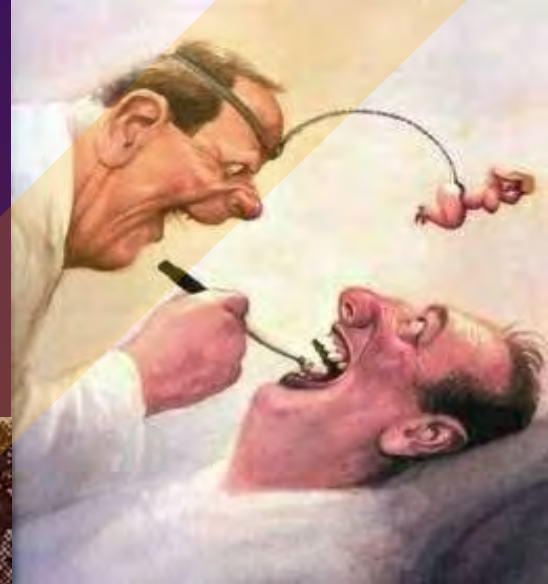


Morfology of the orofacial systém

Anatomical remarks

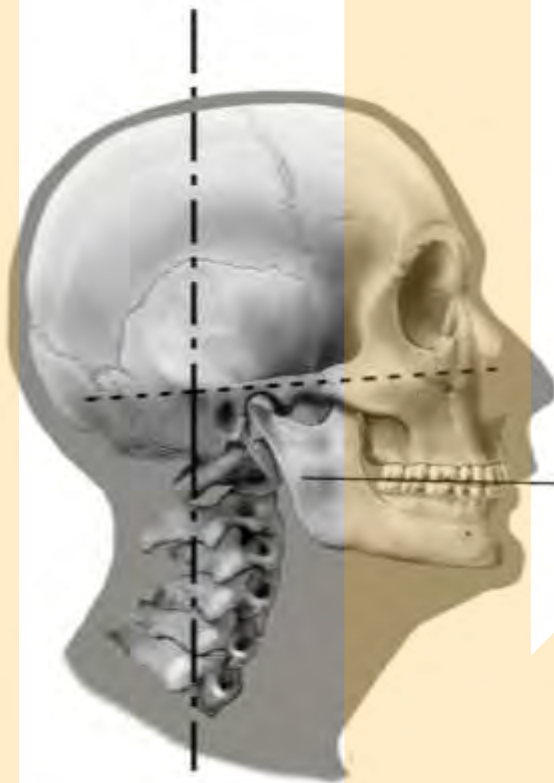


The persecution of Christians began in Alexandria during the reign of the Emperor Philip. The first victim of the pagan mob was an old man named Metrius, who was tortured and then stoned to death. The second person who refused to worship their false idols was a Christian woman named Quinta. Her words infuriated the mob and she was scourged and stoned. While most of the Christians were fleeing the city, abandoning all their worldly possessions, an old deaconess, Apollonia, was seized. The crowds beat her, knocking out all of her teeth. Then they lit a large fire and threatened to throw her in it if she did not curse her God. She begged them to wait a moment, acting as if she was considering their requests. Instead, she jumped willingly into the flames and so suffered martyrdom.



Skeleton of the face, thickened and weakened skull areas. Formation of jaws and dental arches. Anatomical base of clefts of face and palate.

Ivo Klepáček



rovina okluze occlusal plane
protetická rovina Camper plane
x
vodorovná rovina
horizontal plane

