdroj: a. submental

Menší zdroj: a. suprasternalis

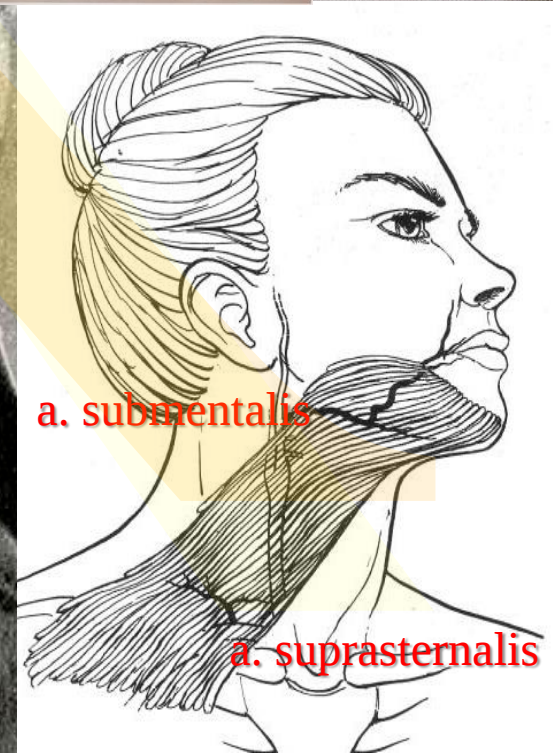
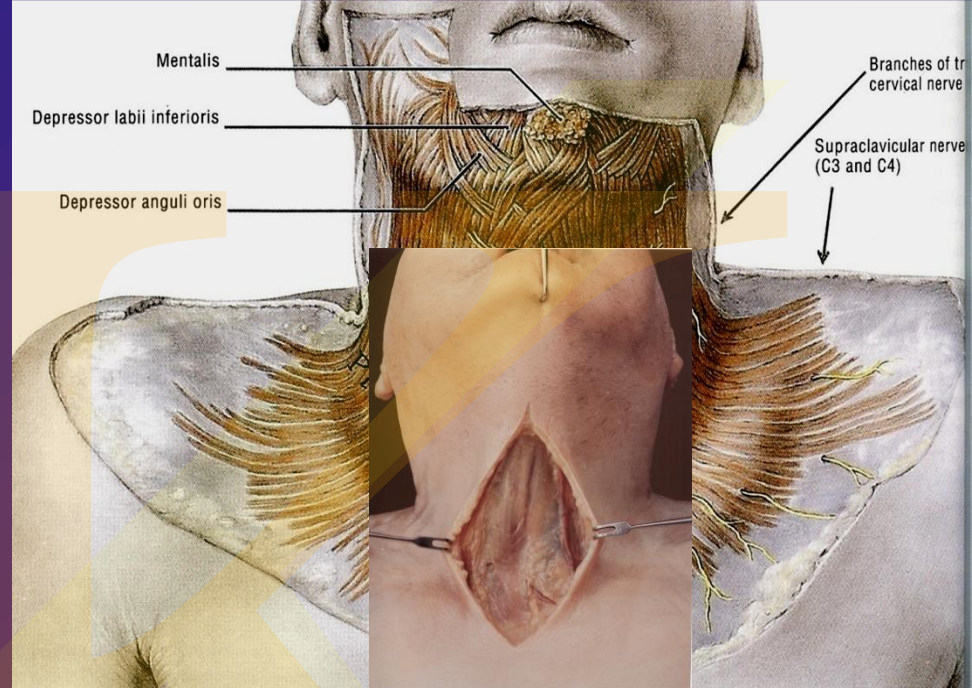
Nervové zásobení:

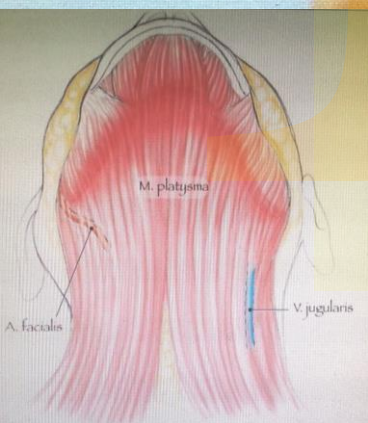
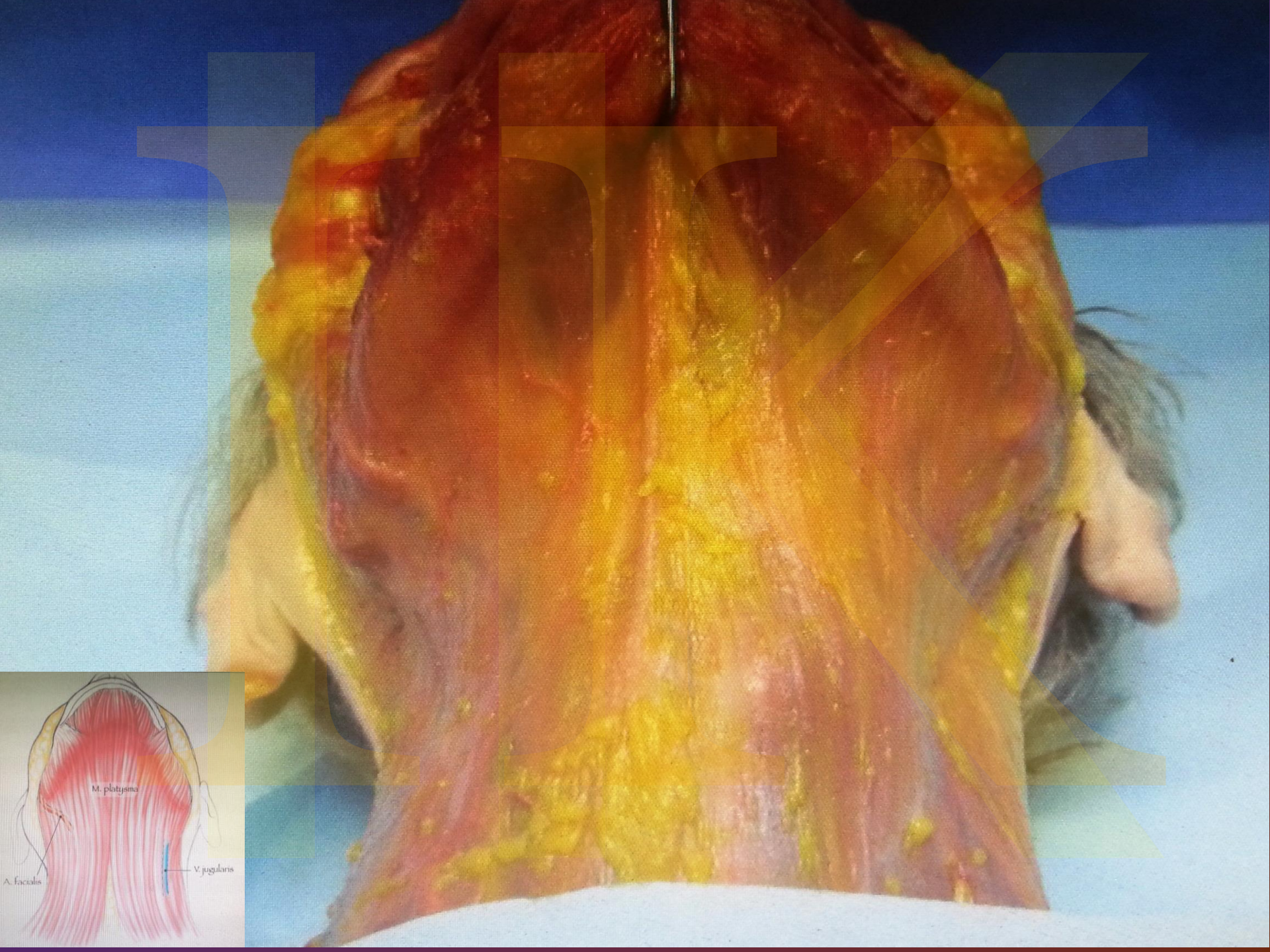
Motorika: krční větve

z n. VII

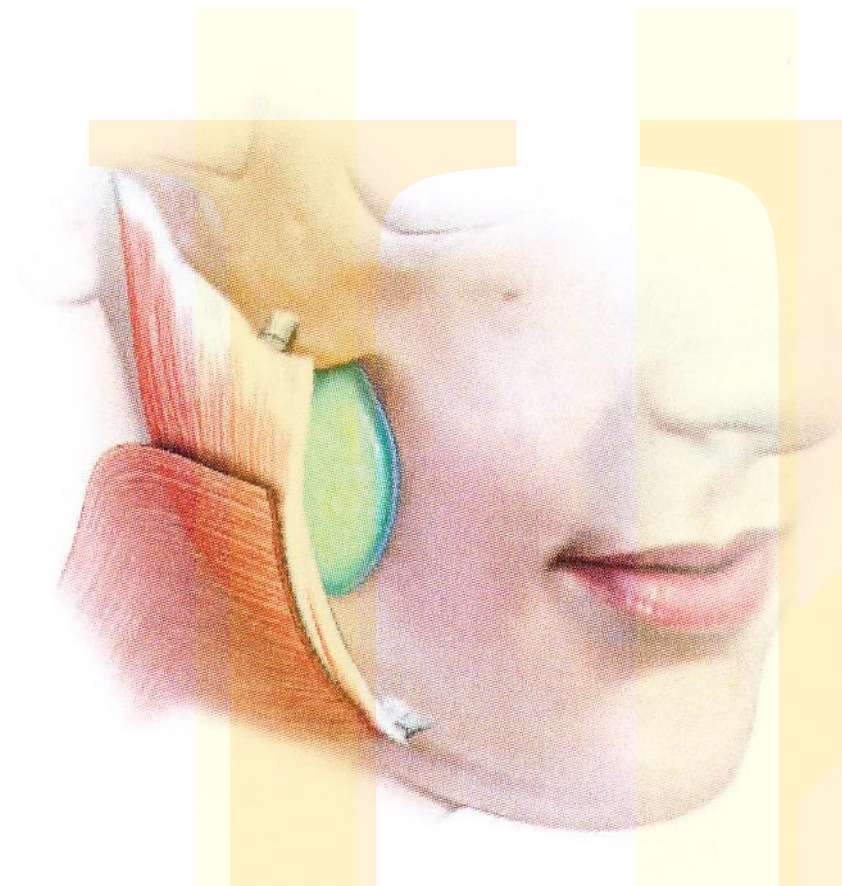
Sensitivita:

n. cervicalis transversus





A



B

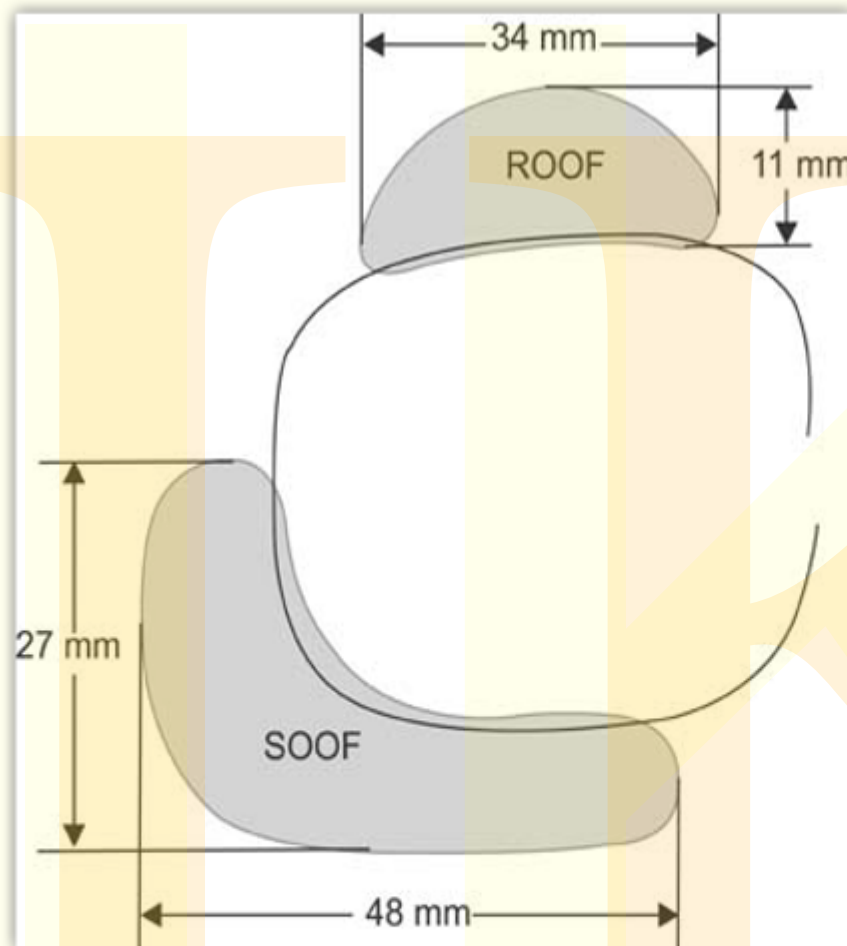


Fig. 4.3.3 The origin of the jowl with ageing and the changing relations of platysma and masseter. **A**, In youth, platysma, which forms the roof of the lower premasseteric space, is in close and tight relation to the anterior border of masseter via the vertical line of ligaments. **B**, The jowl develops as a result of the developing laxity and distension of the septa-like lower masseteric ligaments. This allows enlargement of the lower premasseteric space, specifically of its anterior and lower boundaries and the adjacent roof. This ligamentous weakness allows the inferior extent of the buccal fat pad to prolapse, which contributes fullness to the labiomandibular fold above the jowl.



SOOF

SMAS



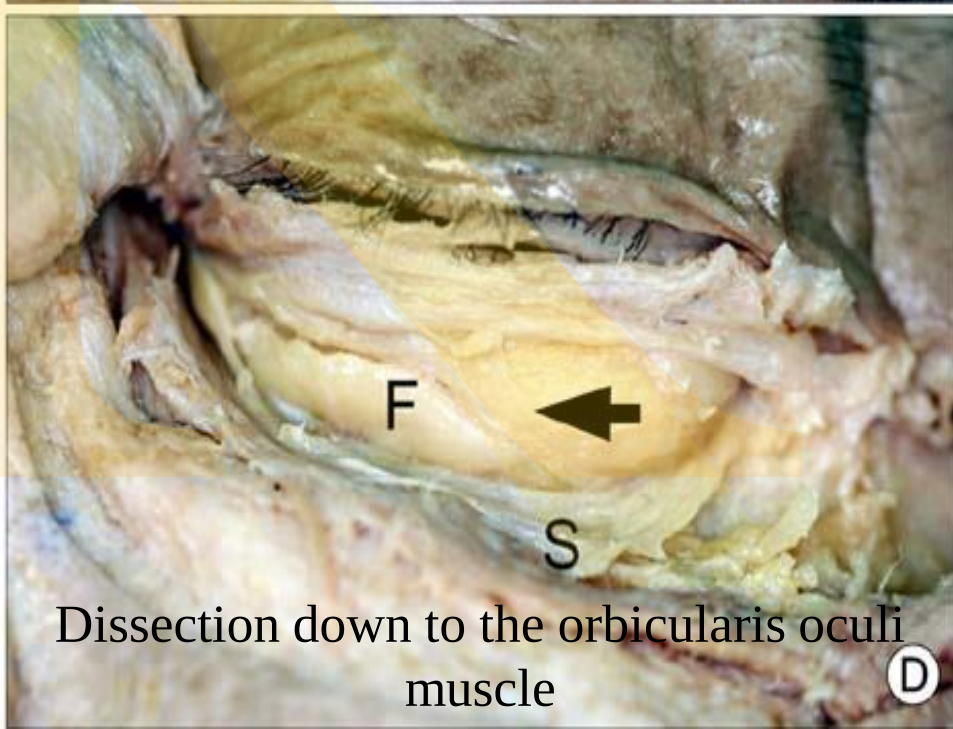
Suborbicularis oculi fat (SOOF) in the lower eyelid lies between the zygomatic bone and orbicularis oculi muscle

it can be located as a triangular bulk above insertion of the zygomaticus minor muscle; posteriorly covers beginning of the zygomatic major muscle and it is limited by ligaments called zygomatic ones.

Dimensions of the SOOF. The length of the SOOF horizontal part is almost equal to a transverse orbital dimension. The height of the SOOF vertical part was about three fourth ($\frac{3}{4}$) of the vertical orbital dimension and the width of the vertical part was one fourth ($\frac{1}{4}$) of a transverse orbital dimension (Hwang et al., 2007).

FIGURE 1

upper lid fold in Caucasians is approximately 8 to 11 mm. The lower lid crease is about 5 to 6 mm. The high point of the brow is directly superior to the lateral limbus. The distance from the supraorbital rim to the inferior aspect of the brow at the lateral limbus is about 10 mm in Caucasian women.



Svaly okolo nosu

❖ M. nasalis + přiřazená vlákna

- ❖ Od předního povrchu maxily do kořene nosu; pars transversa (constrictor) et pars alaris (dilatator)

❖ M. levator labii superioris alaequae nasi

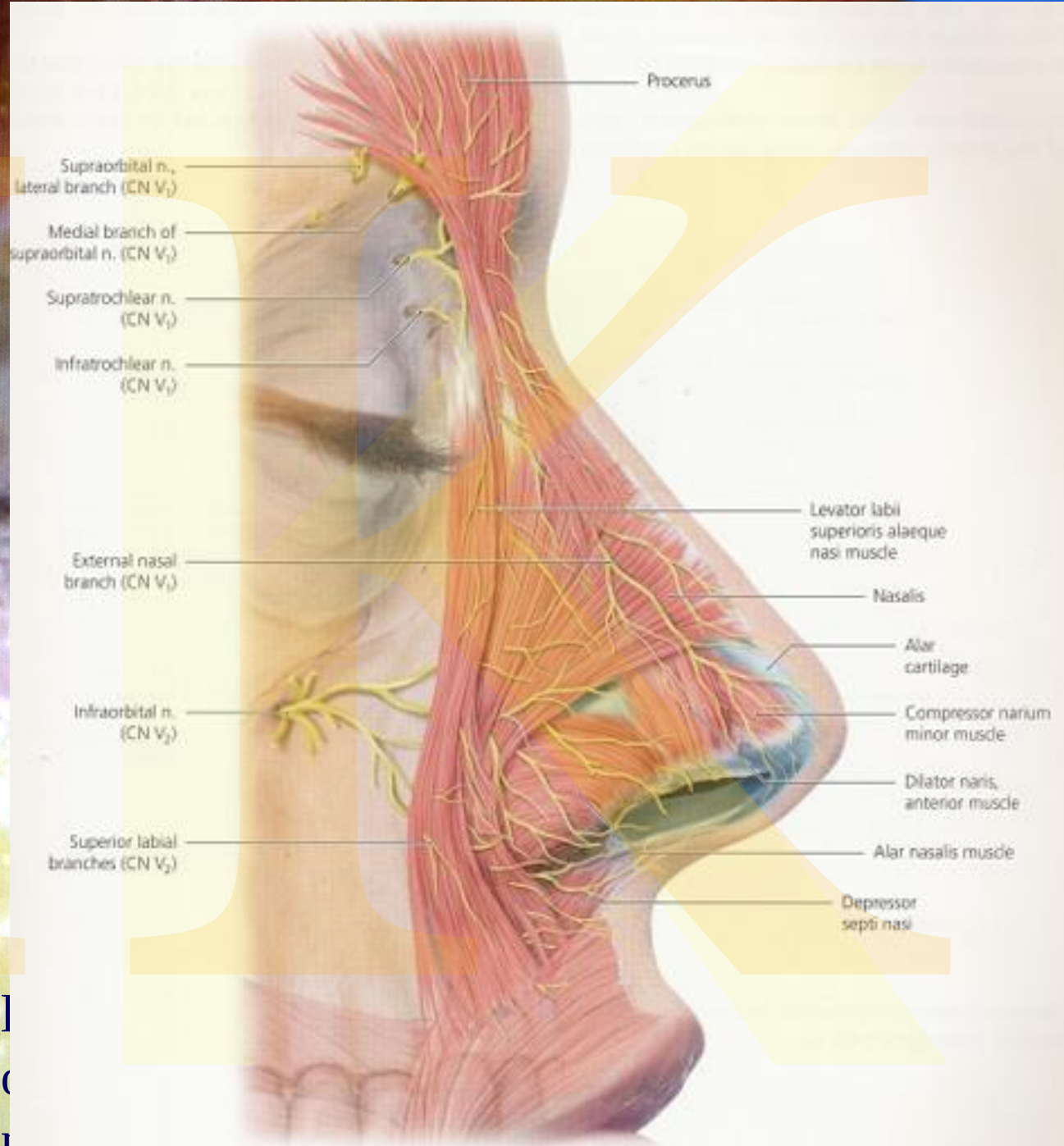
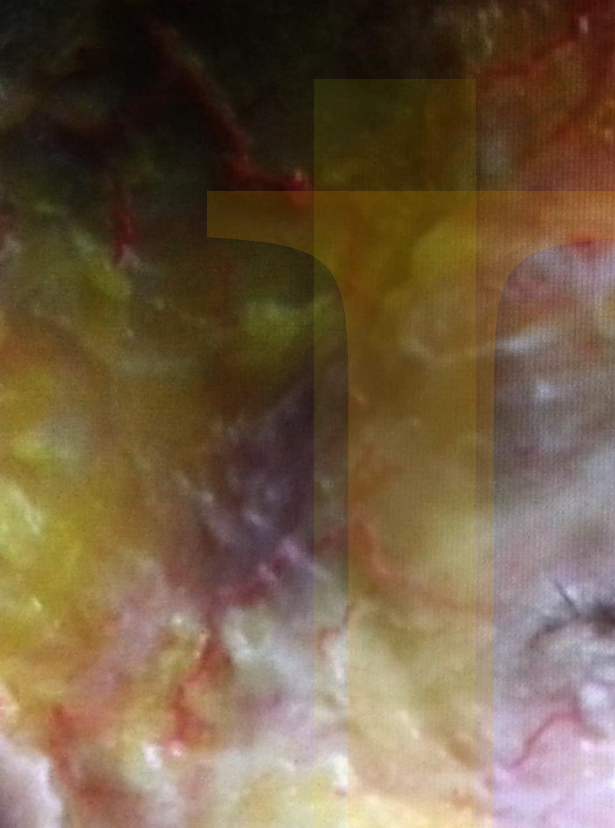
- ❖ Pars nasalis et pars labialis