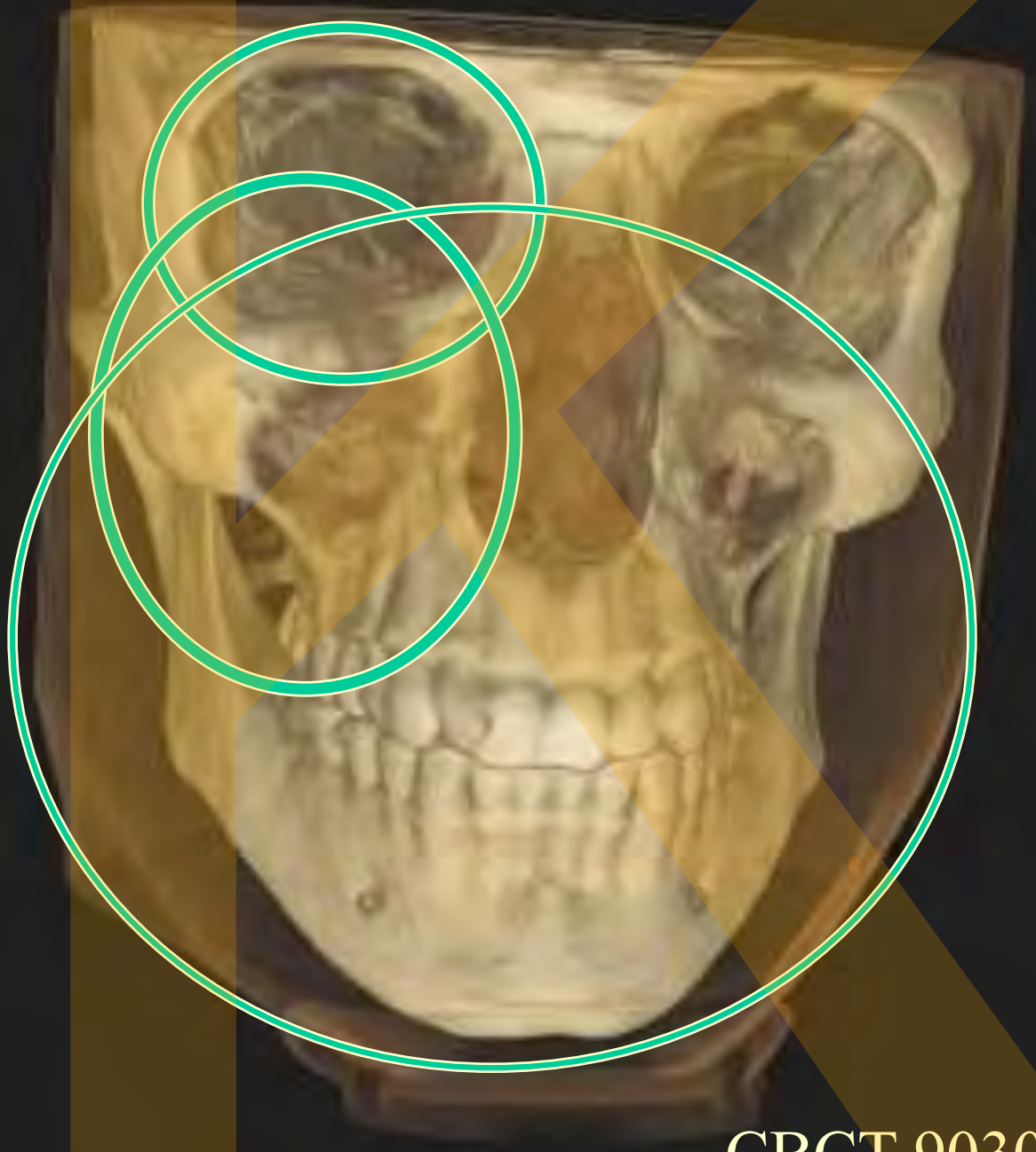
areae

intermingling together



better

regiones



30 yr man

3D visual methods

Skull with cavities
tendinous

insertions; ligaments
projection of the
nerves and vessels;
their arrangement

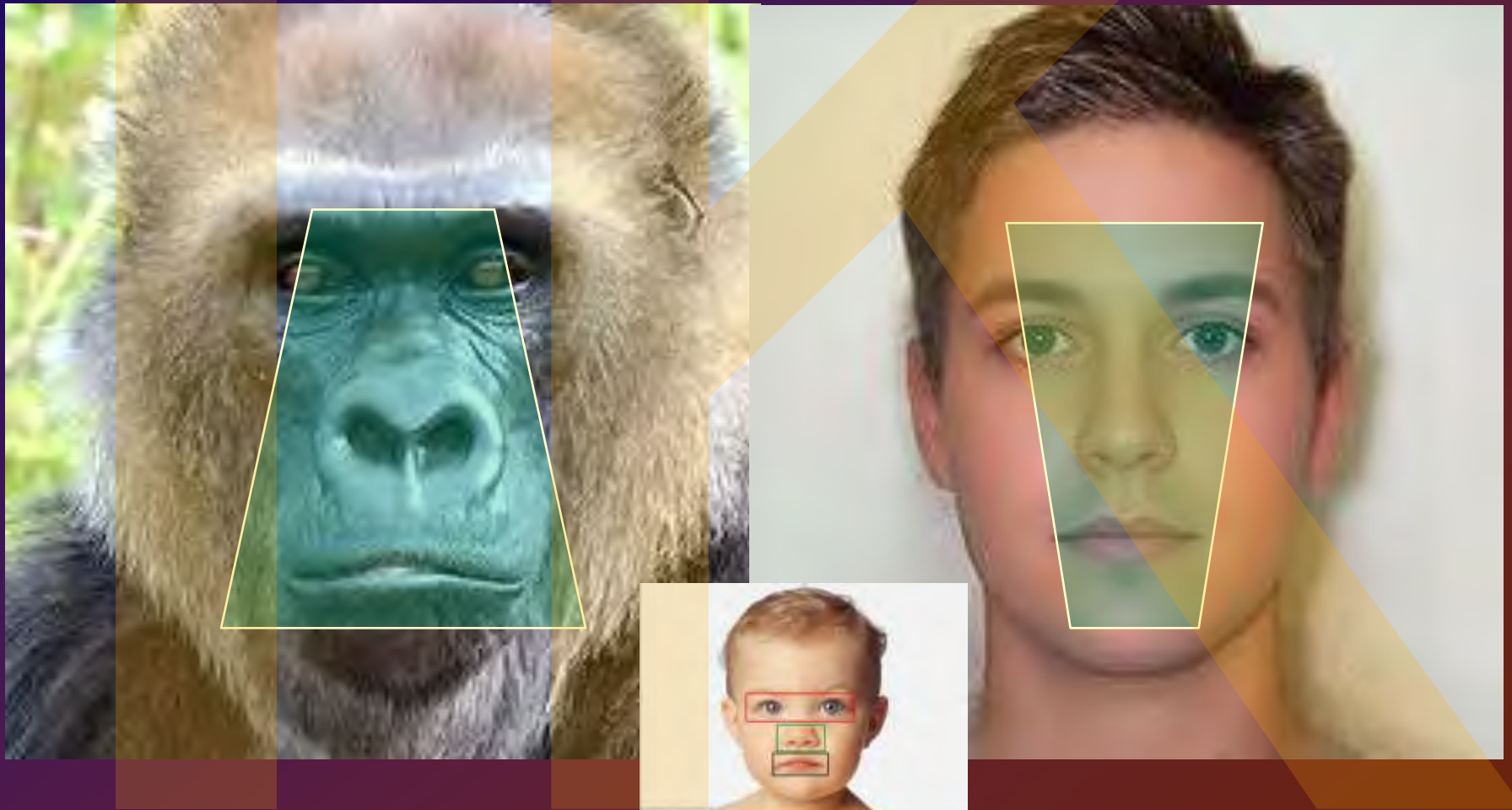
Topographic relation
between structures



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.



Face: What can be focused on ?



13
This image shows the faces of infants, focused on by the scientist. The scientist measured how long the babies looked at each area to determine the importance of an image.

Characteristics of aging



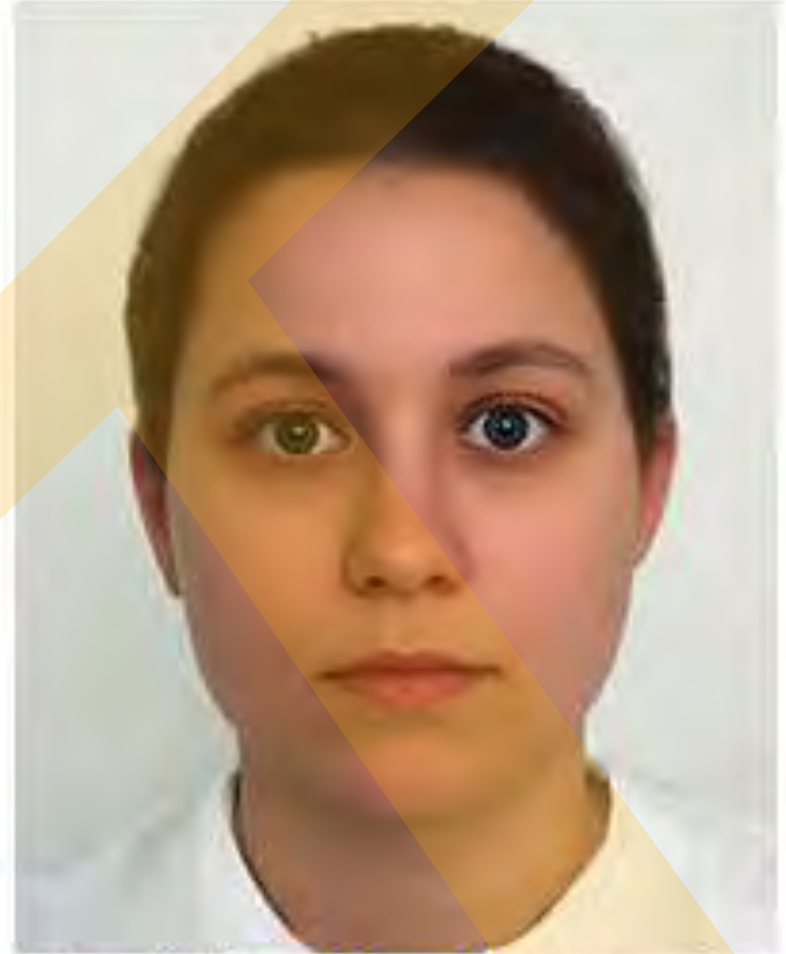
Nasolabial folds

Downturning mouth angle

Rysy obličeje - vztah mezi tvrdými a měkkými tkáněmi
Face features - relation between soft and hard tissues



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

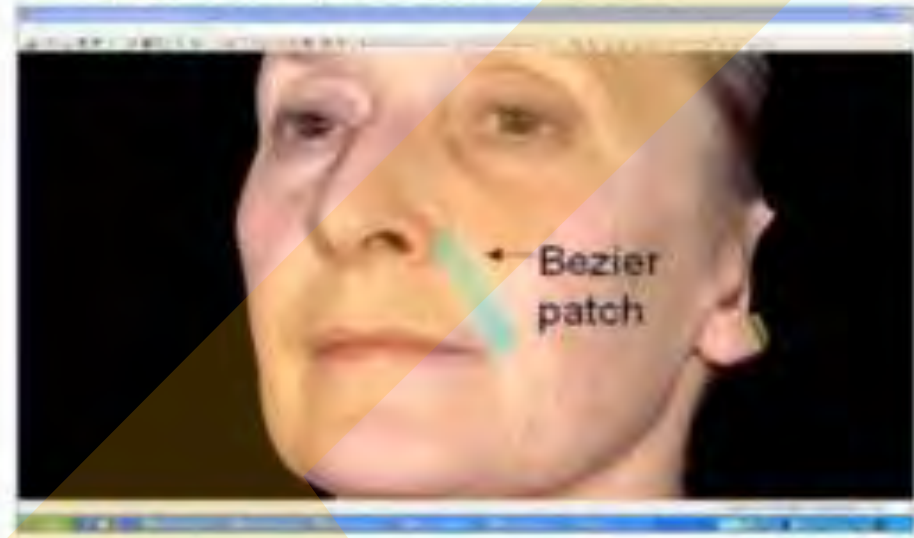


Prototypic female face of low attractiveness
("unsexy face")

Right NLF with Bezier patch



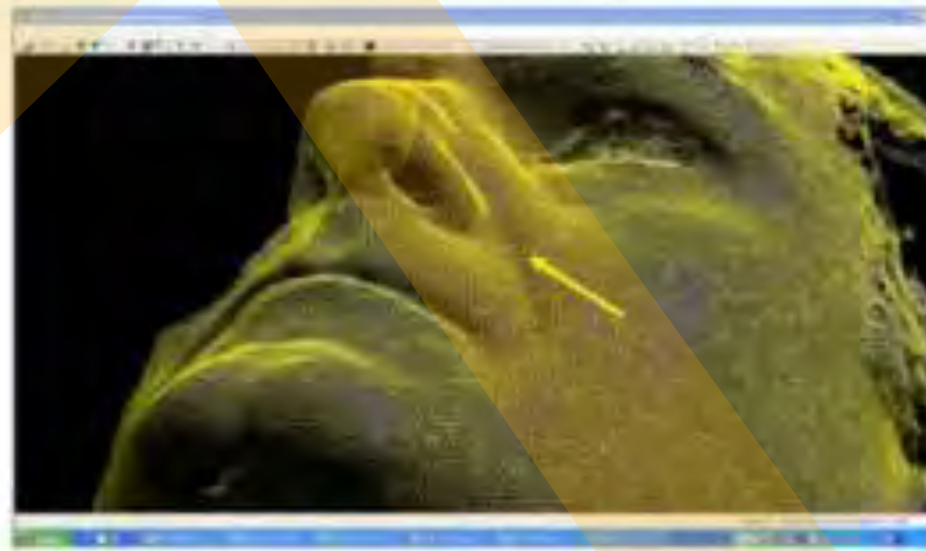
Left NLF with Bezier patch



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 week



toddler



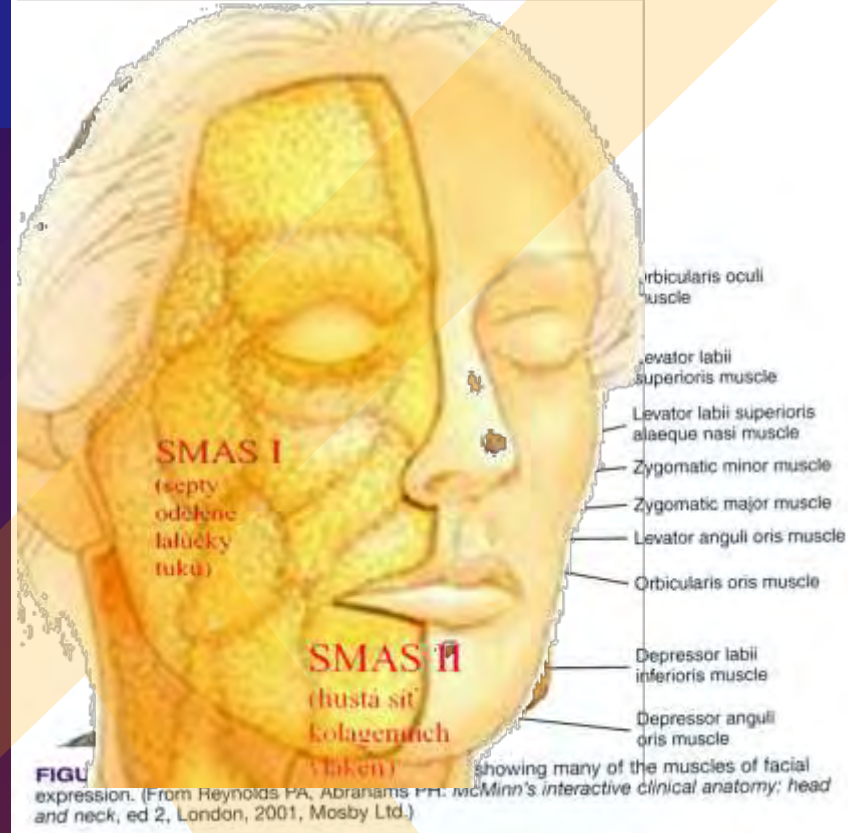
adultus



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

Mimic muscles in head

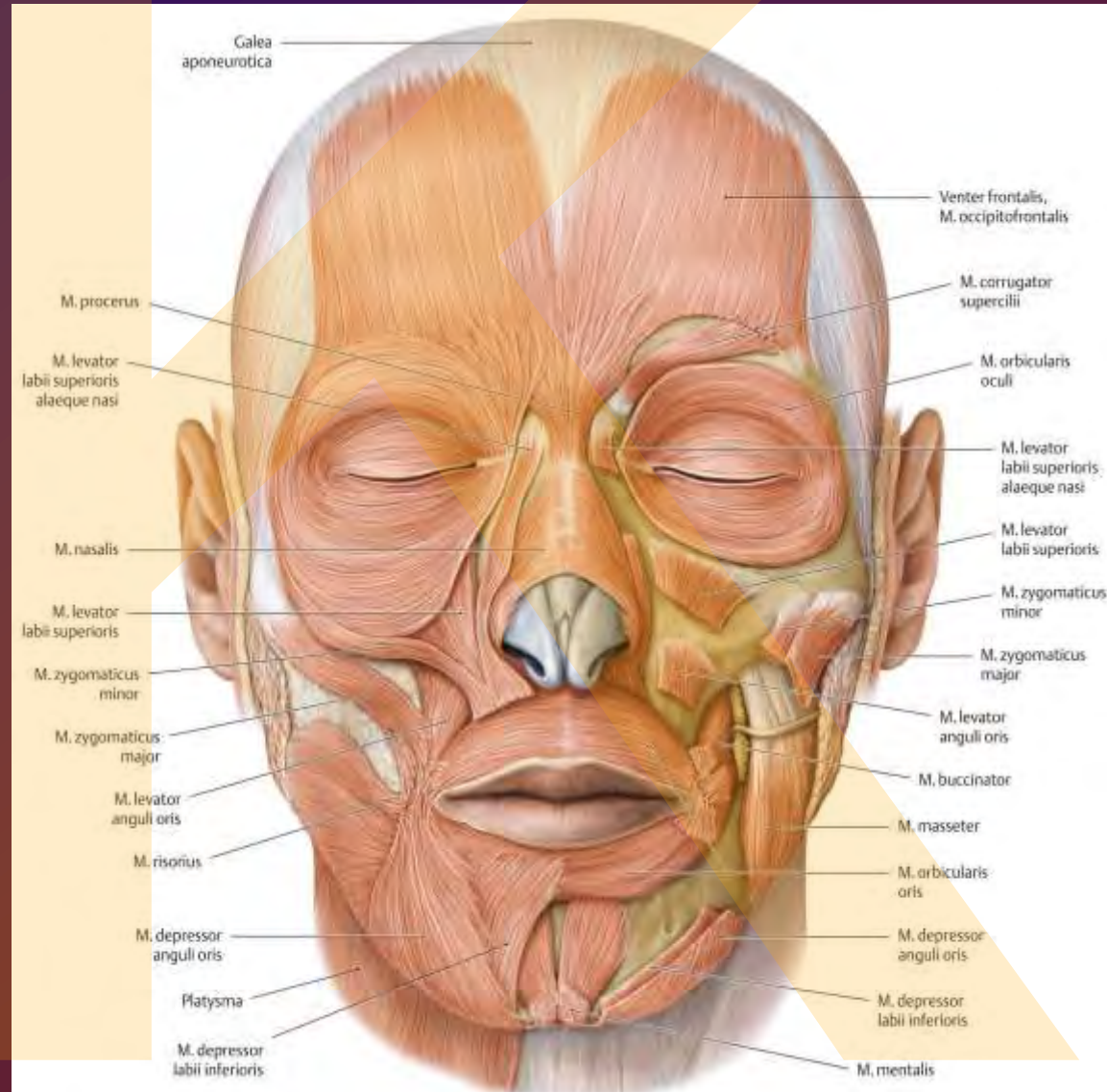
mm. faciales

VII – FACIALIS
Derivatives of the 2.
pharyngeal arch

Inervation from n.
facialis
(nervus cranialis
septimus; VII.)

muscles:

- ❖ Head vault
- ❖ Proper facial muscles
 - ❖ Muscles around eye
 - ❖ Muscles around nose
 - ❖ Muscles around oral cavity
- ❖ Muscles around external ear