❖ M. depressor septi nasi

- ❖ od předního povrchu maxily (fossa incisiva maxillae) do kořene nosu a glabelly

❖ M. procerus

- ❖ Od kořene nosu (aponeurosis septi nasi) do glabelly



M. levator labii superioris

- ❖ Below orbital margine
- ❖ To the skin following nasolabial groove

❖ M. zygomaticus minor

- ❖ Os zygomaticum
- ❖ To the distal area of the nasolabial groove

❖ M. zygomaticus major

- ❖ From the proc. zygomaticus ossis temporalis
- ❖ To skin of the oral angle or to the orbicularis oris muscle

M. levator labii superioris

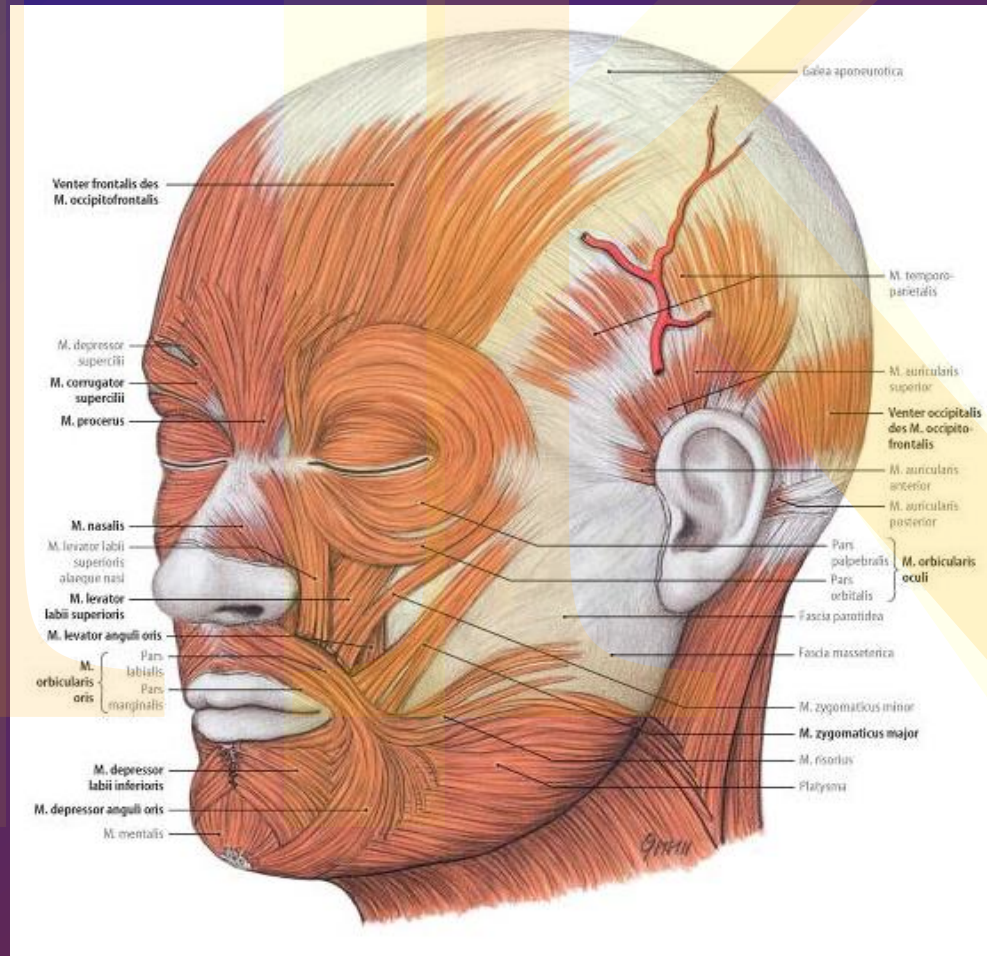
- ❖ Pod margo infraorbitalis
- ❖ Do kůže u sulcus nasolabialis

❖ M. zygomaticus minor

- ❖ Os zygomaticum
- ❖ K distálnímu okraji sulcus nasolabialis

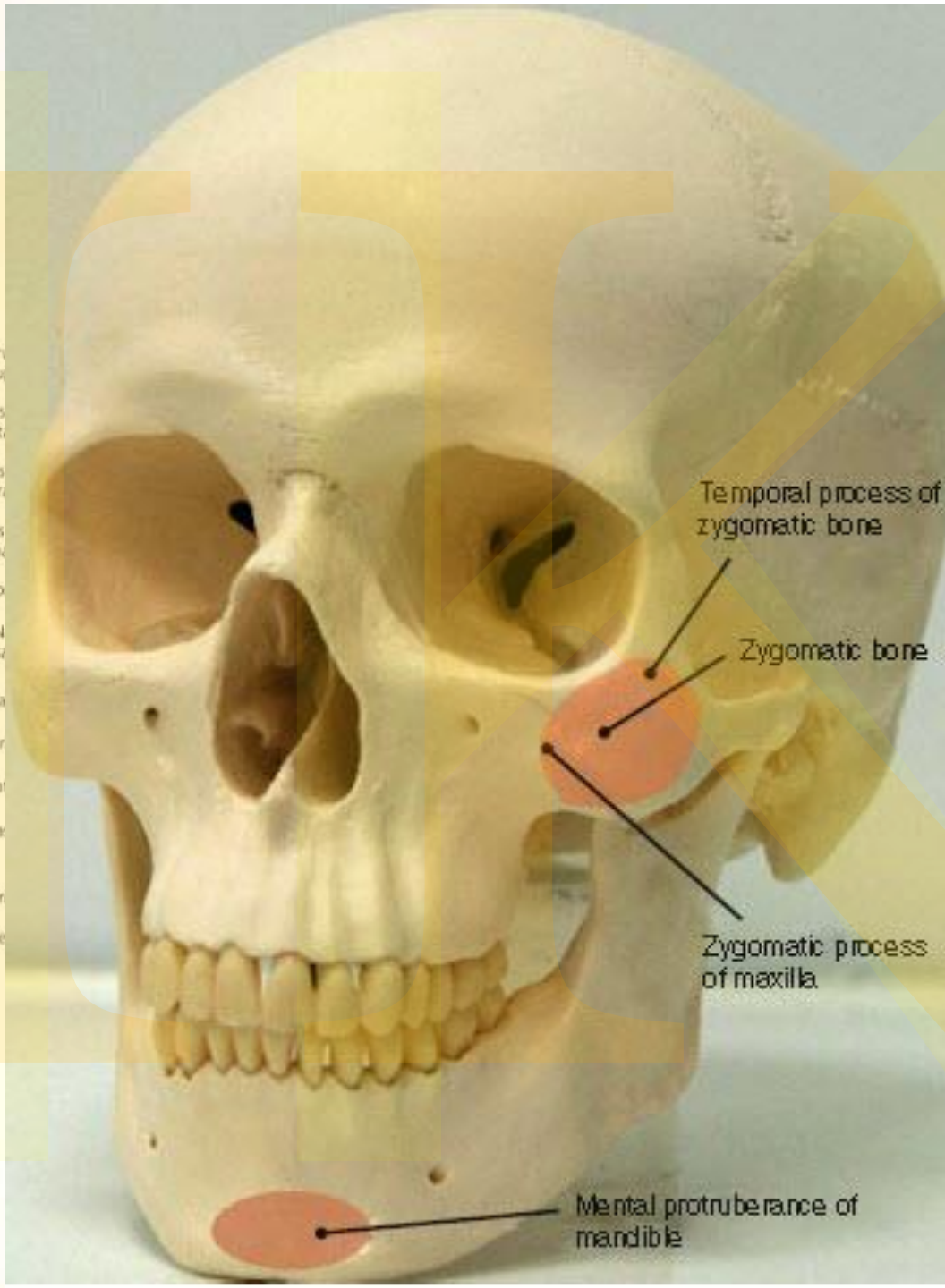
❖ M. zygomaticus major

- ❖ Od proc. zygomaticus ossis temporalis
- ❖ Do kůže a musculoaponeurotickéh o tělesa u koutku ústního (modiolus)



Cornu
 sulcus
 Orbicularis
 orbitae
 Orbicularis
 palpebrae
 Orbicularis
 lacrimalis
 Levator labii super-
 N
 transversa
 Nasalis, ala
 Orbicularis
 Depressor septi
 Mas
 Orbicularis
 Me

is
 r supercilii
 bii superioris
 asi muscle
 :us major
 :us minor
 nguli oris
 s
 r
 labii inferioris
 anguli oris

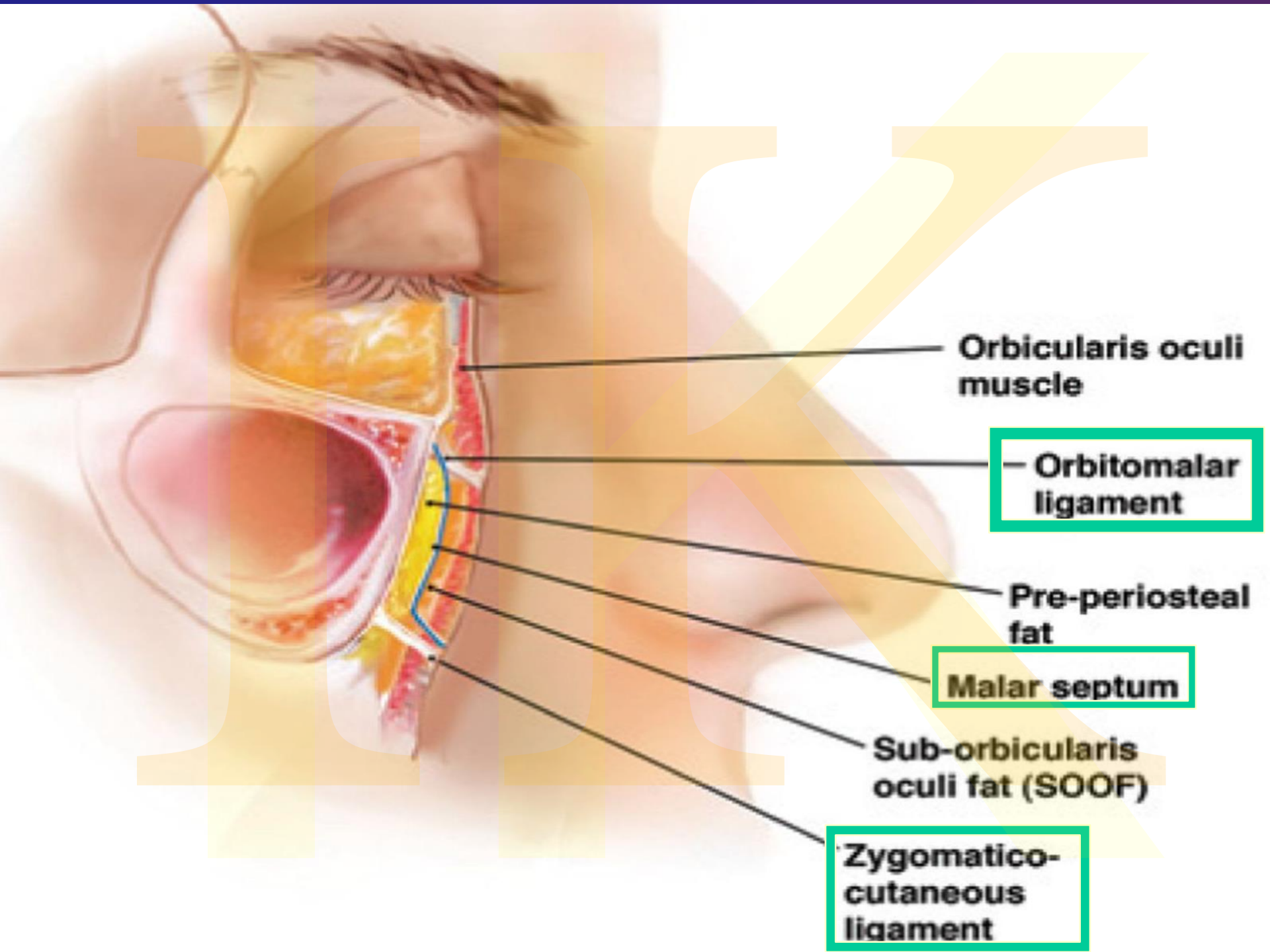


Temporal process of zygomatic bone

Zygomatic bone

Zygomatic process of maxilla

Mental protuberance of mandible



Orbicularis oculi muscle

Orbitomalar ligament

Pre-periosteal fat

Malar septum

Sub-orbicularis oculi fat (SOOF)