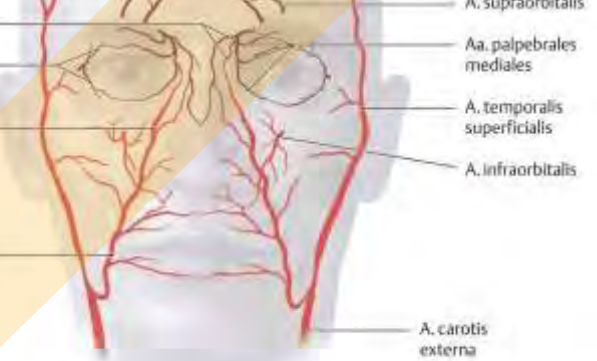


Mimické svaly cévy obličeje

Mimic muscles face vessels



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



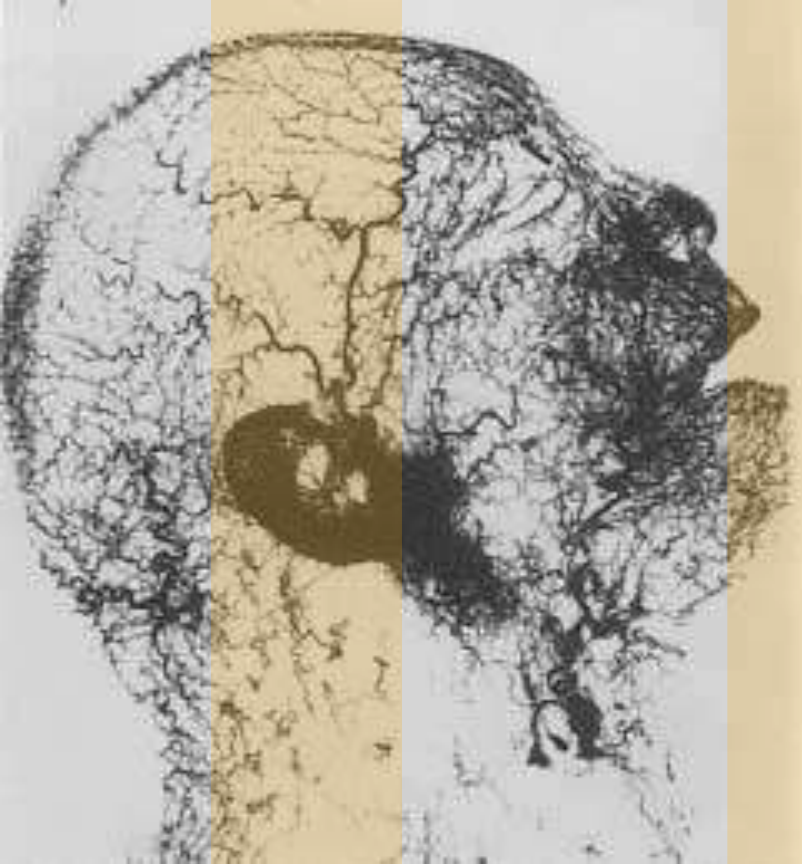
- A. supra-trochlearis
- A. supraorbitalis
- Aa. palpebrales mediales
- A. temporalis superficialis
- A. infraorbitalis
- A. facialis
- A. carotis externa

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

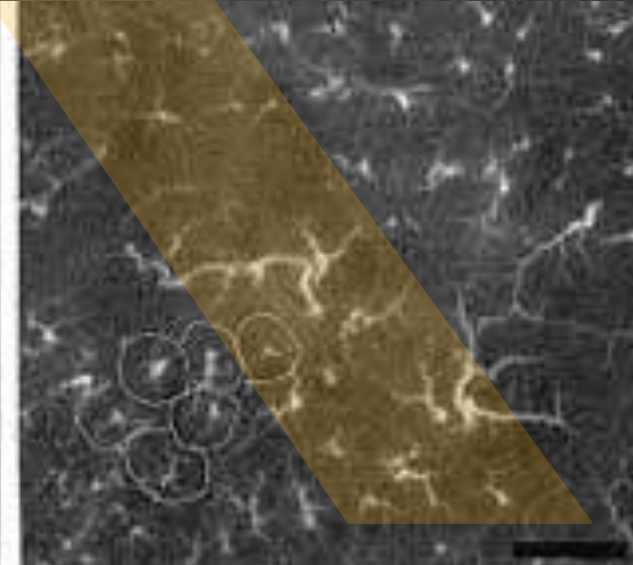
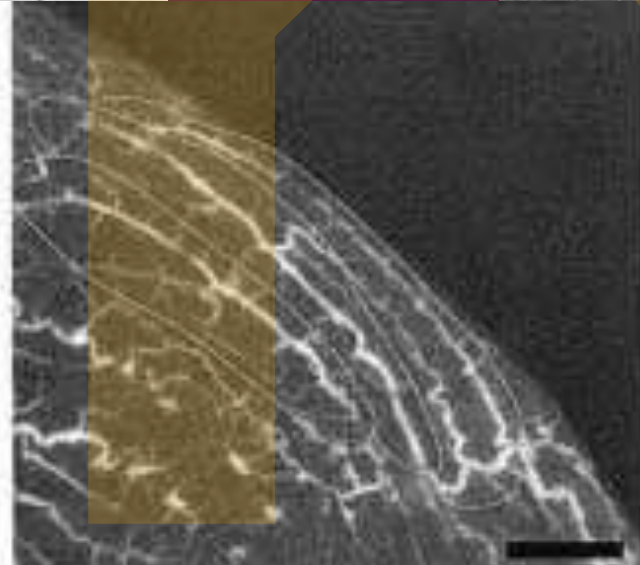
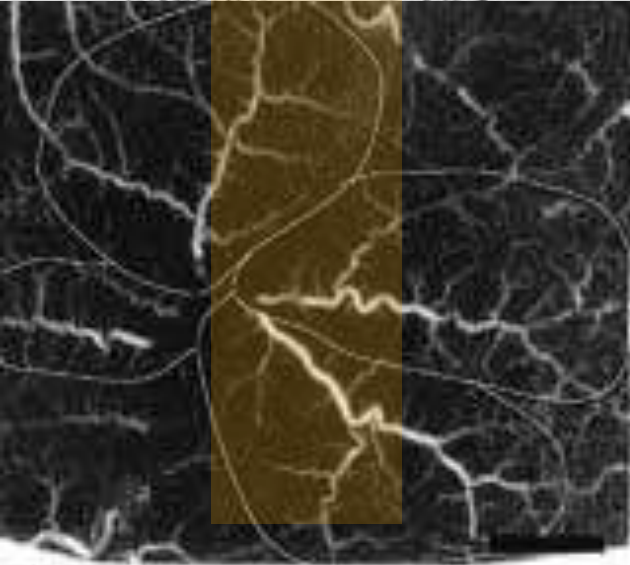
- N. auriculo-temporalis
- A. u. V. temporalis superficialis
- A. u. N. infra-orbitalis
- A. transversa faciei
- Ductus parotídeus
- M. masseter
- R. mentalis, A. alveolaris inferior
- N. mentalis