Zygomatico-cutaneous ligament

Face tvář

malar fat expansion



external malar pad

Vnější tvářové tukové těleso



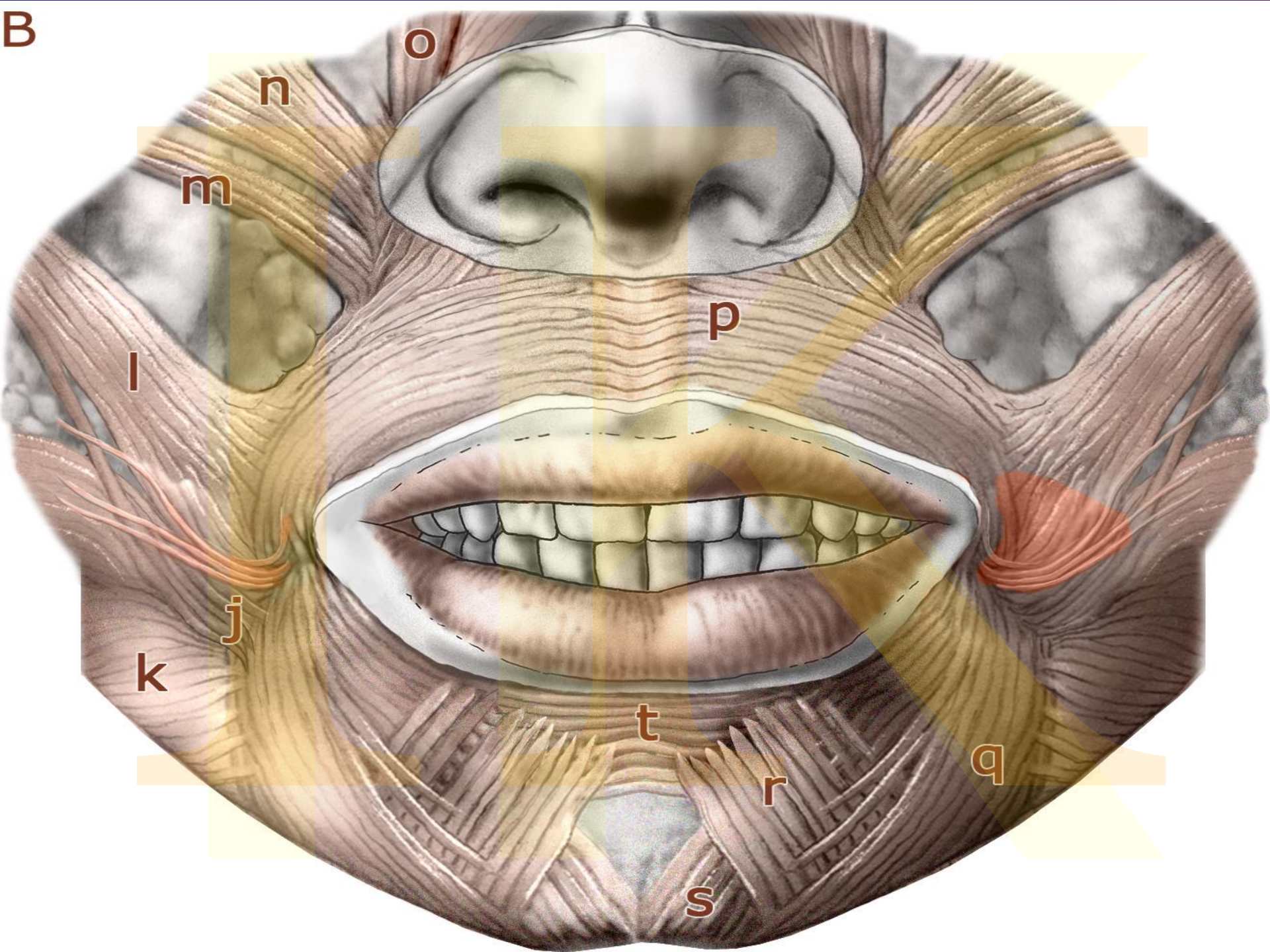
Zygomaticus major – varianty

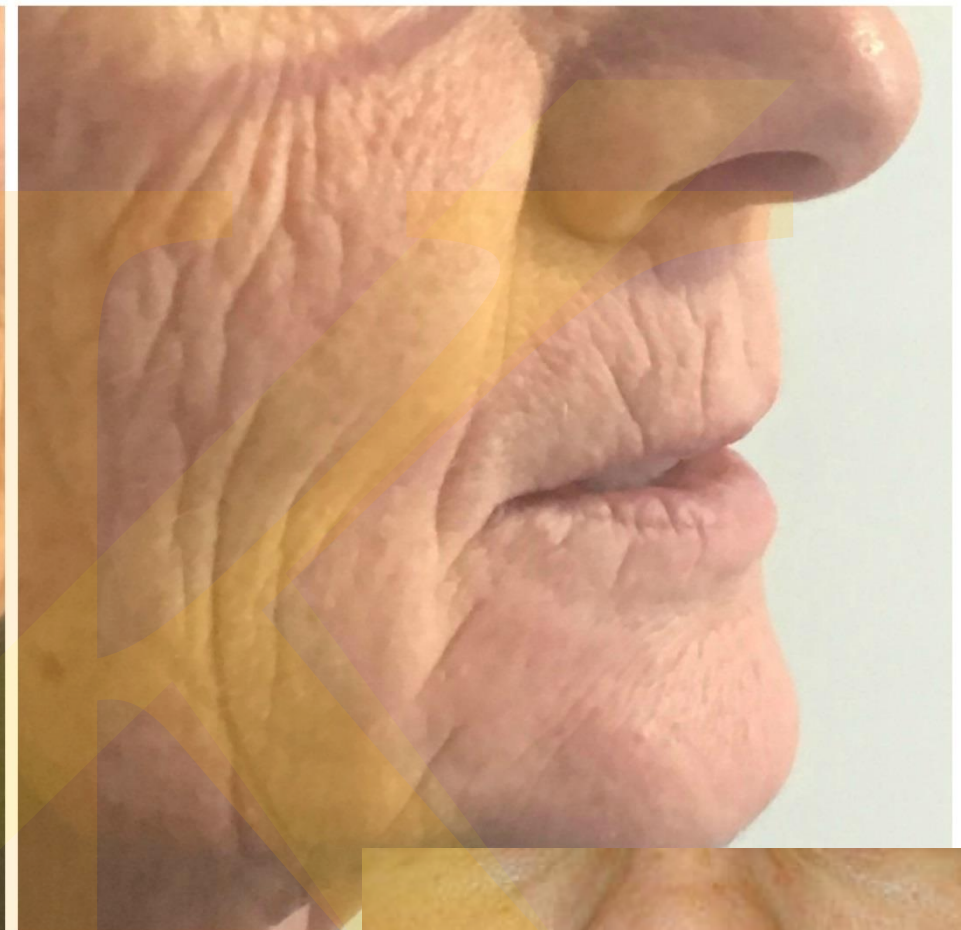
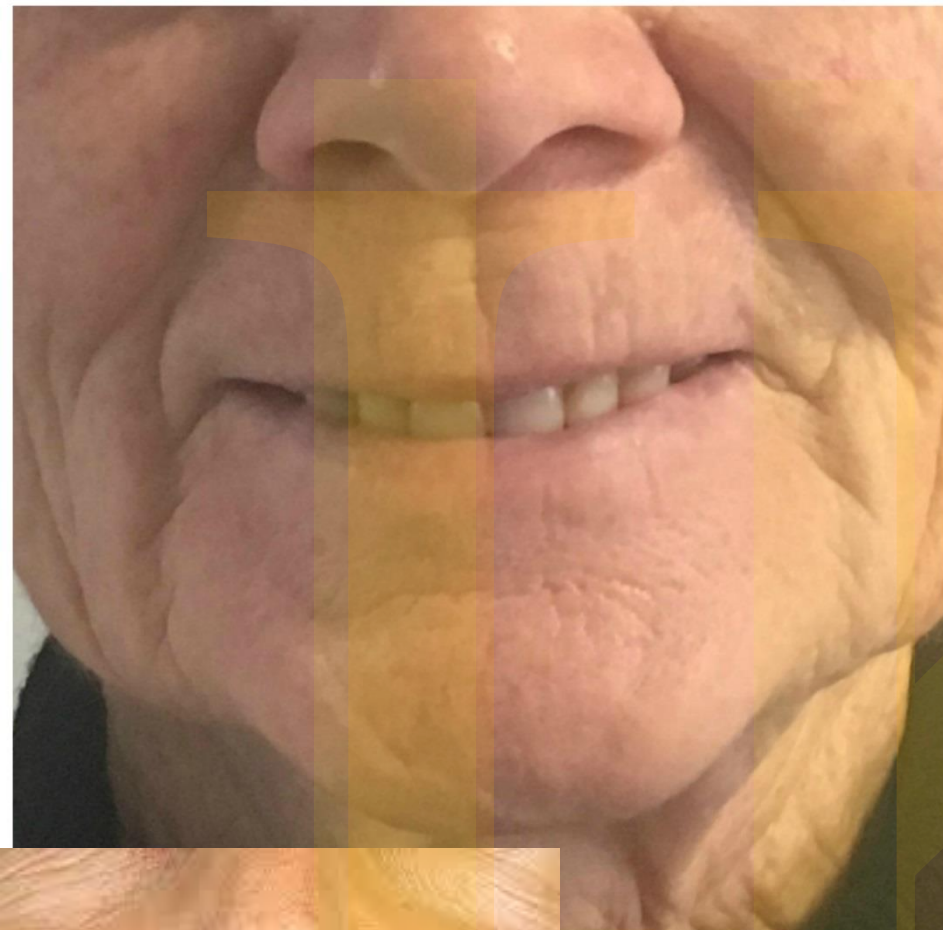
cca 12 mm

Duplicitní forma (zygomaticus duplex)
Někdy spojen s m. marginalis oculi

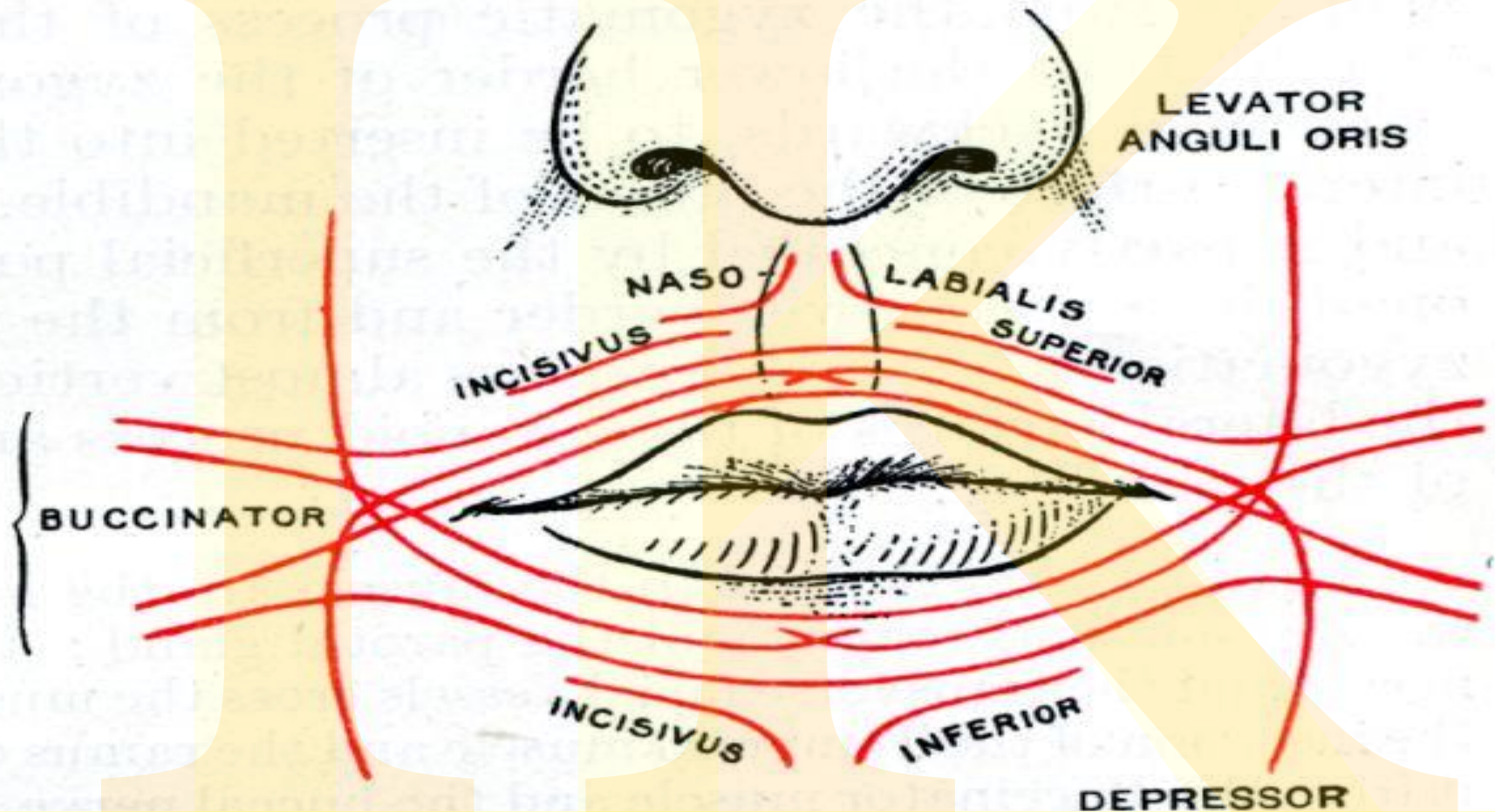


B

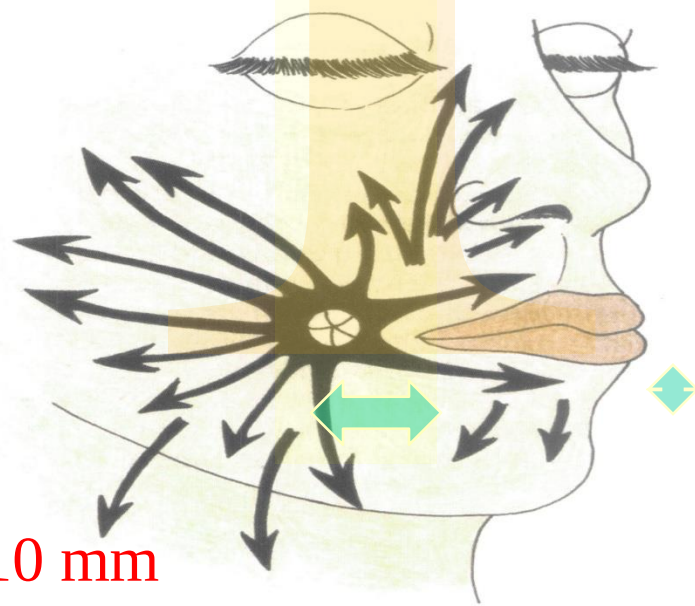
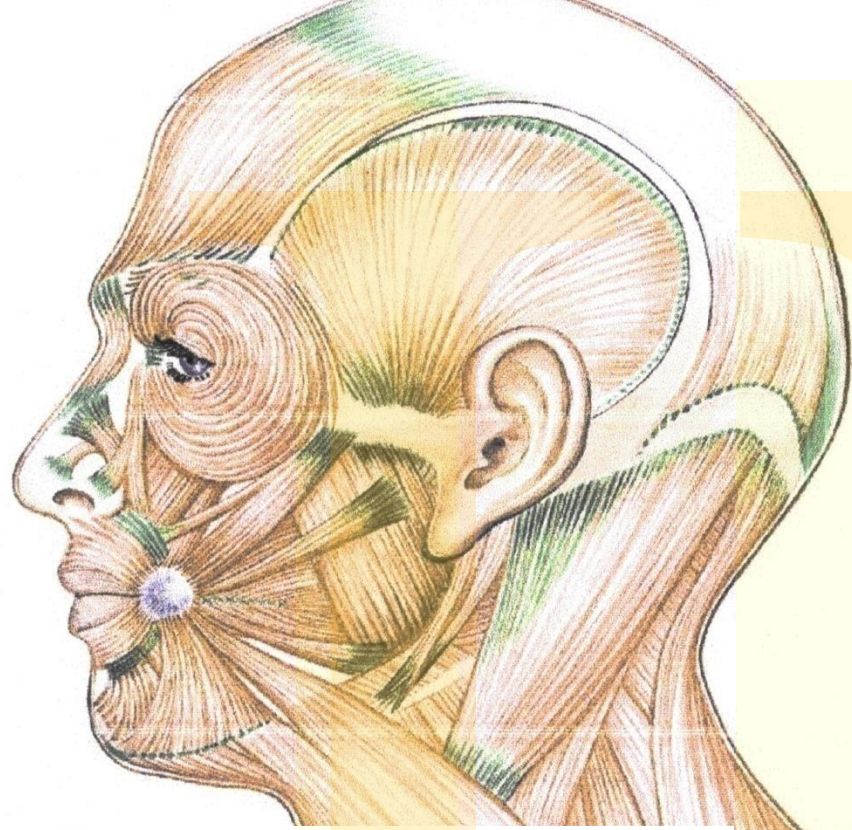




Trakční svaly: pars labialis m. levator labii superioris alaequae nasi, levator labii superioris, zygomaticus minor, depressor labii inferioris, pars labialis platysmatis
Kolmo se připojují do rtu (deprese, protrakce, everse)



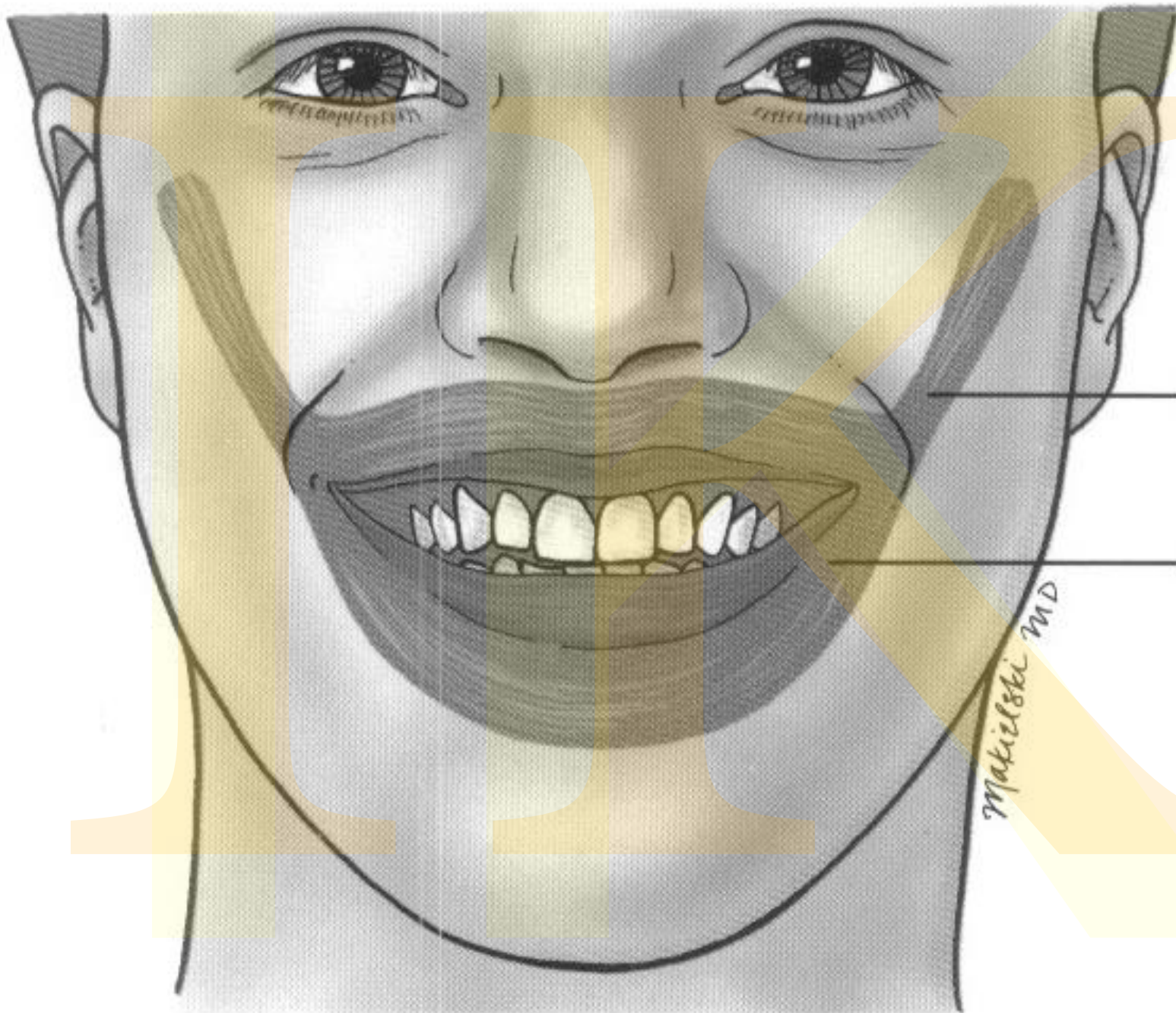
Svaly kolem koutku: m. levator anguli oris, depressor anguli oris, levator labii superioris, zygomaticus major, pars modiolaris platysmatis, buccinator, risorius, orbicularis oris, m. incisivus superior et m. incisivus inferior
Hýbou koutkem (elevace, deprese, konstrikce a dilatace rima oris)