trigonum mortis

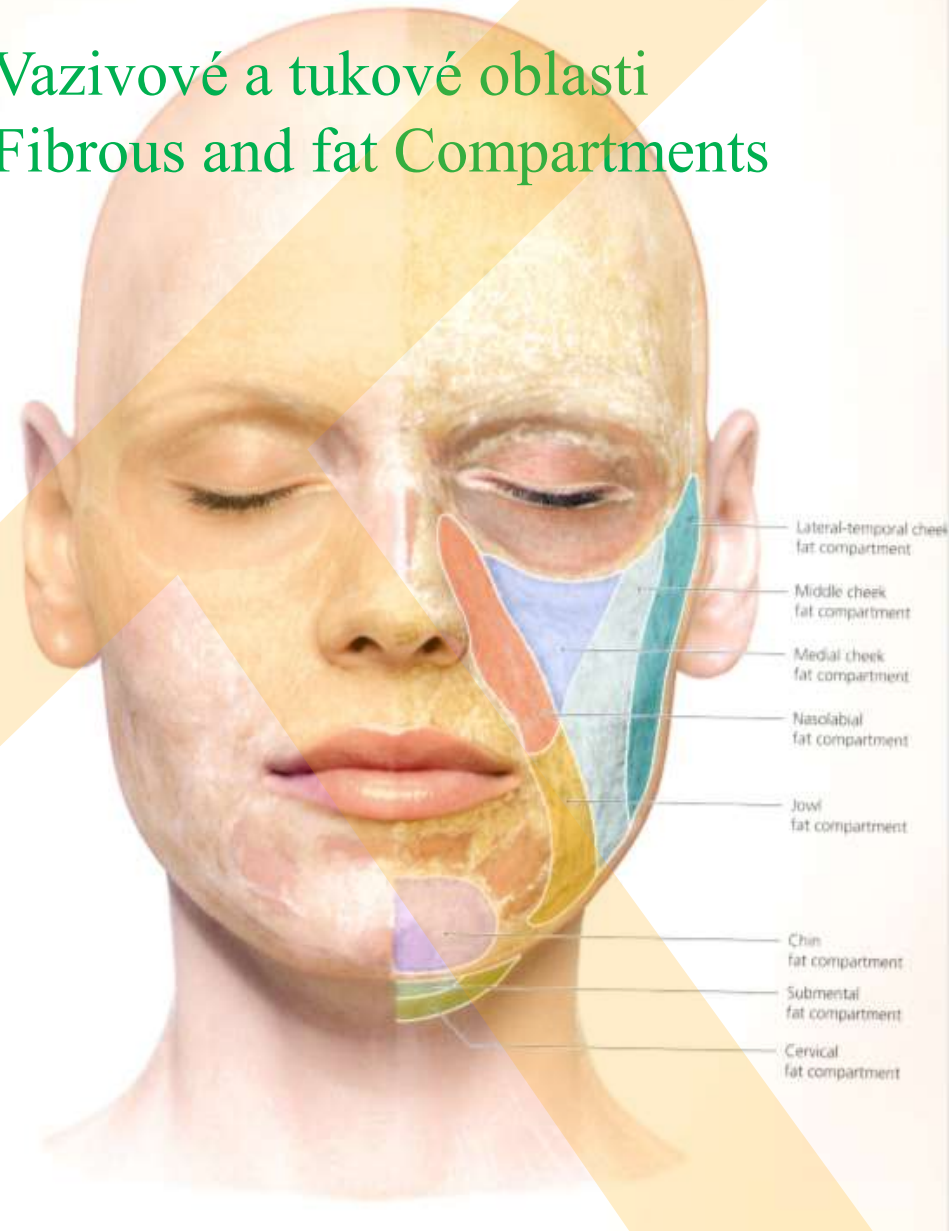
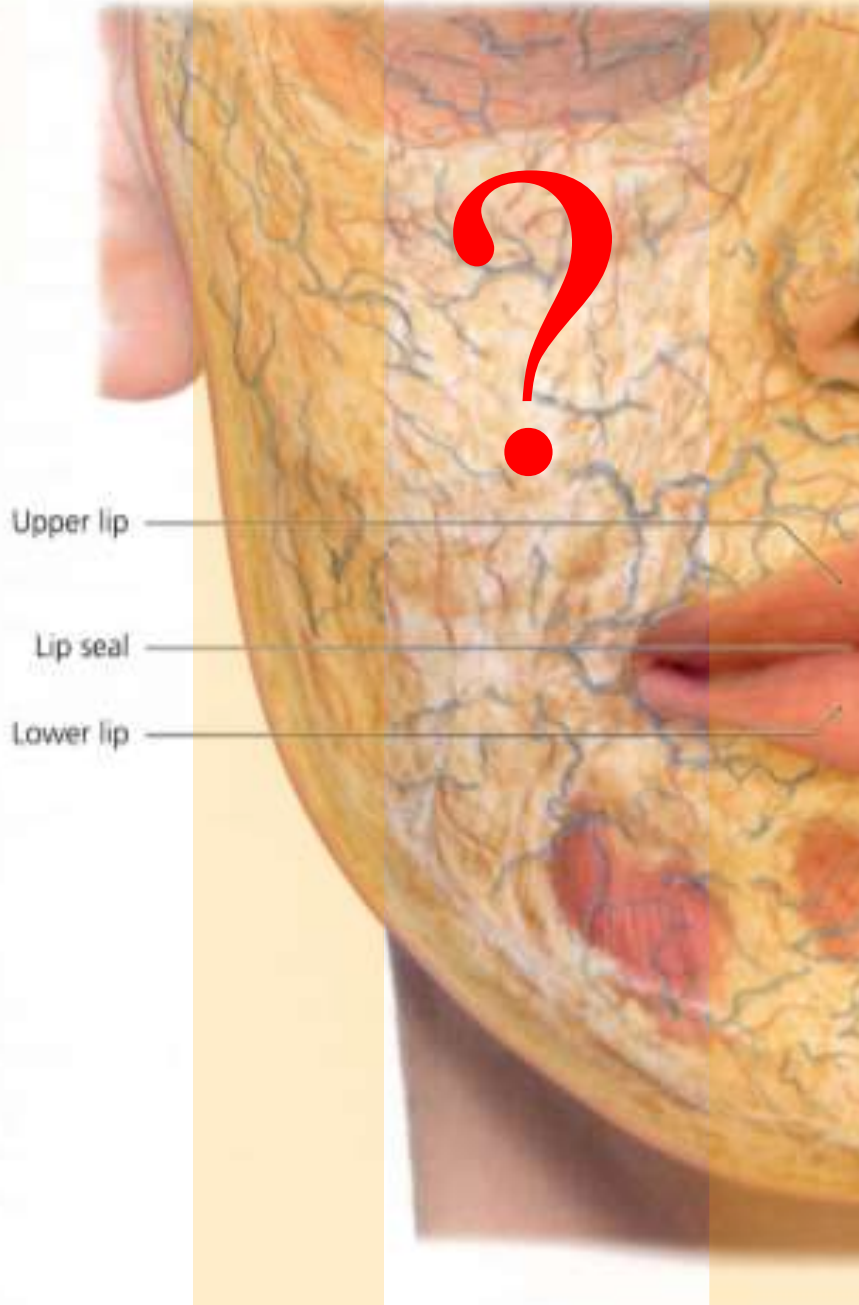




H.Chang: Arterial anatomy of subdermal plexus of the face. Keio J Med 50: (1)31-34



Vazivové a tukové oblasti Fibrous and fat Compartments



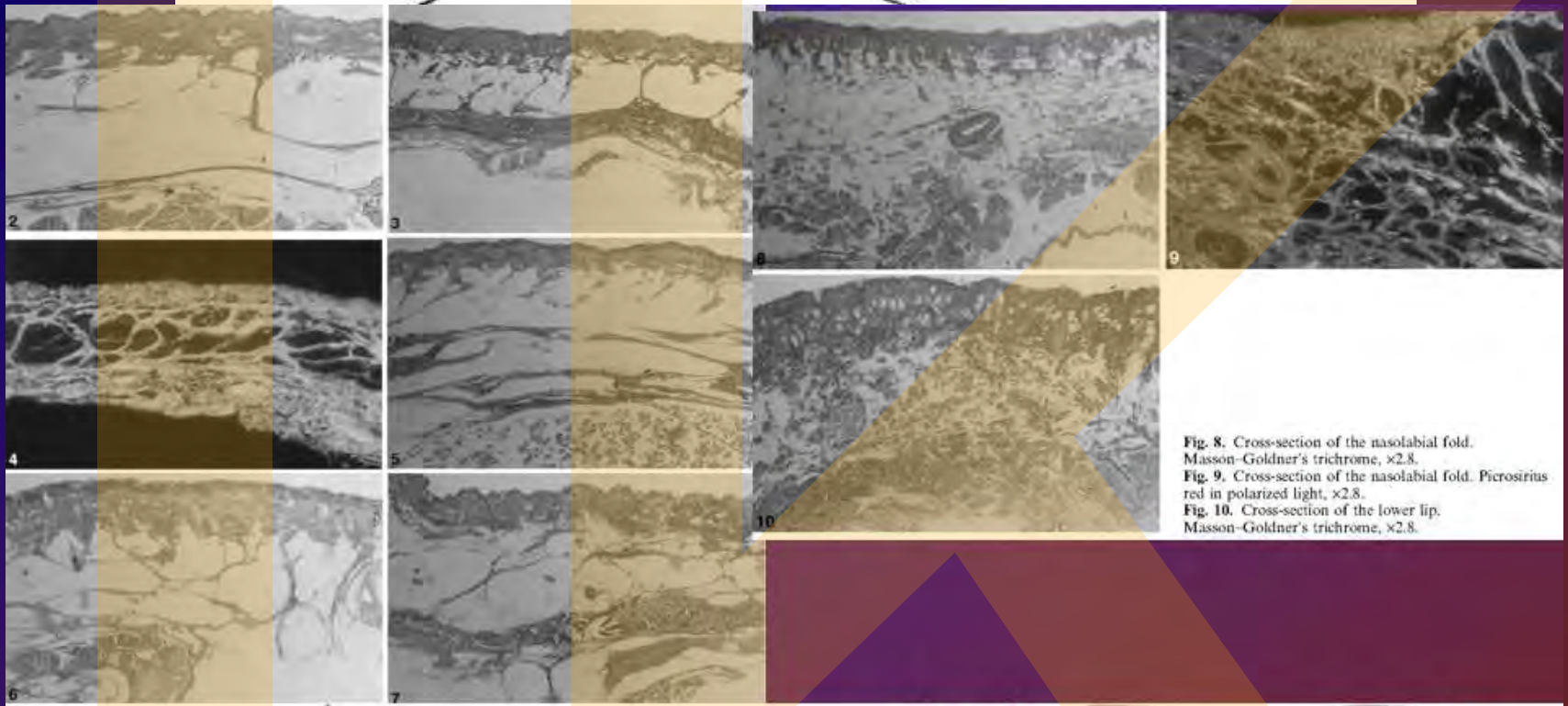


Fig. 8. Cross-section of the nasolabial fold. Masson-Goldner's trichrome, $\times 2.8$.
 Fig. 9. Cross-section of the nasolabial fold. Picrosirius red in polarized light, $\times 2.8$.
 Fig. 10. Cross-section of the lower lip. Masson-Goldner's trichrome, $\times 2.8$.