5 mm

The modiolu
conelike stru
buccal muco
of the cone i

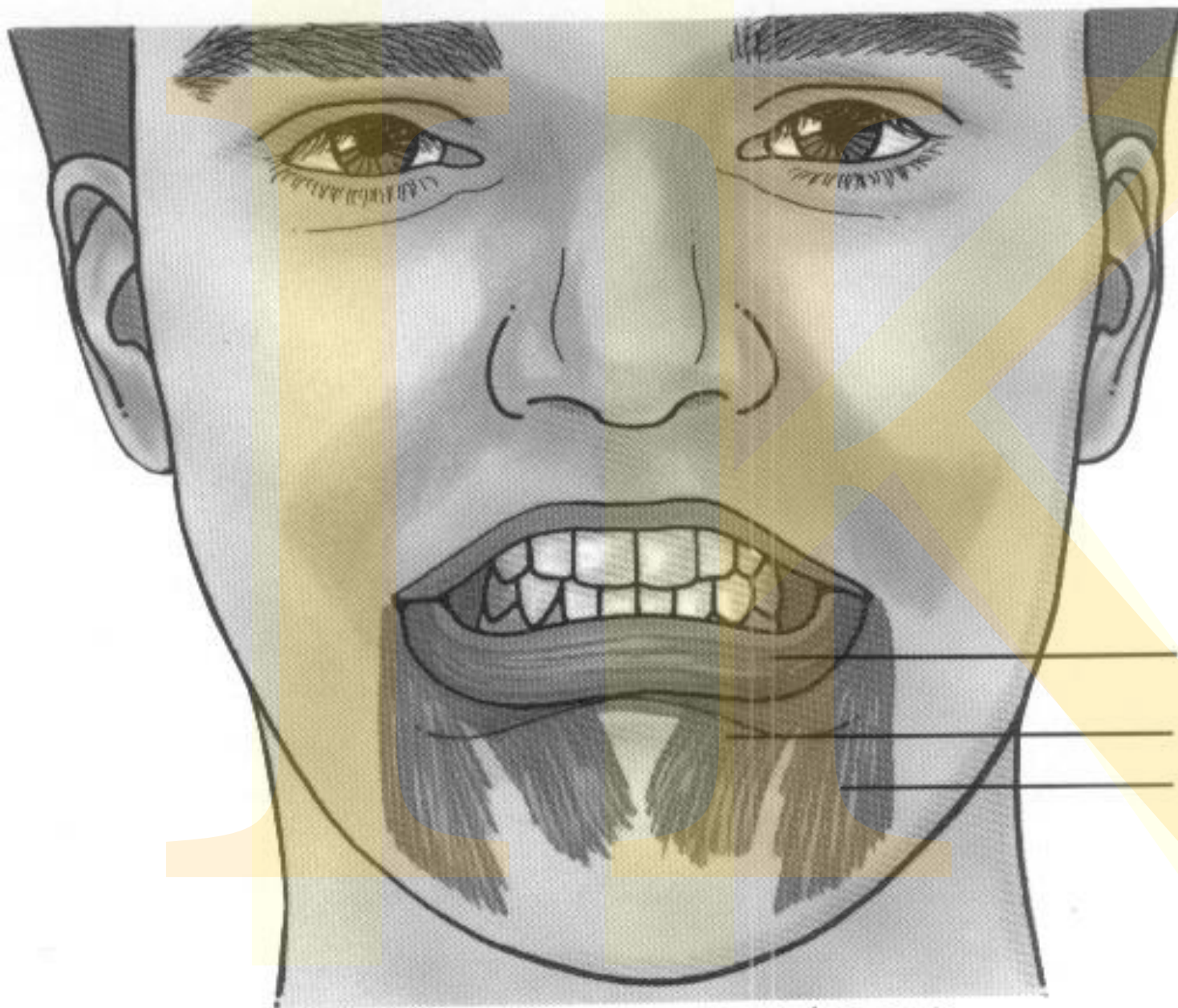
10 mm



Major zygo

Orbicularis

Makielski MD

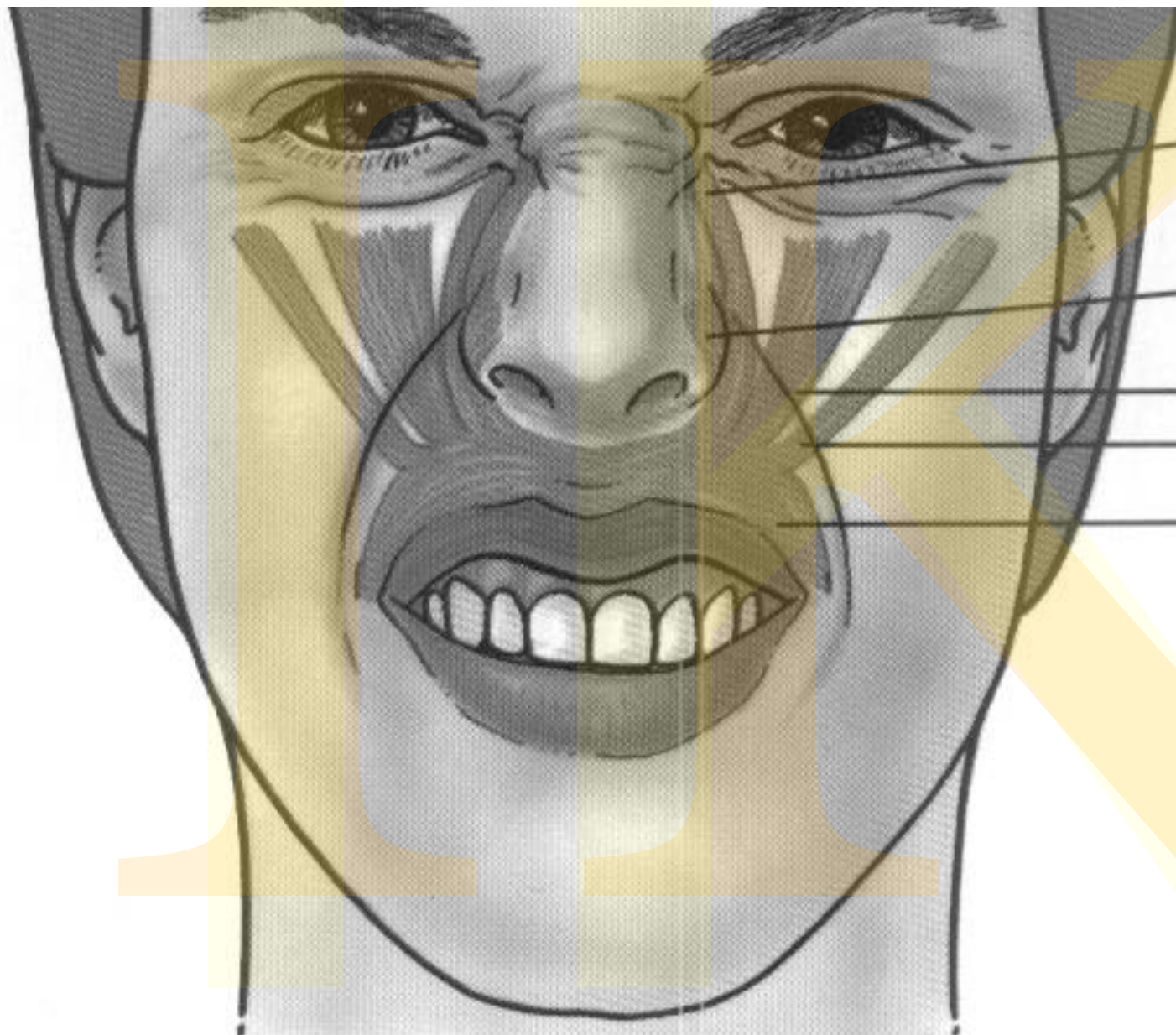


Orbicularis oris m.

Mentalis m.

Depressor anguli
oris m.

Makielski MD



Levator labii super
alaeque nasi m.

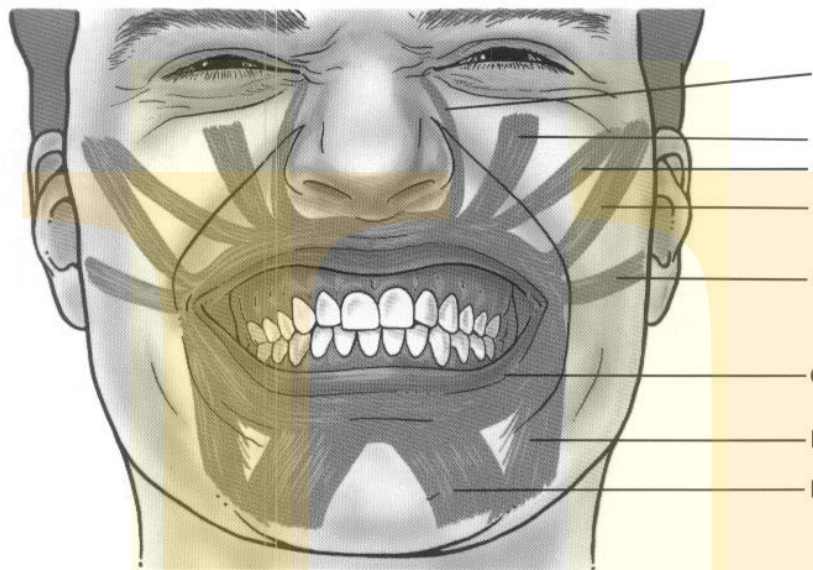
Dilator naris
Portion of nas

Levator labii m

Minor zygoma

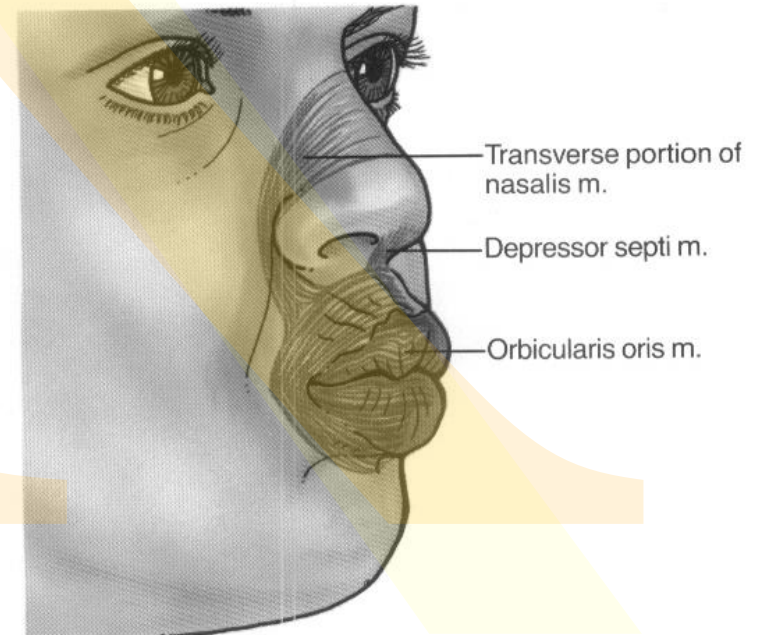
Orbicularis ori

Makielski MD



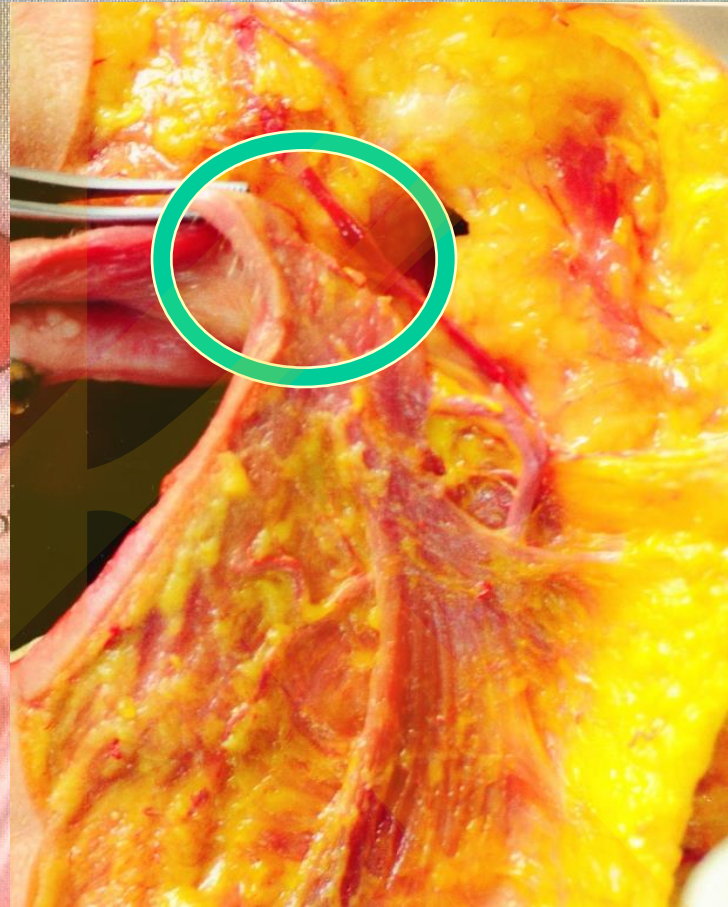
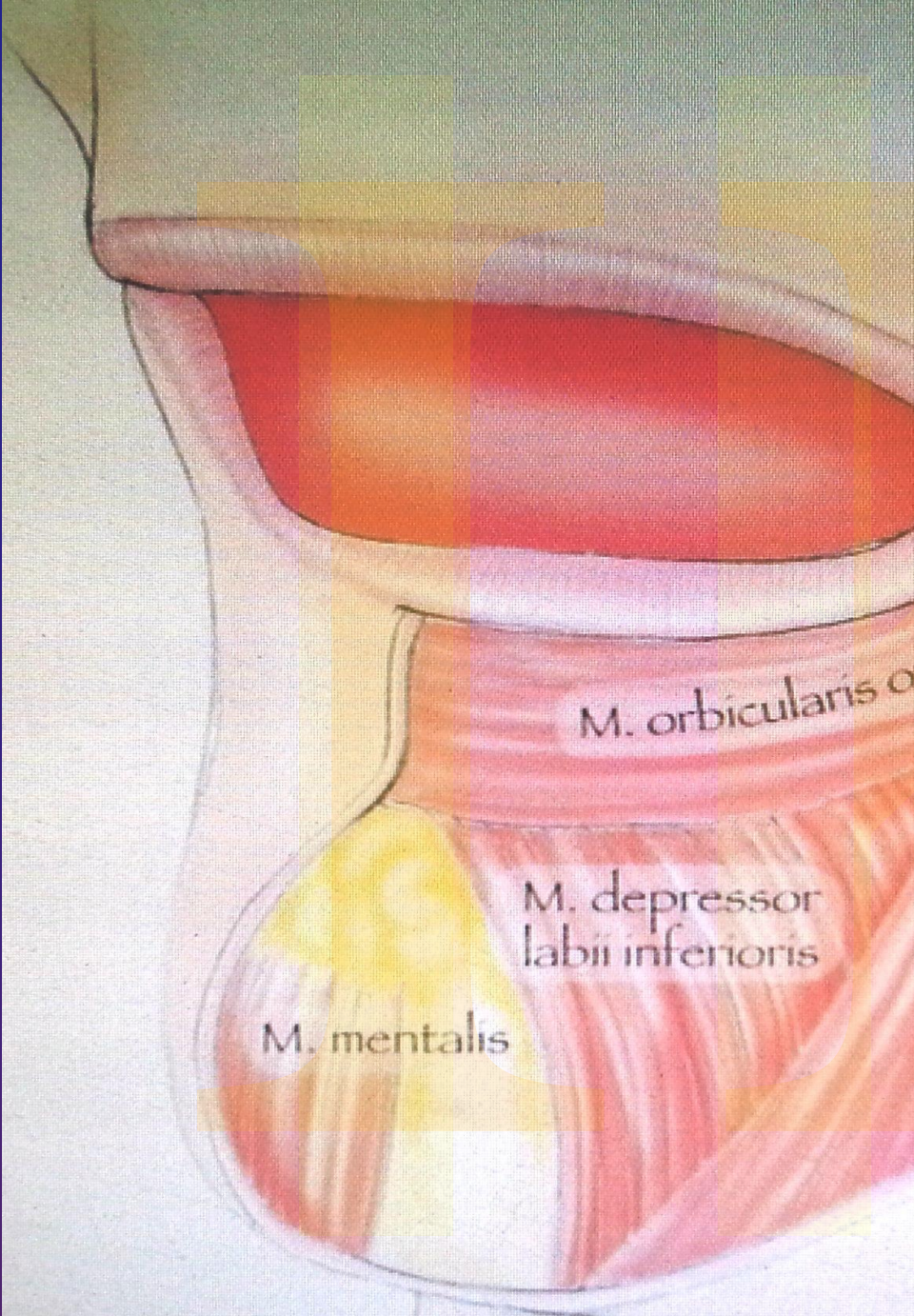
Makielski MD

FIG. 6.9. Musculature of the mouth and the lips. The multiple functions (suction, taste, speech, social expression) require a complex set of motions facilitated by the interplay between the circular contraction of the orbicularis oris and the radial elevators and depressors.



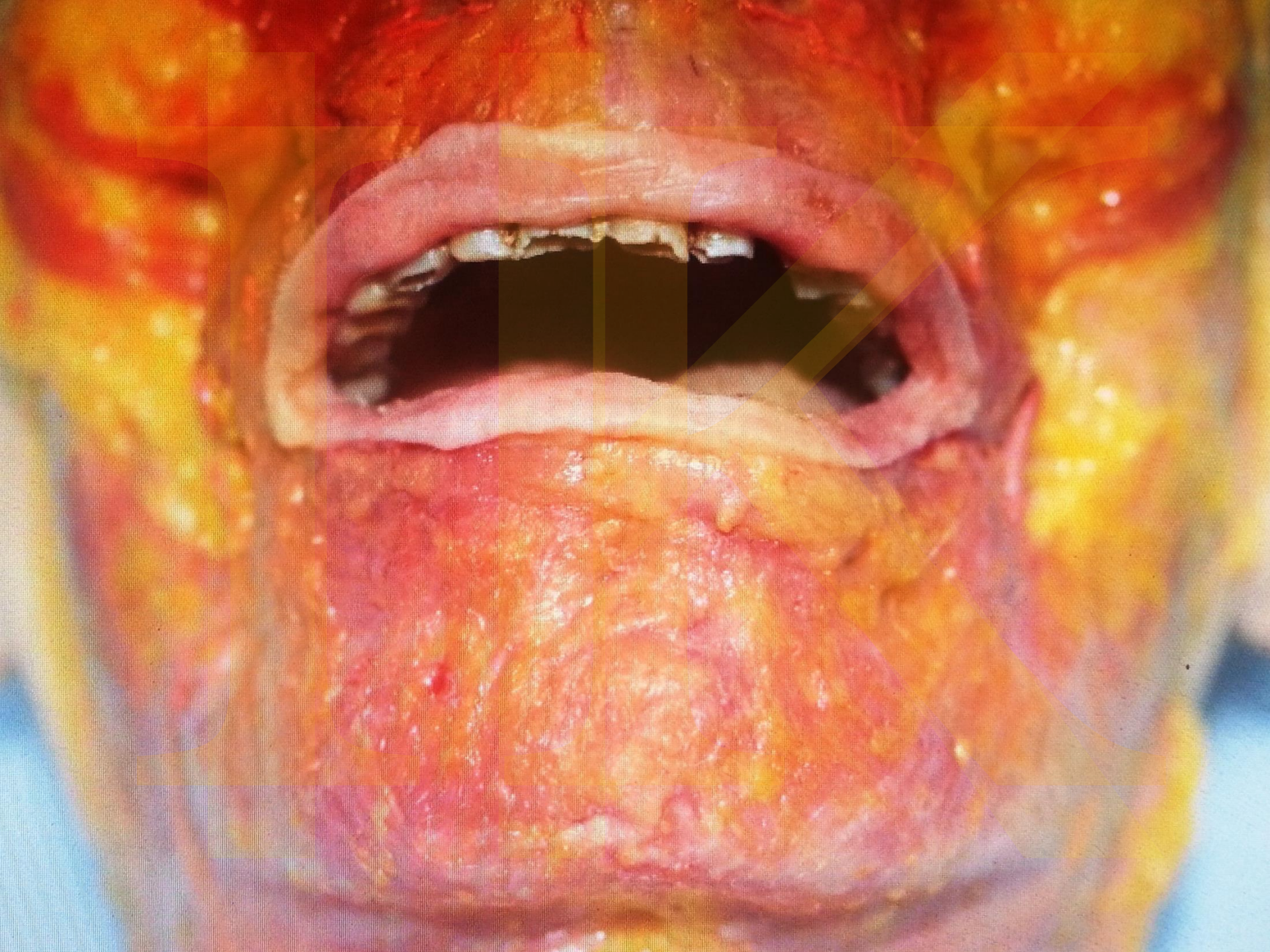
Makielski MD

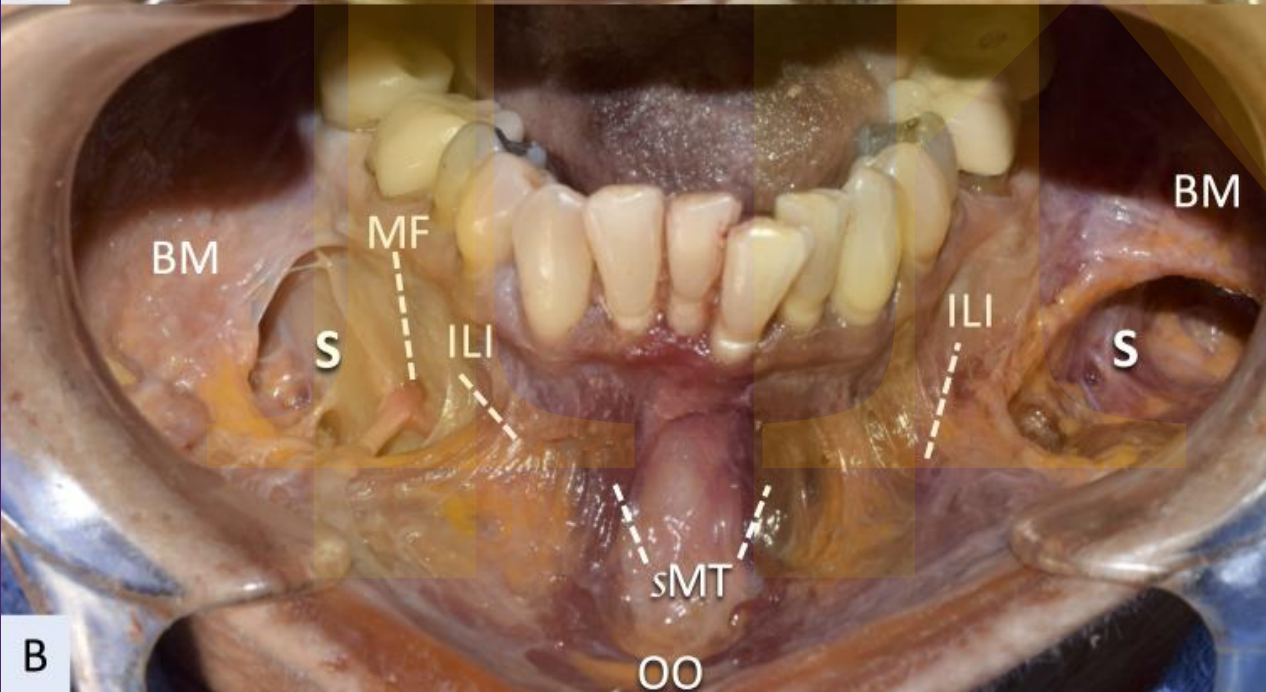
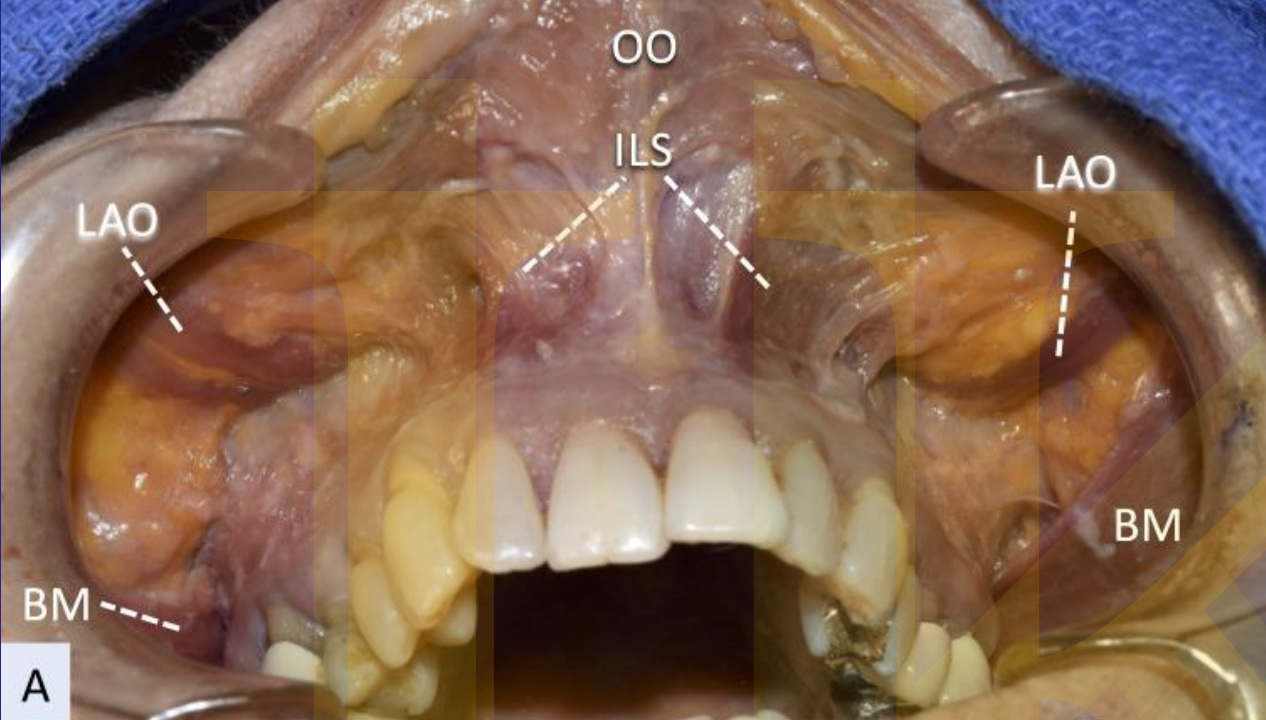
FIG. 6.8. Orbicularis oris and nasal musculature. The nasalis and the depressor septi muscles interdigitate with the orbicularis oris muscle. A strong depressor septi muscle depresses the nasal tip with smiling and can be interrupted during rhinoplasty surgery to decrease active tip rotation.



s major

s



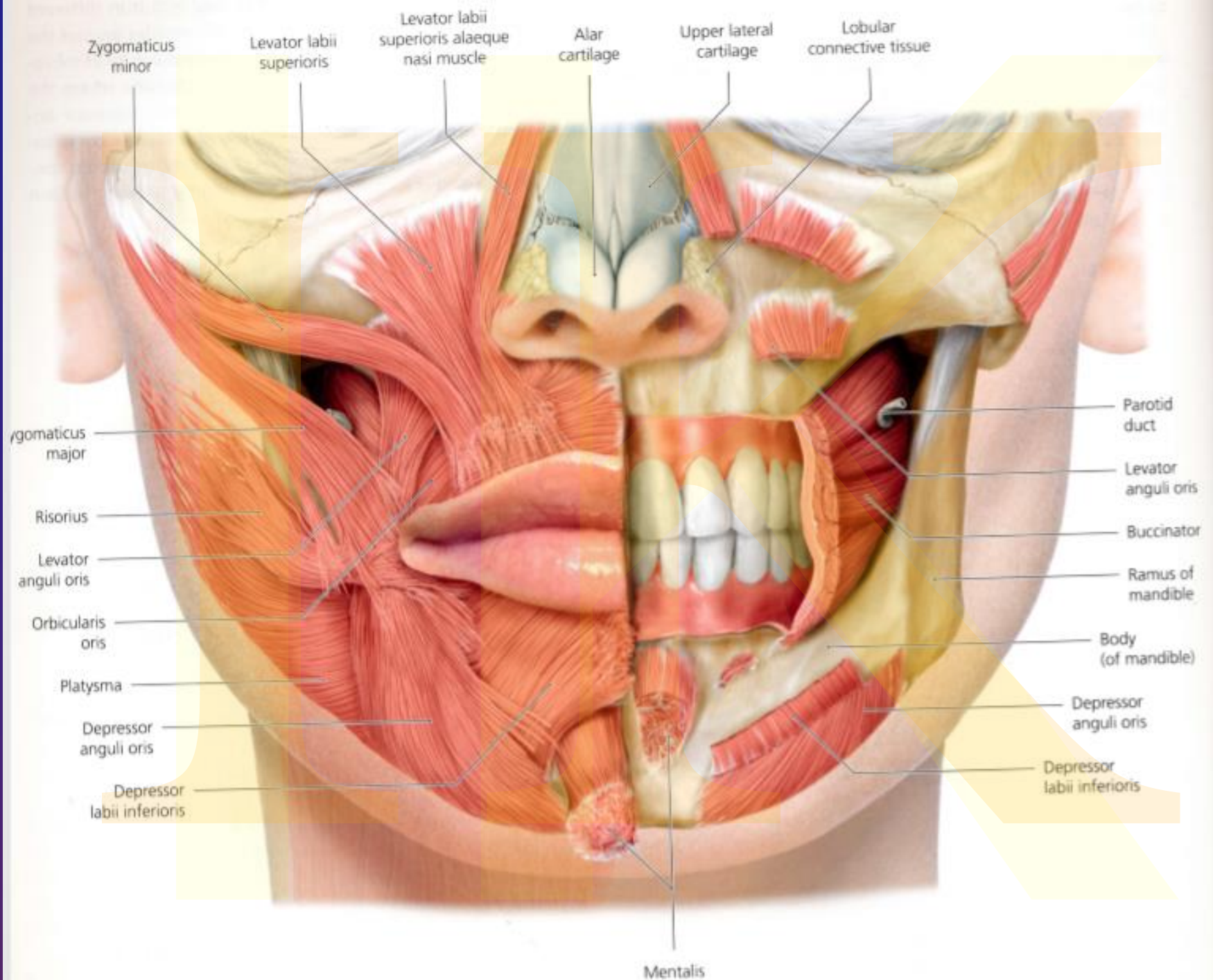


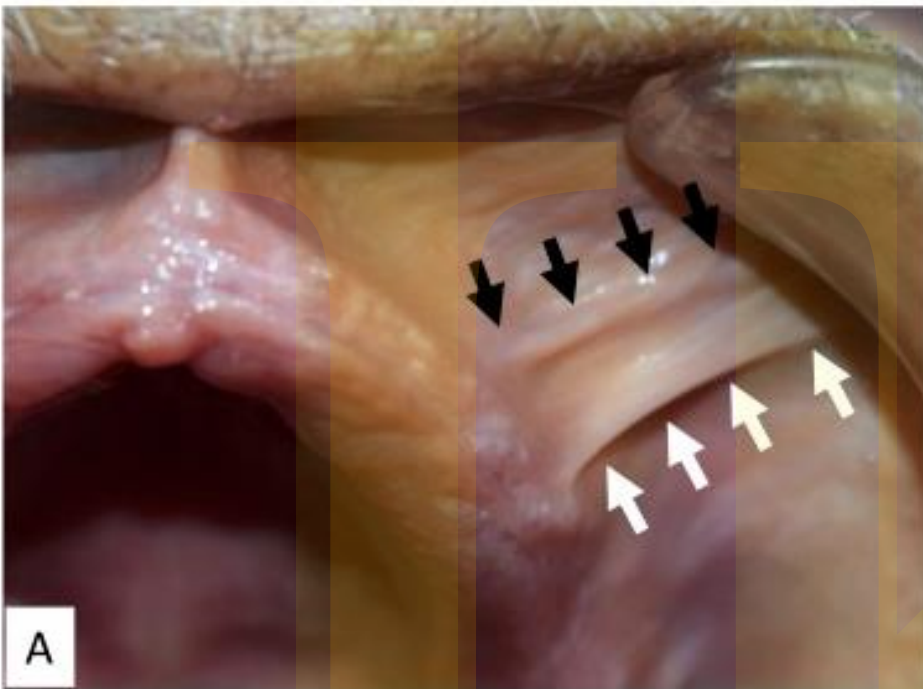
intraoral dissection of the mimetic muscles using a fresh cadaver

A: maxilla

B: mandible

BM; buccinator, ILI; incisivus labii inferioris, ILS; incisivus labii superioris, LAO; levator anguli oris, MF; mental foramen, OO; orbicularis oris, S; buccomandibular space, sMT; superior portion of the mentalis





Buccal frenulum of the left maxilla

A: Before the removal of the mucosa

B: After the removal of the mucosa

Black arrows: lateral border of the incisivus labii superioris (ILS),
white arrows: anterior border of the buccinator

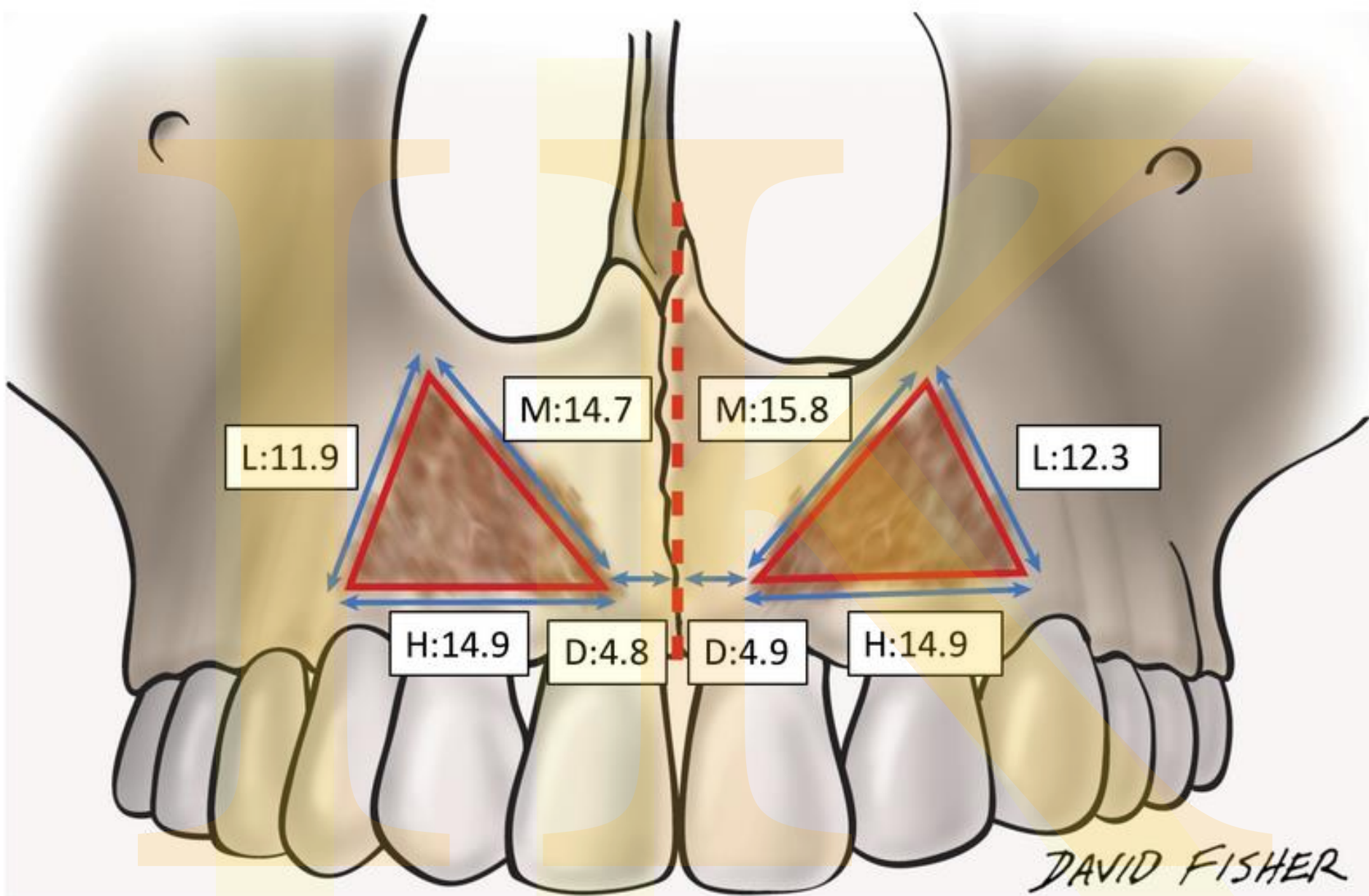
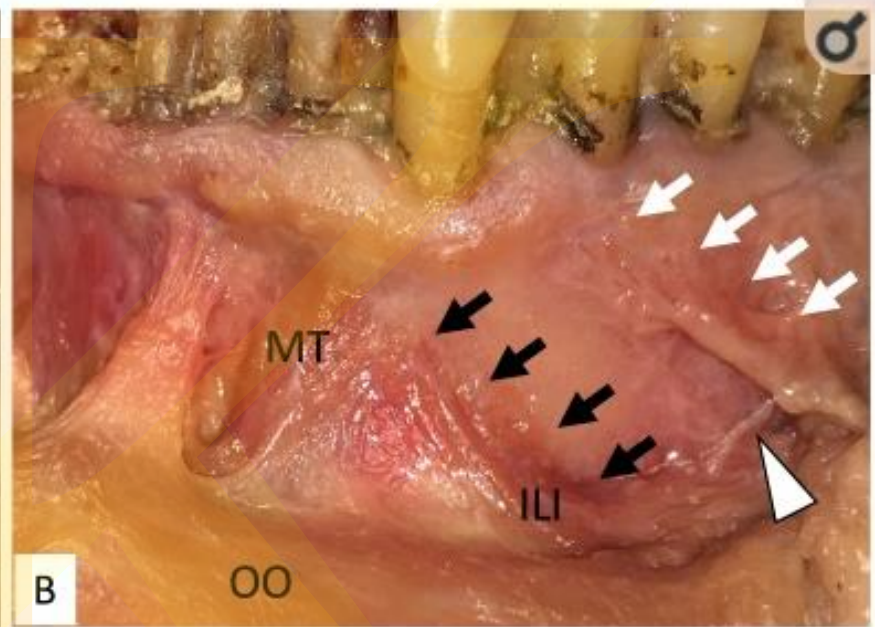


Figure 7: The measurement of the distance and circumference of the bony attachment. D: the distance from mid-line to innermost part of the bony attachment, H: length of horizontal part, L: length of lateral part, M: length of medial part (mm).

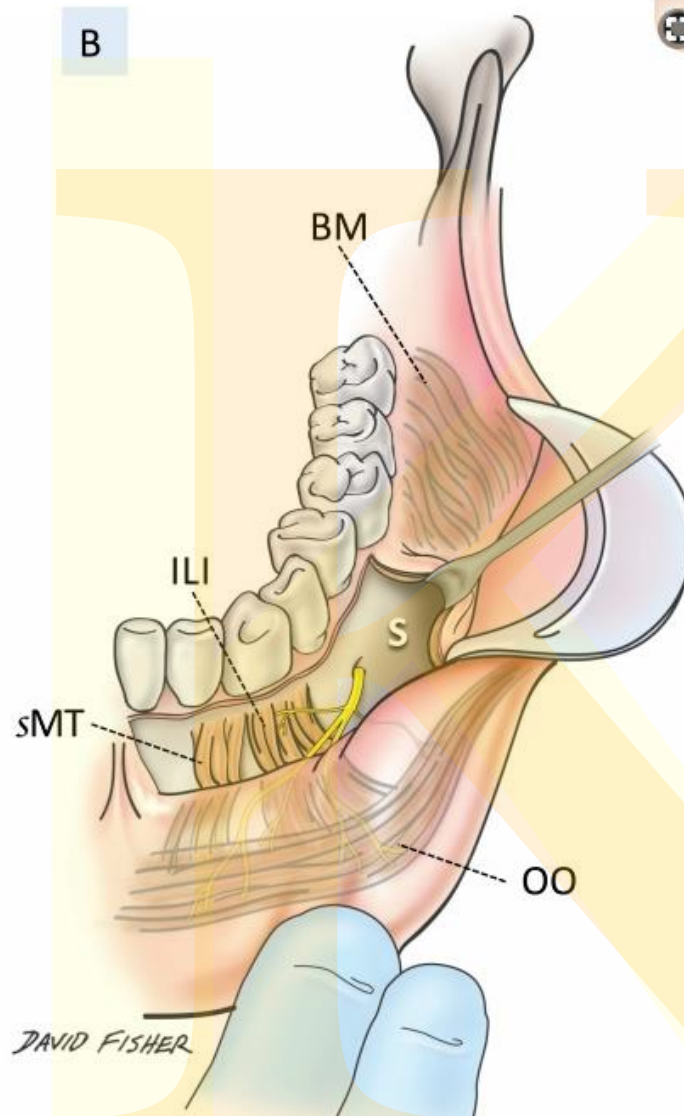
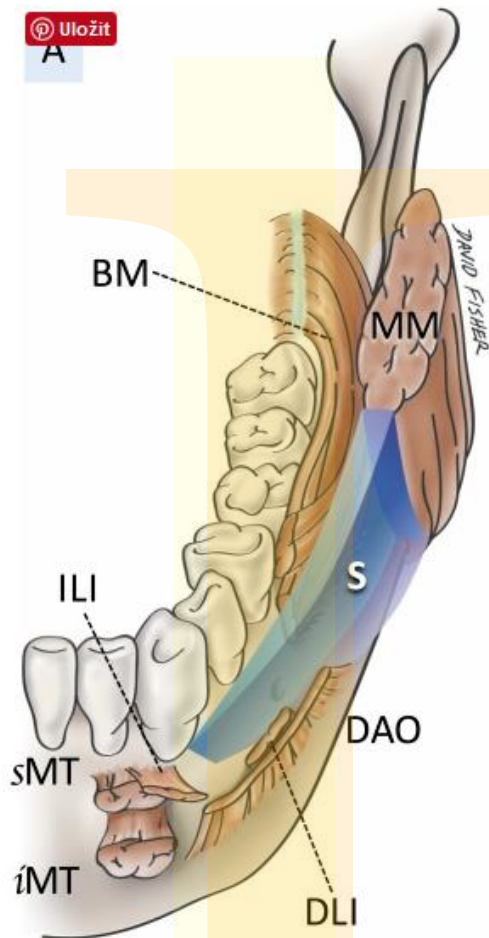


Buccal frenulum of the left mandible

A: Before the removal of the mucosa

B: After the removal of the mucosa (the MT and connective tissue underneath the lower labial frenulum have been separated)

Black arrows: lateral border of the upper part of the MT and ILI, white arrows: anterior border of the buccinator, arrowhead: mental foramen, ILI: incisivus labii inferioris muscle, MT: mentalis, OO: orbicularis oris