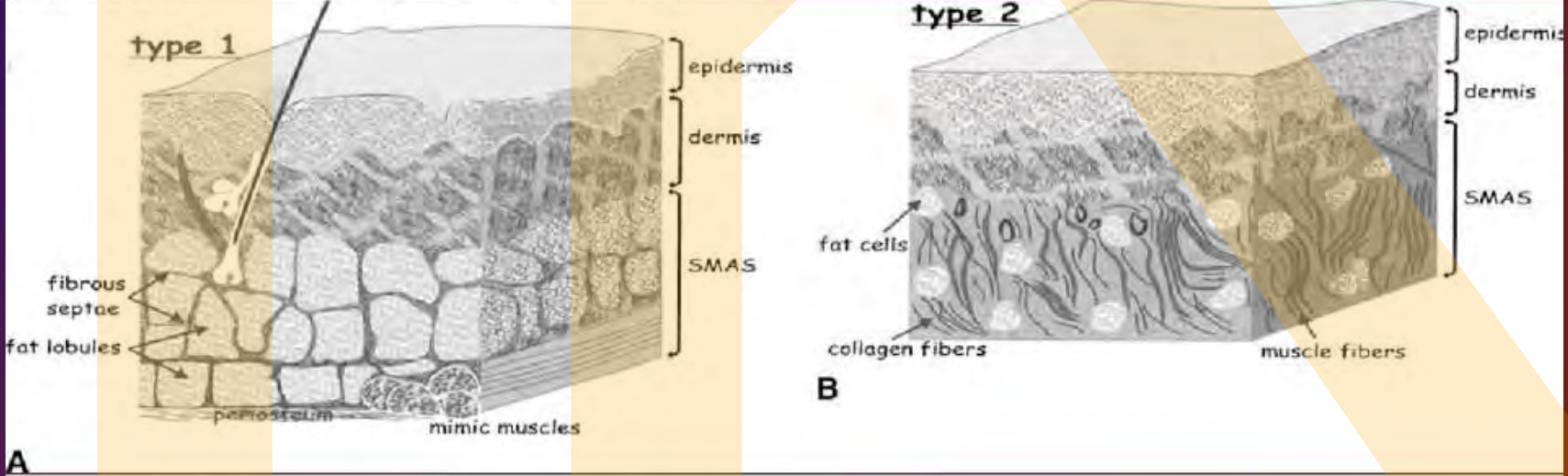
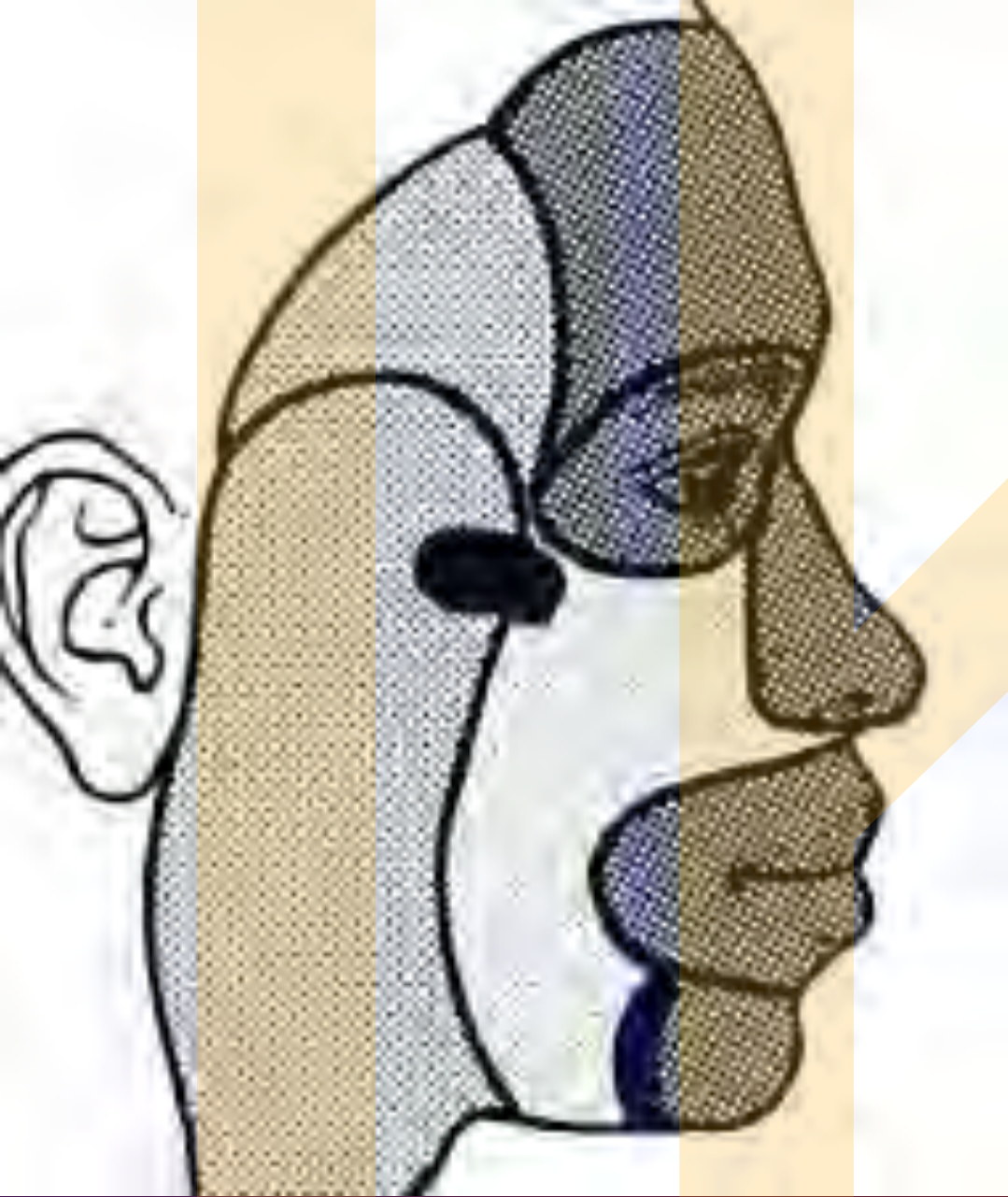