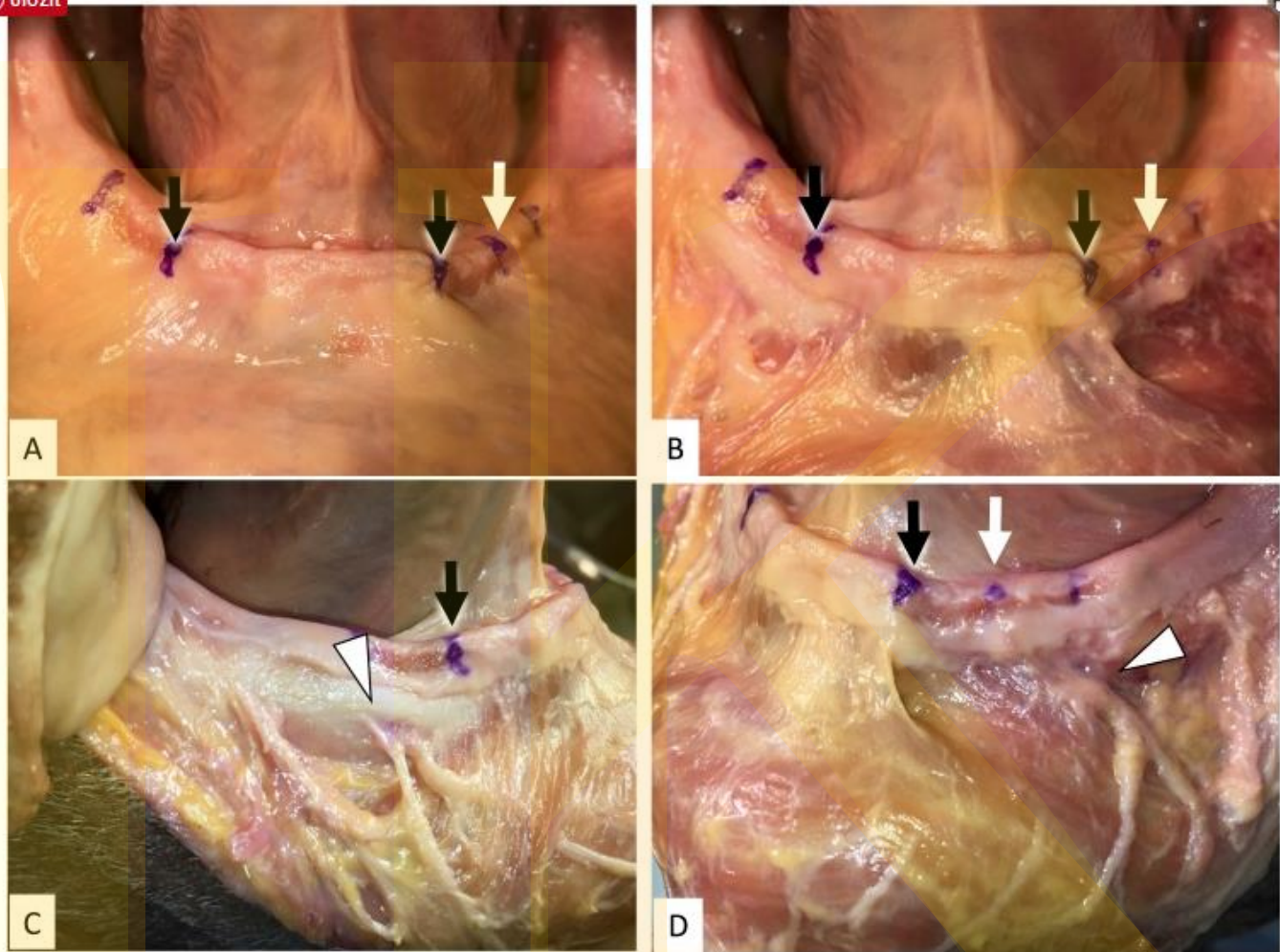


Schematic drawing of the buccomandibular space

A: boundary of the buccomandibular space

B: intraoral observation of the buccomandibular space

BM; buccinator, DAO; depressor anguli oris, DLI; depressor labii inferioris, ILI; incisus labii inferioris, MM; masseter muscle, MT; (inferior and superior portion of the) mentalis OO; orbicularis oris, PM; platysma, S; buccomandibular space



Second buccal frenulum of the mandible

A: Before the removal of the mucosa

B: After the removal of the mucosa

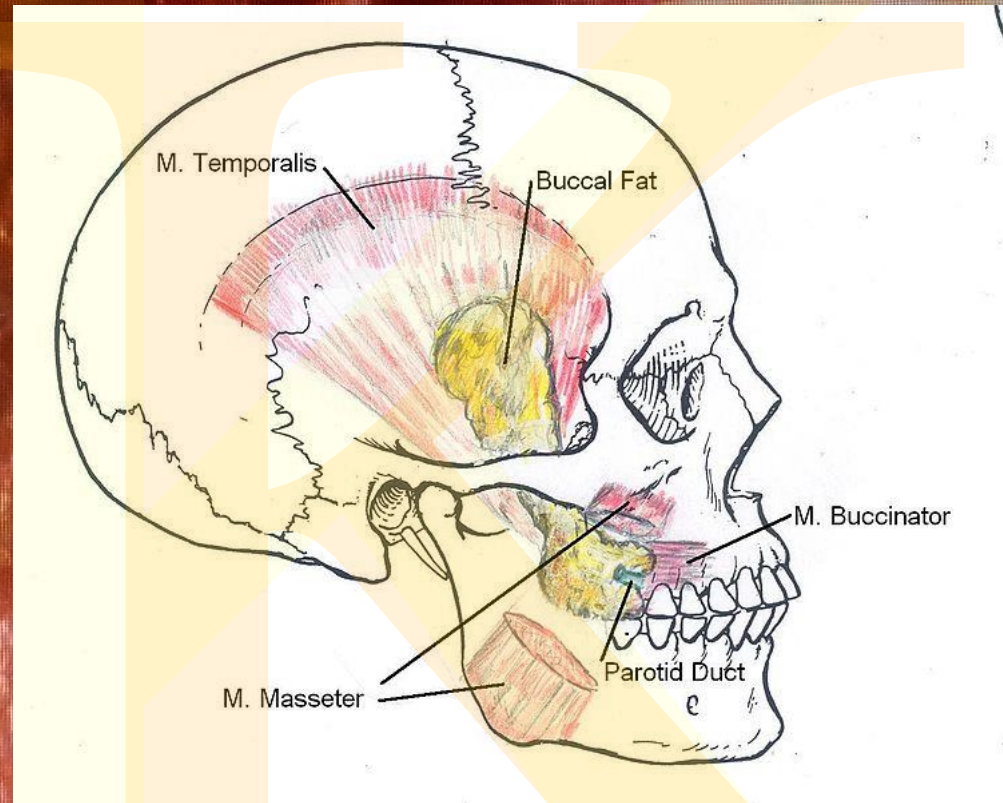
C: Lateral view (right) of the buccal frenulum of the mandible

D: Lateral view (left) of the buccal frenulum of the mandible; note that the white arrow indicates the second buccal frenulum

Black arrows: lateral border of the upper part of the mentalis, white arrows: lateral border of the ILI, arrowhead: mental foramen

Face

Hluboké tukové těleso



internal fat pad - Bichatův polštář

Marie François Xavier Bichat
1771-1802



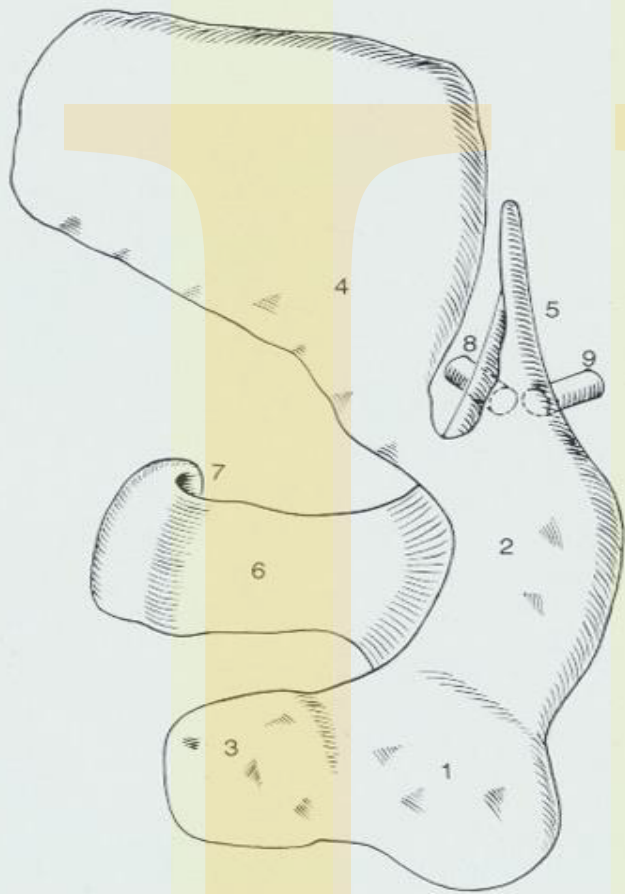


Fig. 115a The buccal fat pad and its processes (after Kahn, Sick, and Koritké 1988 after Bichat 1901)