Fig. 1. Six locations of cross-sections for histological



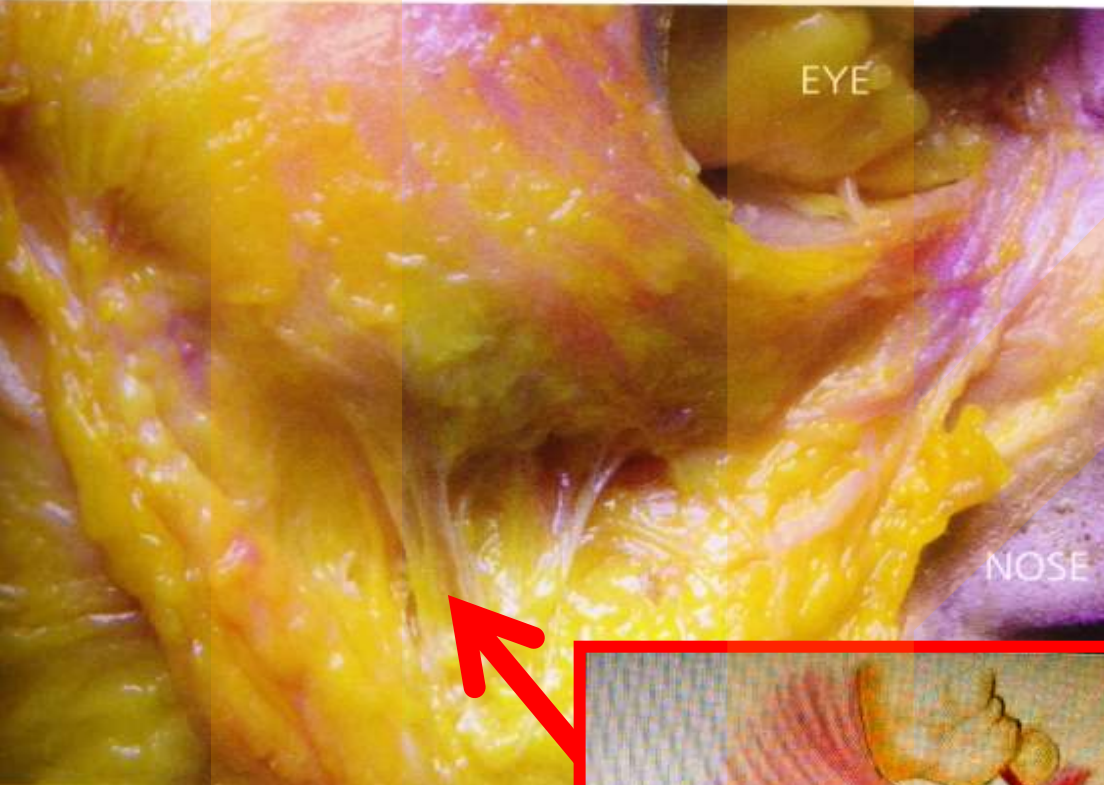
Fasciocutaneous
ligg. -
stippled areas

Osteocutaneous
ligg. -
in black

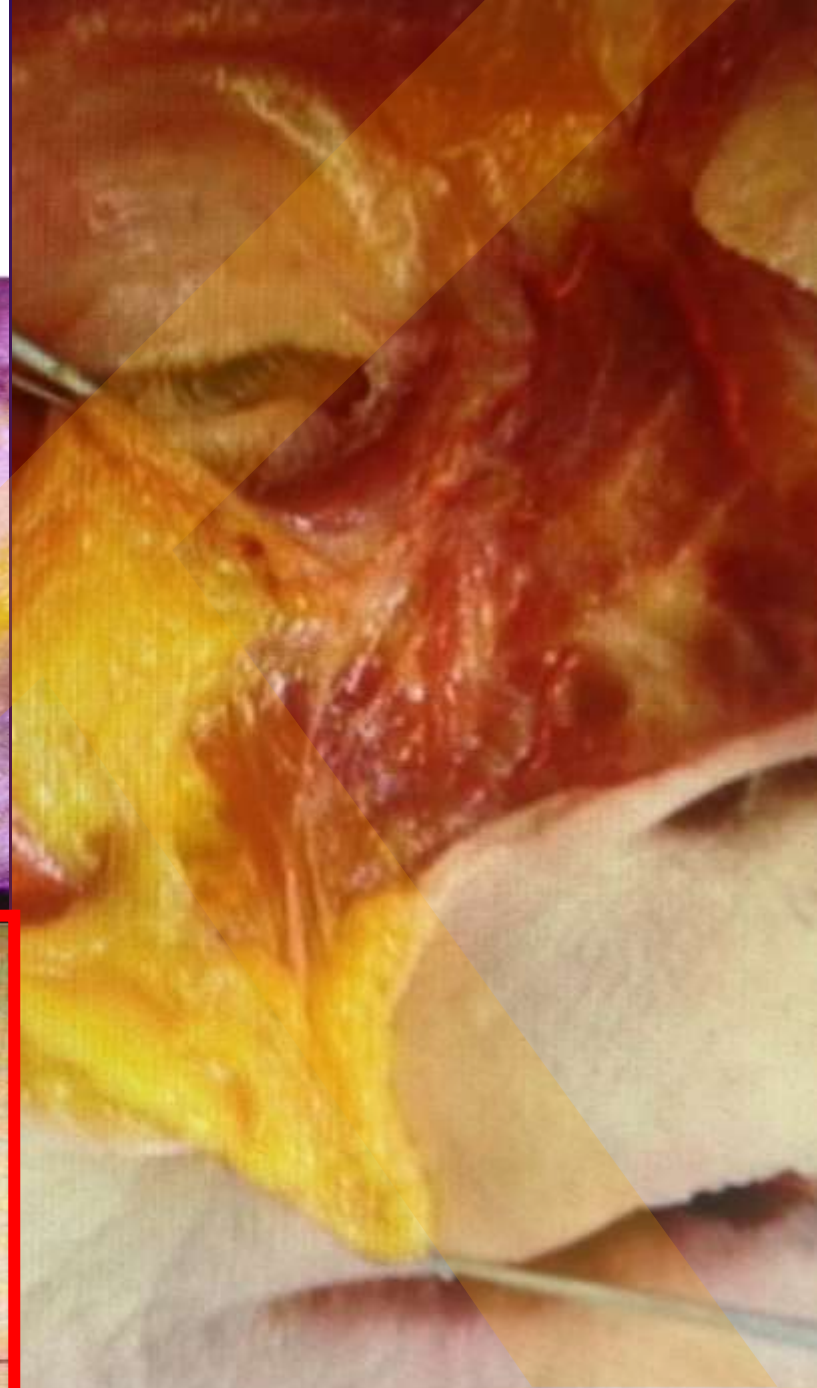
(From Larrabee WF, Makielski KH, Sykes J: Surgical anatomy for endoscopic facial surgery. In: Keller GS, ed. *Endoscopic facial plastic surgery*. St. Louis: Mosby, 1997: 4, with permission.)

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

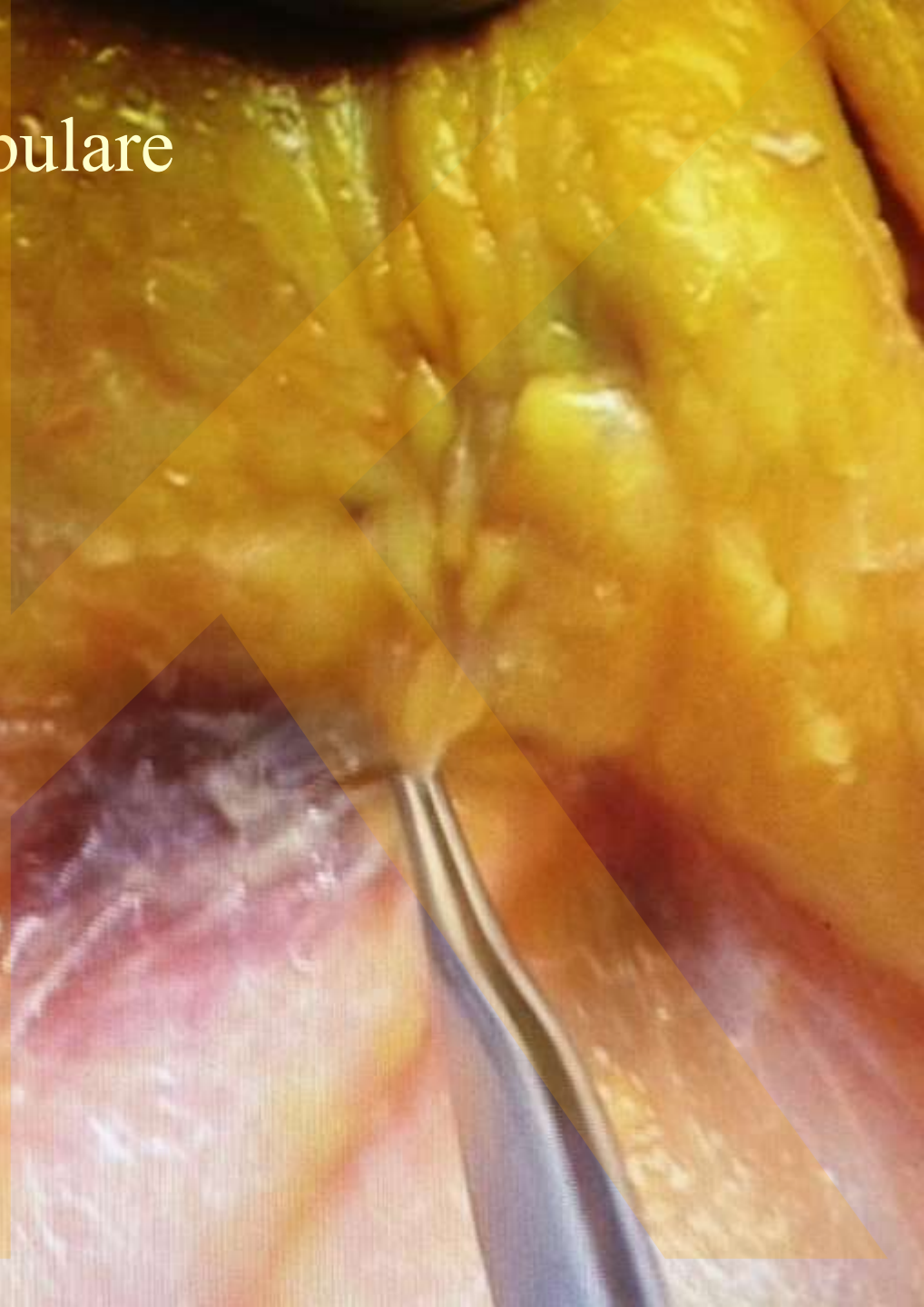
Fig. 6 The zygomatic ligaments along the lower edge of the *orbicularis oculi* muscle. They are inserted close to the *zygomaticus major* and *zygomaticus minor* muscles.