- 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

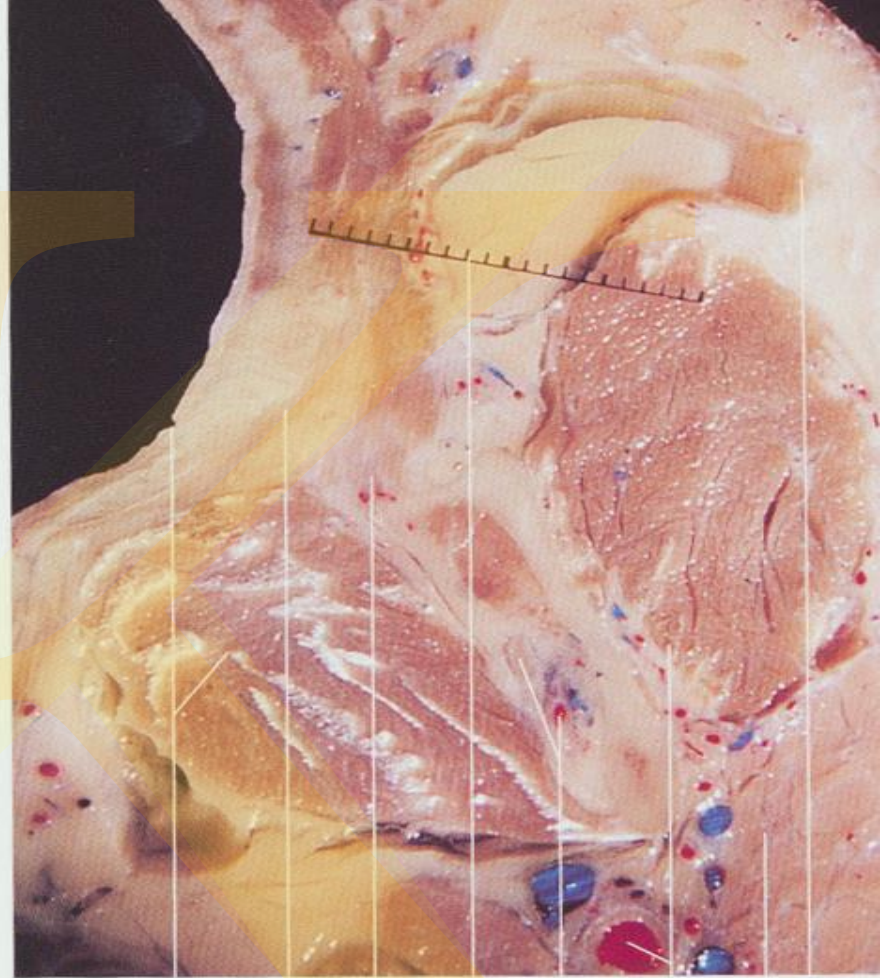


Fig. 115b Buccal fat pad in a 67-year-old man

- 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

Buccal fat pad

Sublevator extension

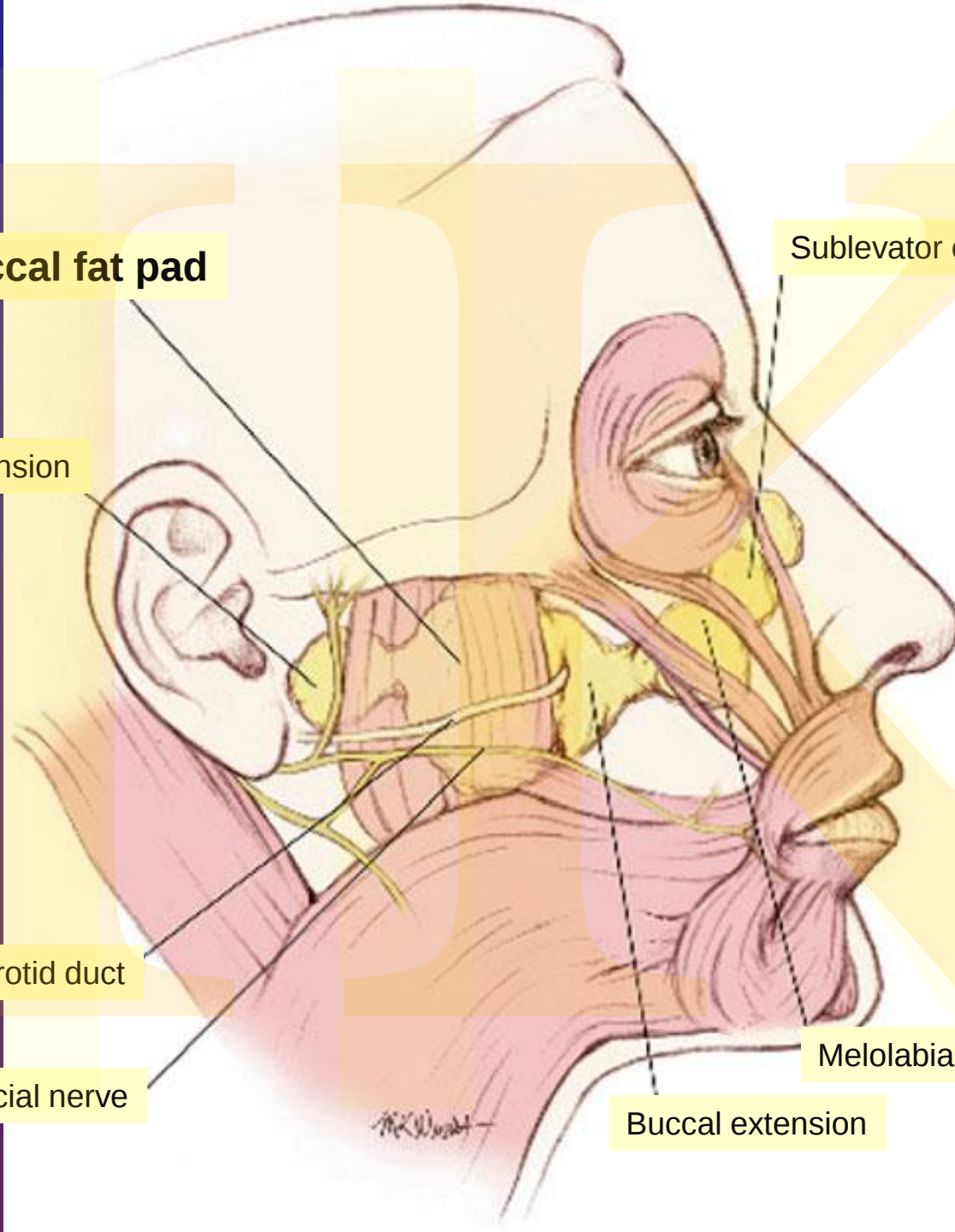
Pterygoid extension

Parotid duct

Facial nerve

Melolabial extension

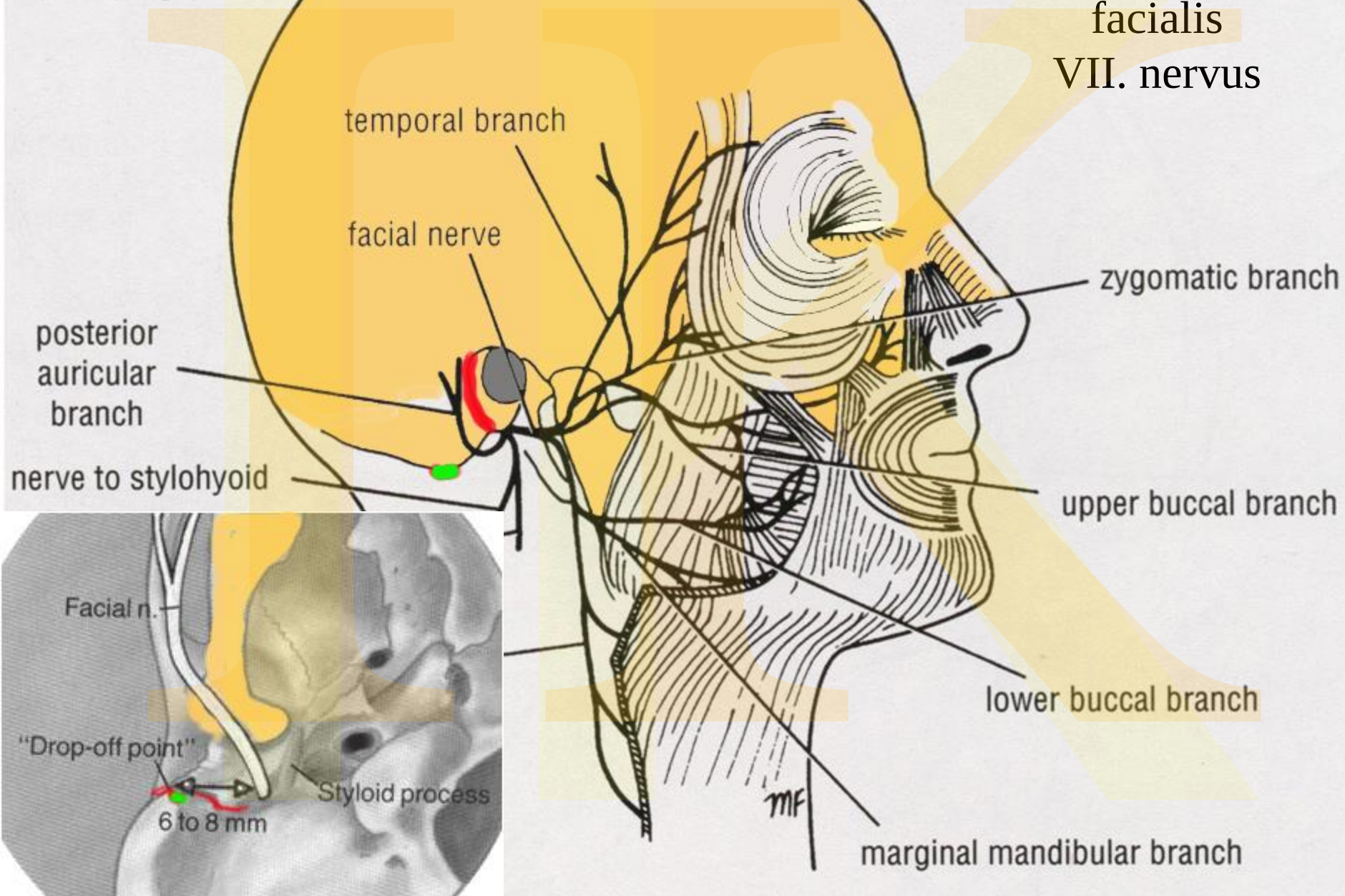
Buccal extension



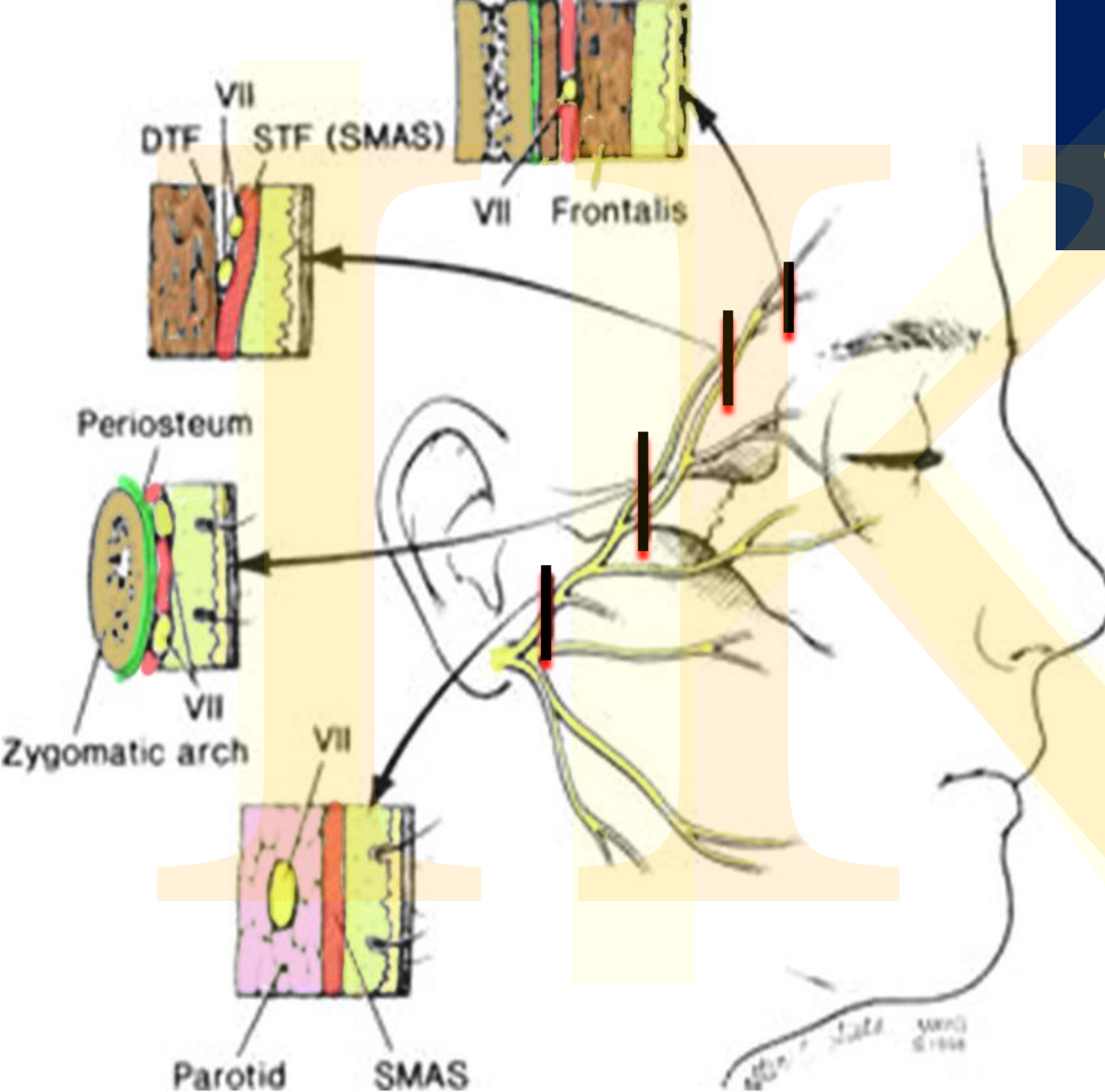
sutura tympanomastoidea

“drop off point -
nejvíce vystupující bod“

Motorická
inervace z nervus
facialis
VII. nervus



Vztah n. VII ke **SMAS** CN VII relation to **SMAS**



kůže skin
musculus muscle
-----*

kůže skin

*
musculus muscle

kůže skin
-----*
kost bone

kůže skin

parotis * parotid

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

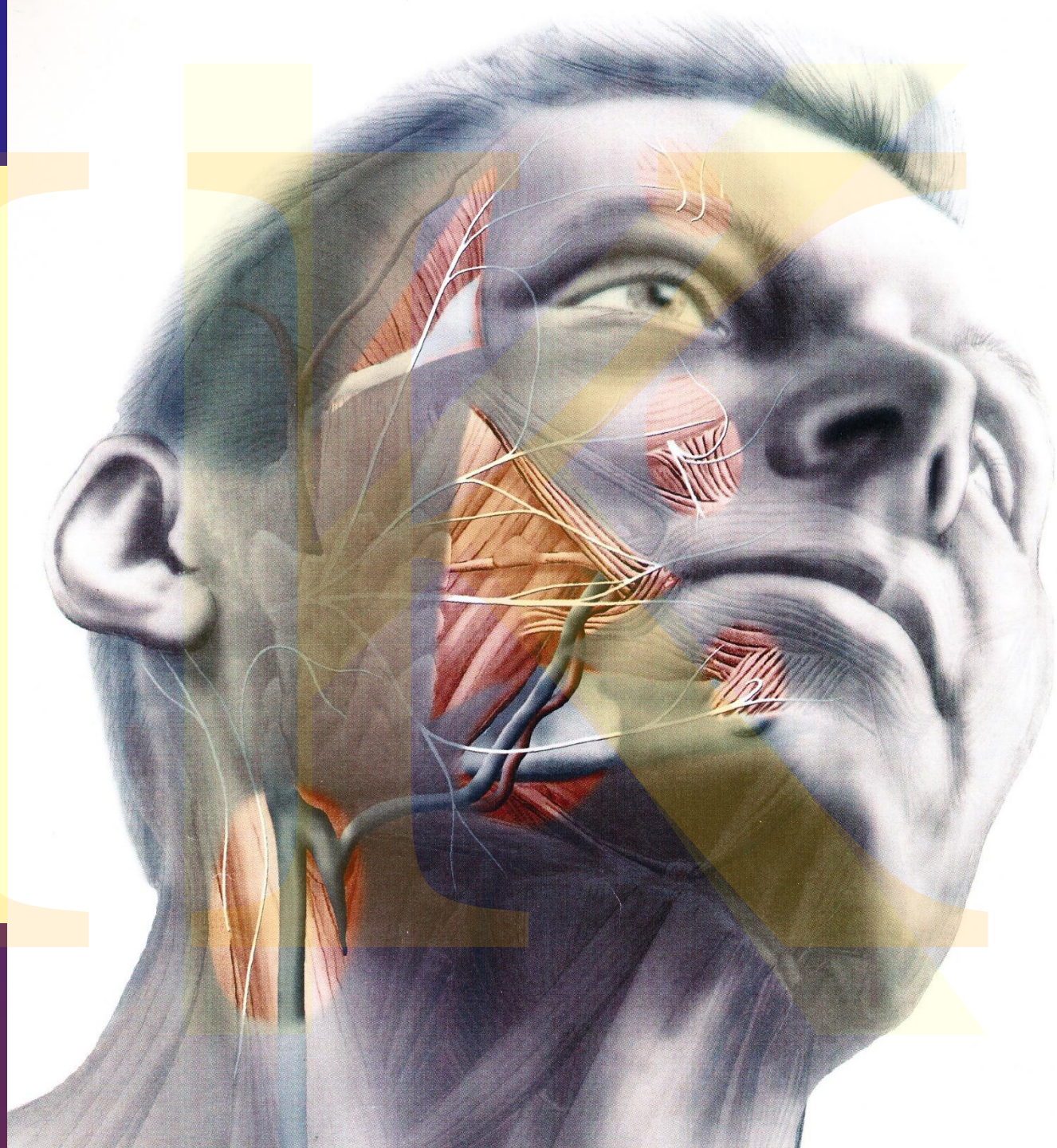
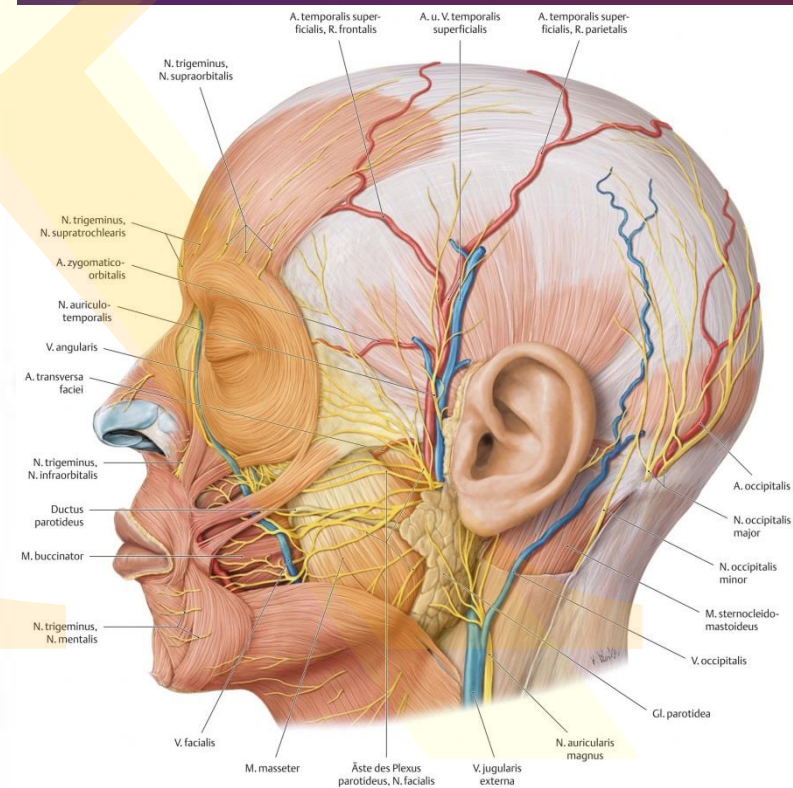


Fig. 3.1 Danger zone 1. This danger zone (red) extends from the inferior border of the zygomatic arch to a line above the bony lateral canthus. The zone curves anteriorly as shown from the lower line to the upper one. Within this zone, the temporal branch of the facial nerve is vulnerable to injury where it passes superficially in the superficial temporal fascia

I.



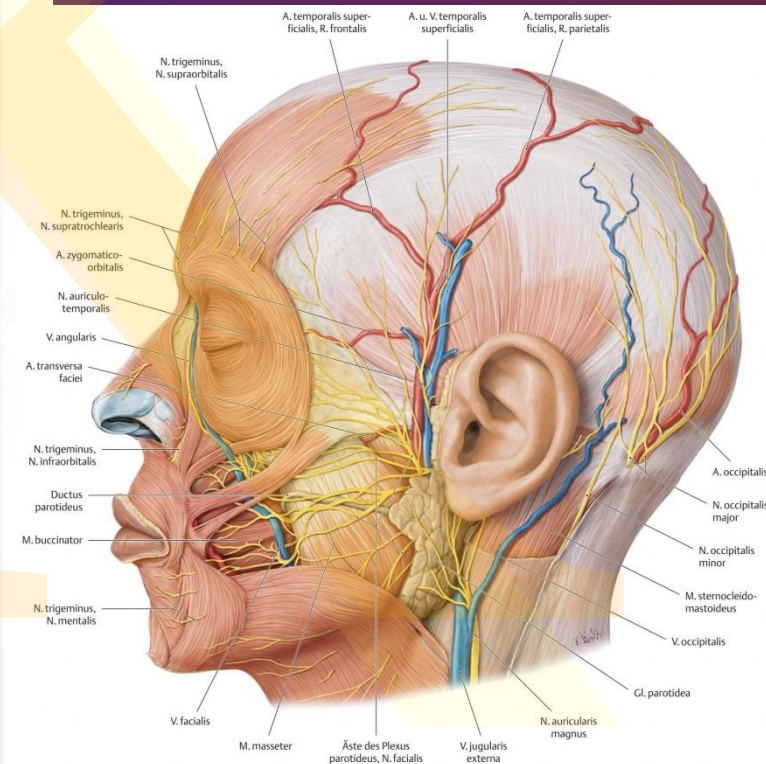
A Oberflächliche Gefäße und Nerven des Kopfes von der Seite

Ansicht von links



Fig. 3.2 Danger zone 2. The anterior continuous green line represents the most anterior position of the lateral border of zygomaticus major. The posterior continuous green line marks the most posterior part of the anterior border of the parotid gland. The borders of this triangular danger zone are formed in relation to these lines, with the base of the triangle running from the masseteric tuberosity at the angle of the mandible toward the oral commissure. The zygomatic and buccal branches of the facial nerve occupy this zone as they run on the buccal fat just underneath platysma

II.



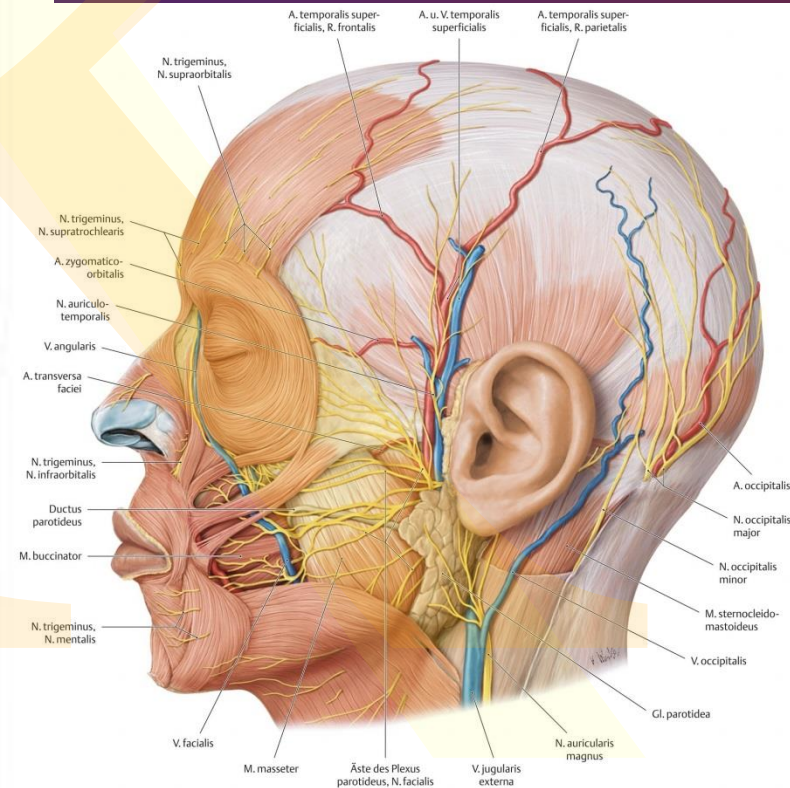
A Oberflächliche Gefäße und Nerven des Kopfes von der Seite
Ansicht von links





Fig. 3.3 Danger zone 3. The marginal mandibular nerve occupies this danger zone, represented by a circle centered on the inferior border of the mandible, 2 cm posterior to the oral commissure. The nerve courses superficially in this zone

III.



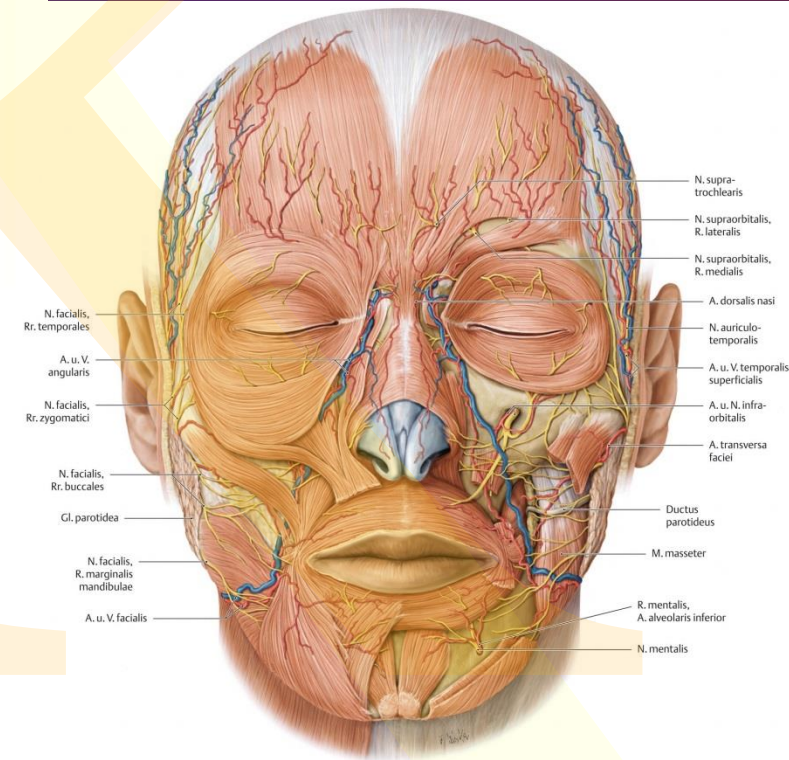
A Oberflächliche Gefäße und Nerven des Kopfes von der Seite
Ansicht von links





Fig. 3.4 Danger zone 4. A circle of 1.5 cm diameter is centered on a point 2.5 cm from the midline along the supraorbital ridge, or on the supraorbital foramen or notch if palpable. The danger zone extends from the superolateral part of the circle along the superior temporal crest lines and for 1.5 cm medial to it, where the deep branch of supraorbital nerve passes on the periosteum. This danger zone includes the supraorbital nerve, deep branch of supraorbital nerve, and supratrochlear nerve

IV.



A Oberflächliche Nerven und Gefäße der vorderen Gesichtsregion



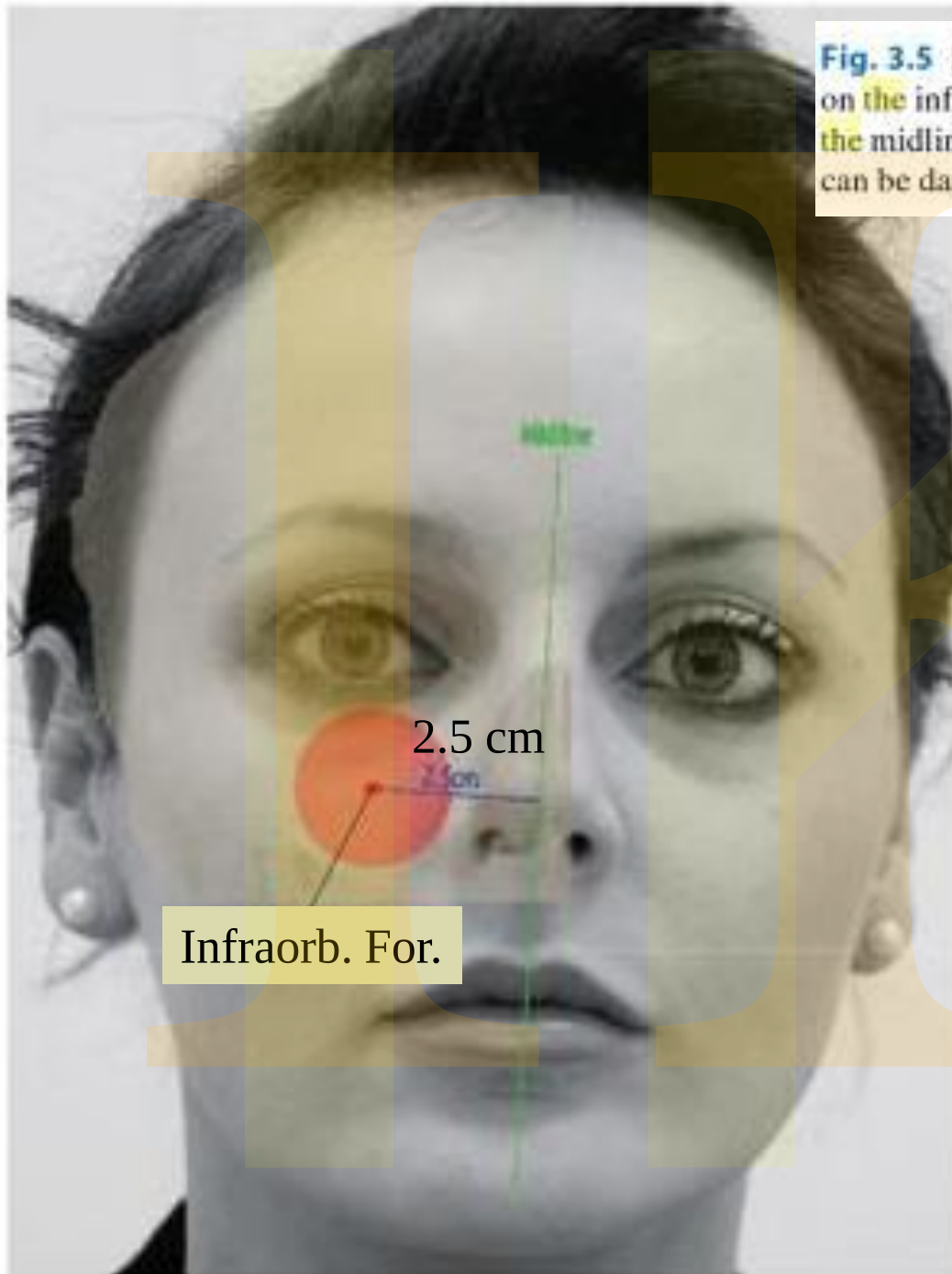
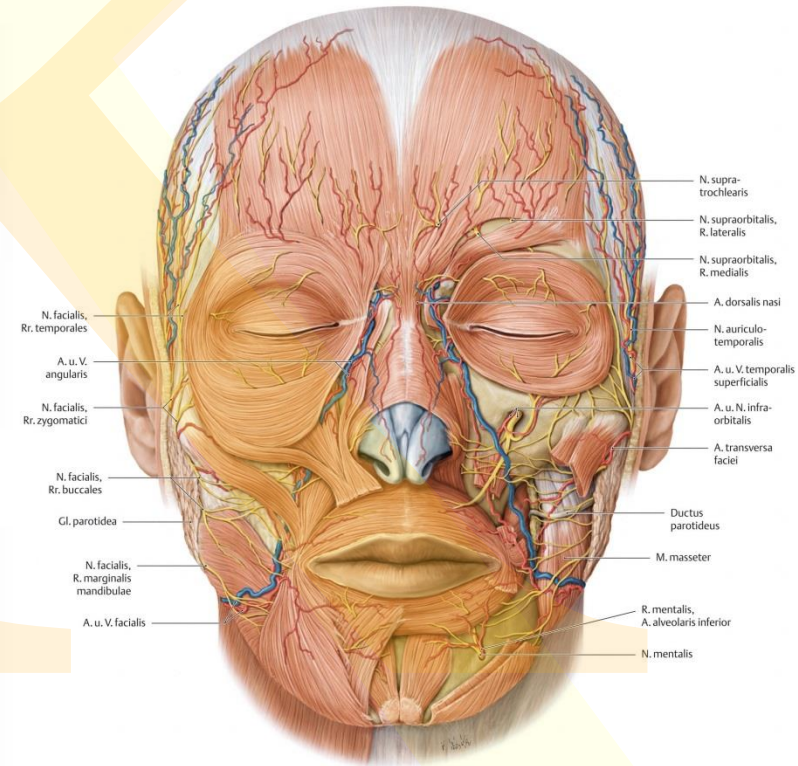


Fig. 3.5 Danger zone 5. This danger zone is circular, centered on the infraorbital foramen. The foramen is usually 2.5 cm from the midline, close to the midpupillary line. The infraorbital nerve can be damaged here during deep dissections over the maxilla

V.



A Oberflächliche Nerven und Gefäße der vorderen Gesichtsregion



PROMETHEUS Lernatlas der Anatomie - Kopf und Neuroanatomie
M. Schünke, E. Schulte, U. Schumacher, Illustrator: K. Wesker
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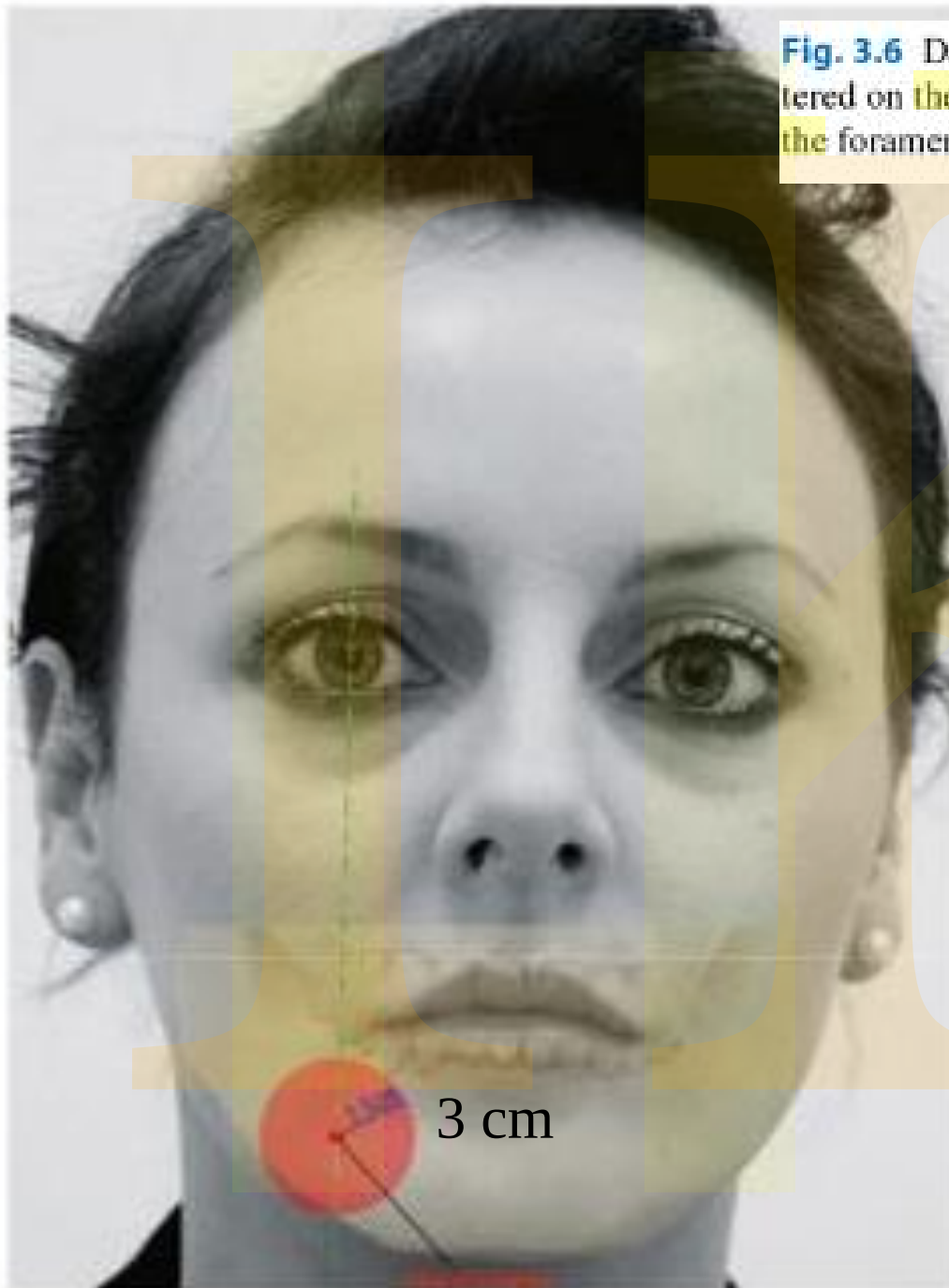


Fig. 3.6 Danger zone 6. A circular area of 3 cm diameter centered on the mental foramen defines this danger zone. Note that the foramen is approximately in the midpupillary line

VI.

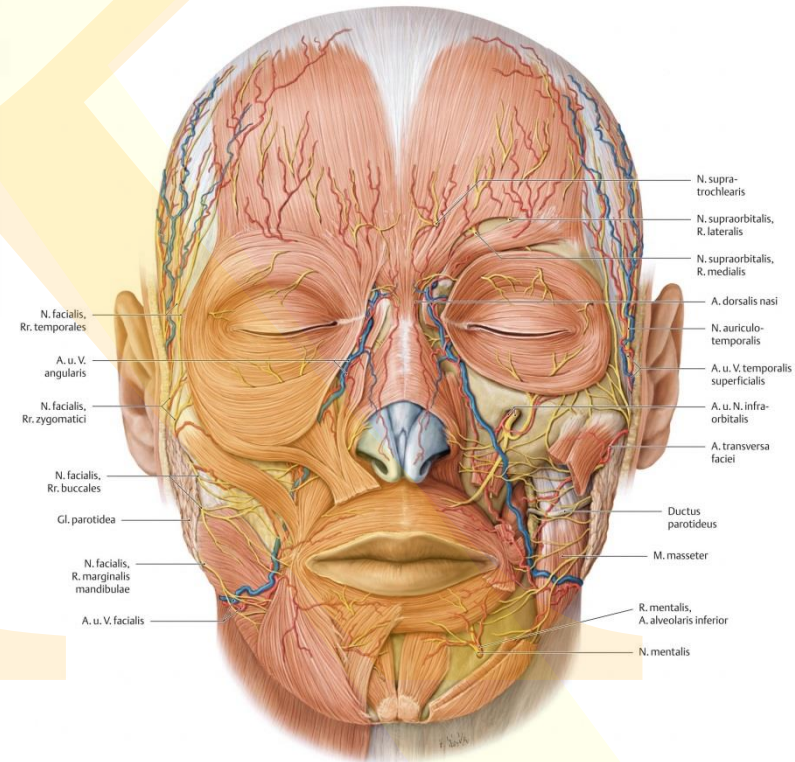
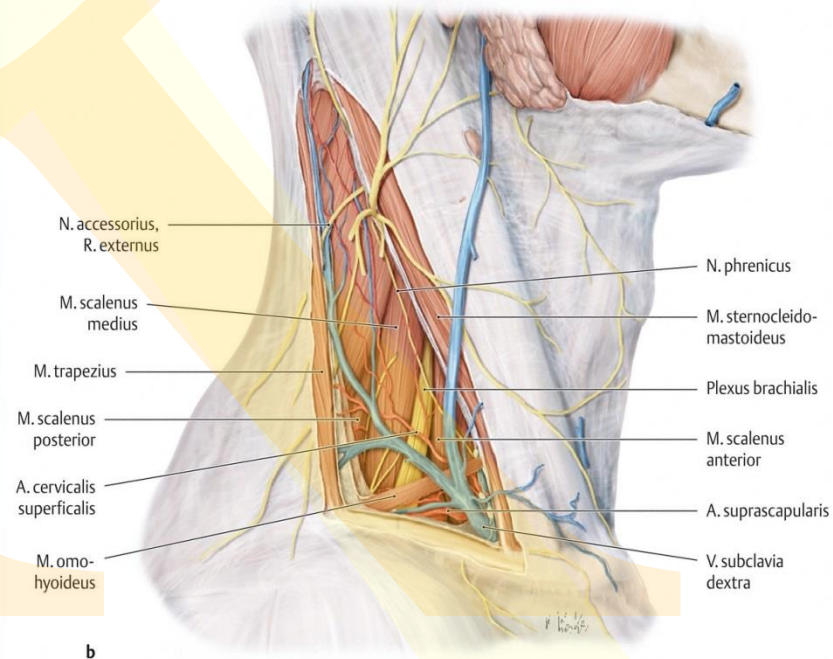


Fig. 3.7 Danger zone 7. This lies 6.5 cm below the external auditory meatus, in the middle of sternocleidomastoid, parallel to the external jugular vein. The greater auricular nerve is prone to injury as it passes through this danger zone behind the border of platysma

VII.

6.5 cm

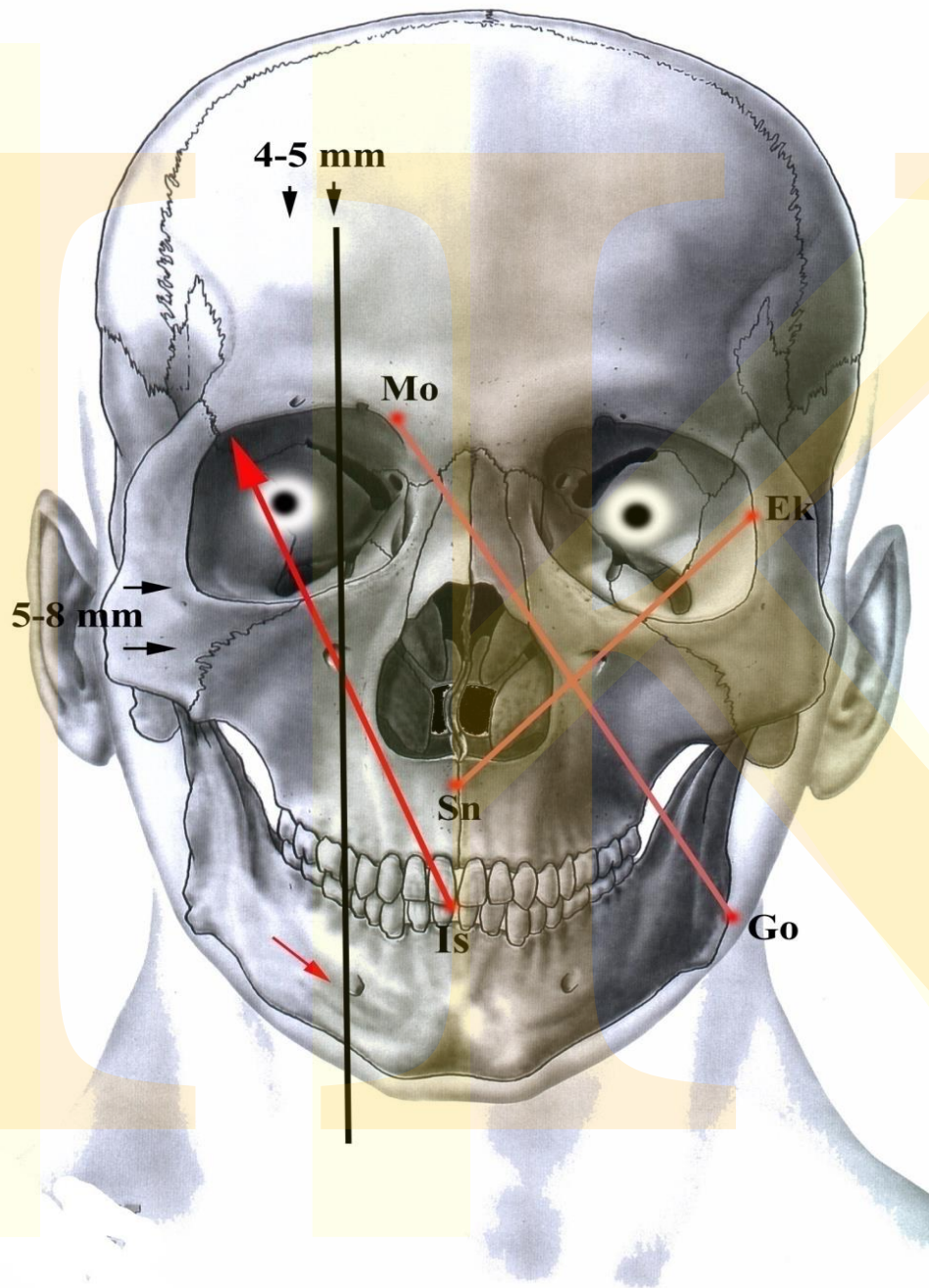
Ext. Jug. vein



C Laterales Halsdreieck

b Tiefste Schicht mit Sicht auf den Plexus brachialis, Ansicht von rechts



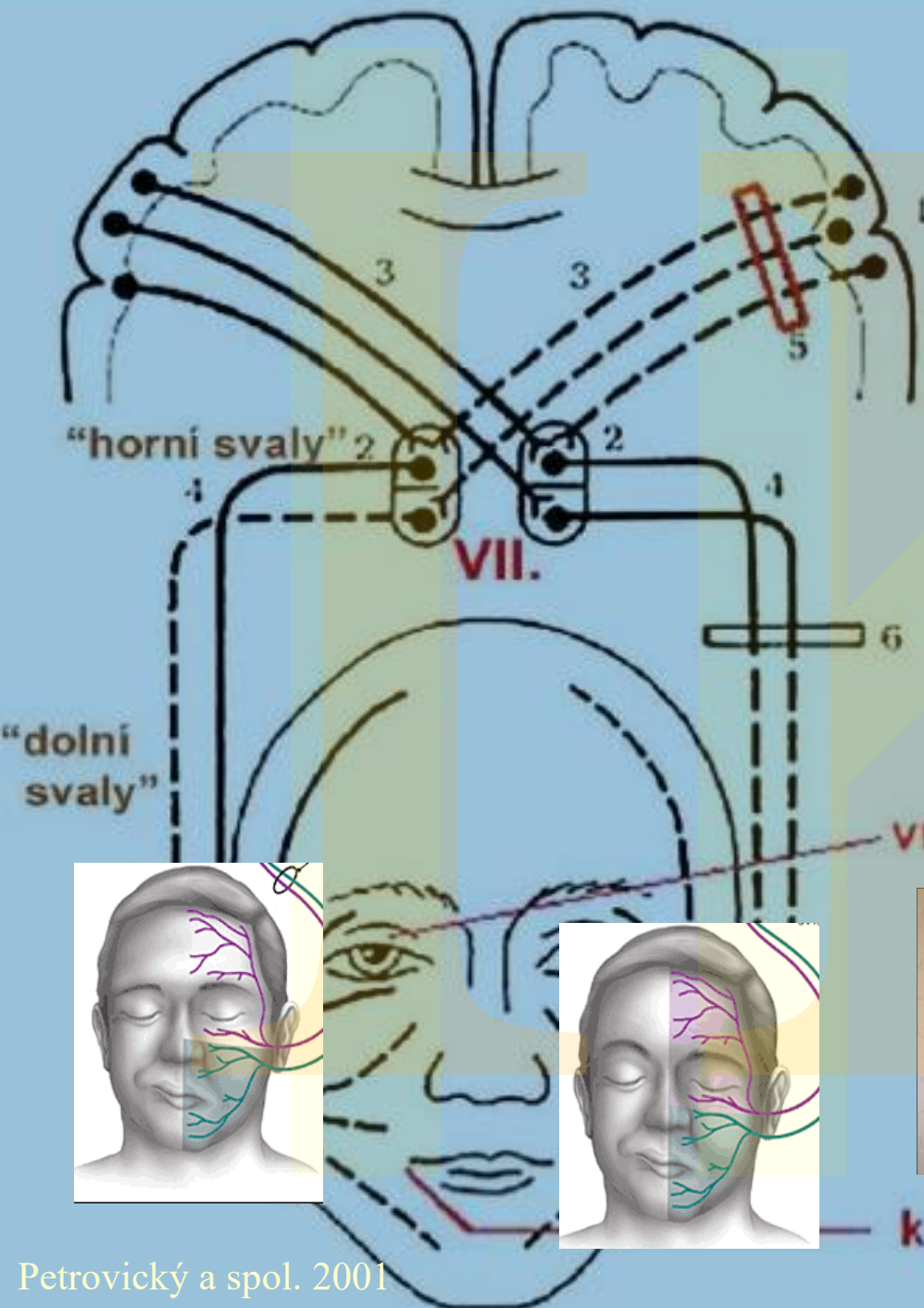


Pomůcka pro
určení otvorů v
obličejové části
lebky , kde
odstupují nervy
a cévyMimické
svaly a lebeční
otvory

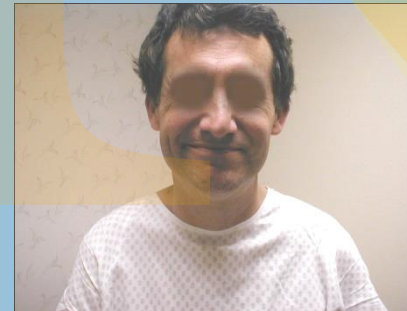
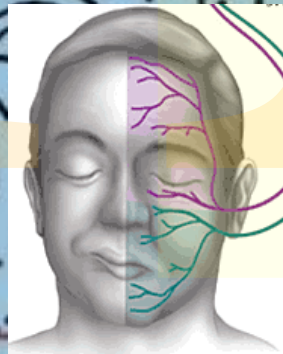
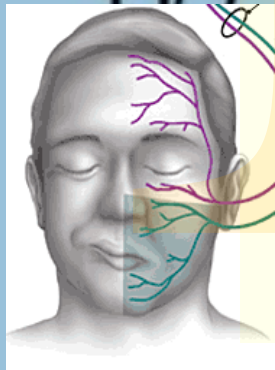
Obr. 41/II. Centrální a periferní obrna n. facialis.

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 - ncl. 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

POUŽITÁ LITERATURA

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