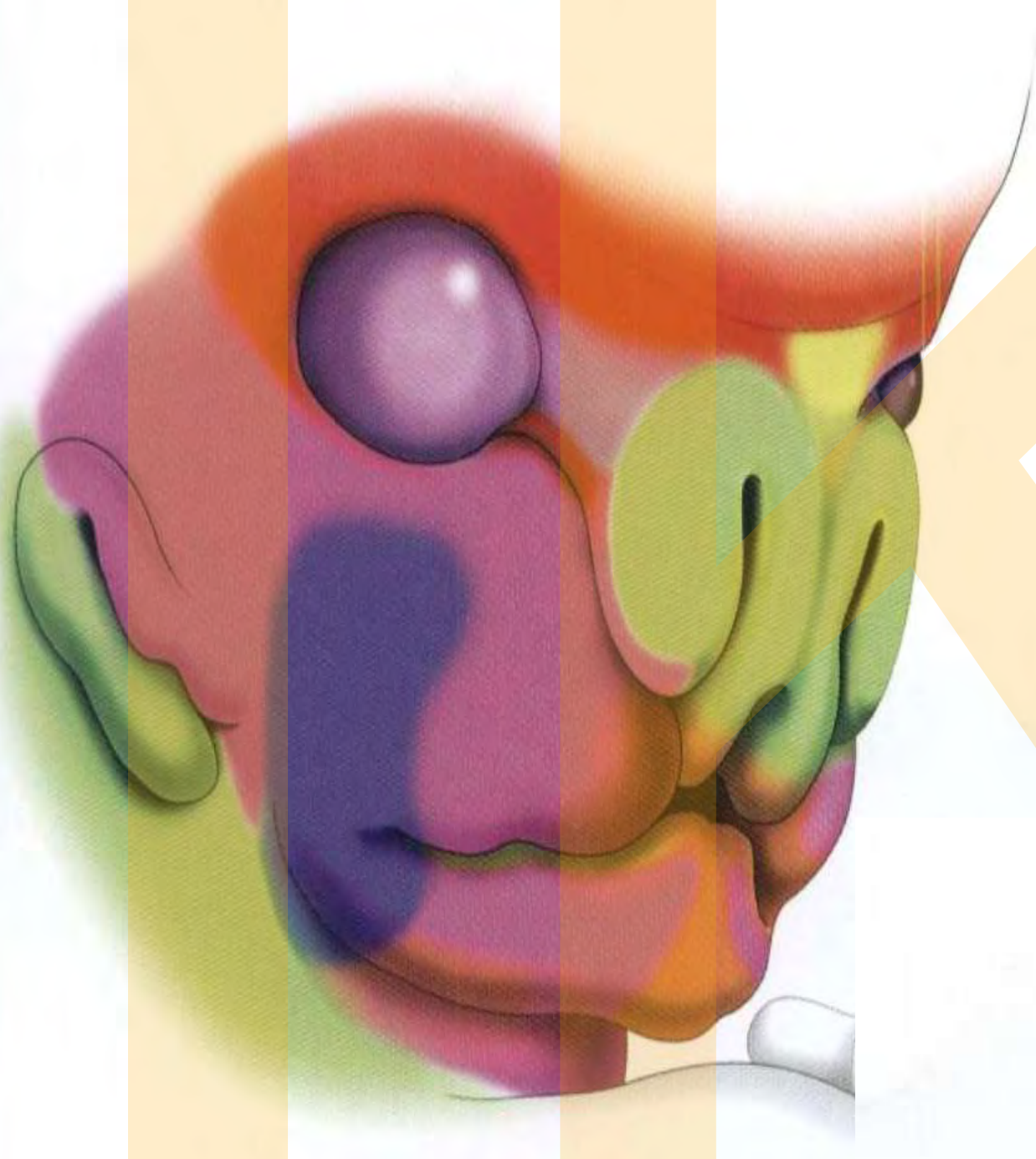
Zygomatico
- cutaneous
ligament



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 partiích lebky.

Líneas de tensión, según Rubin

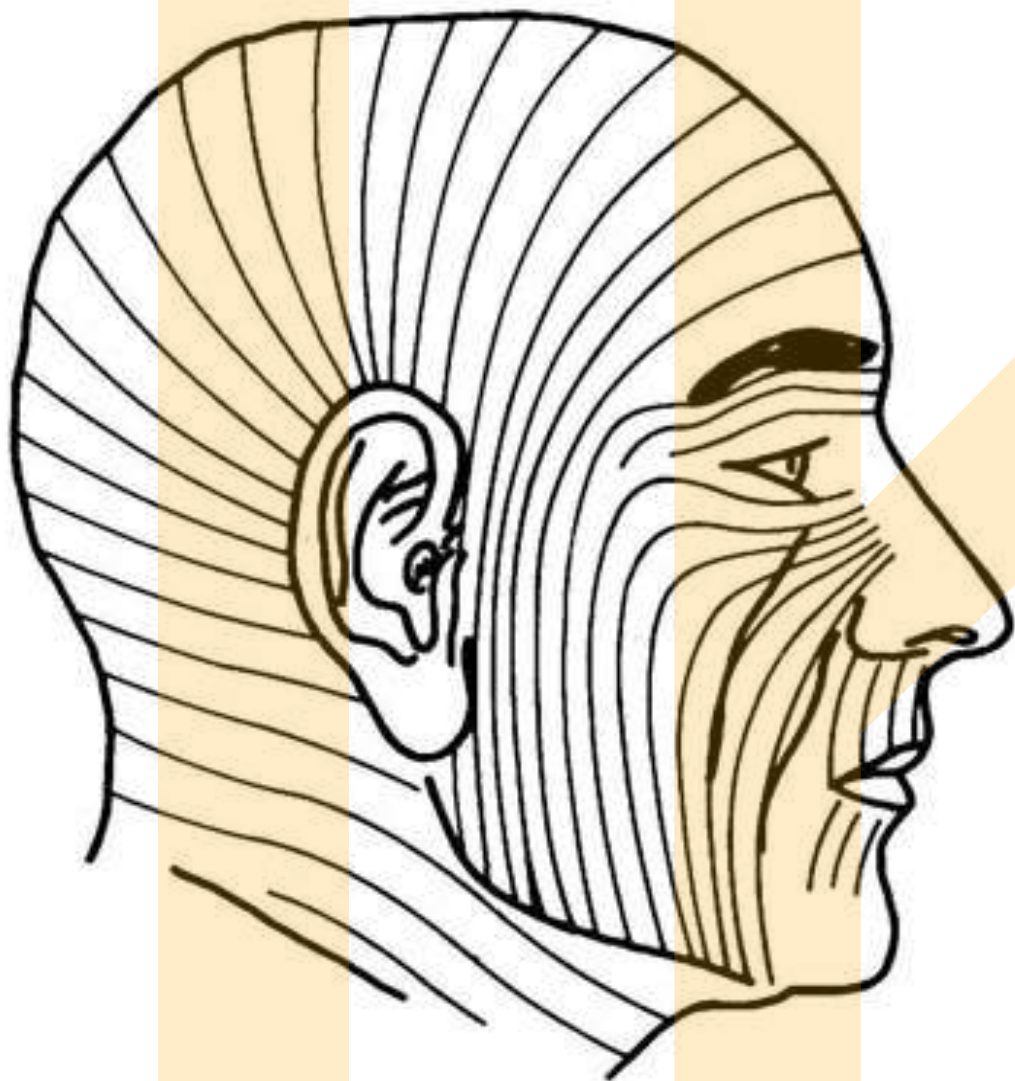
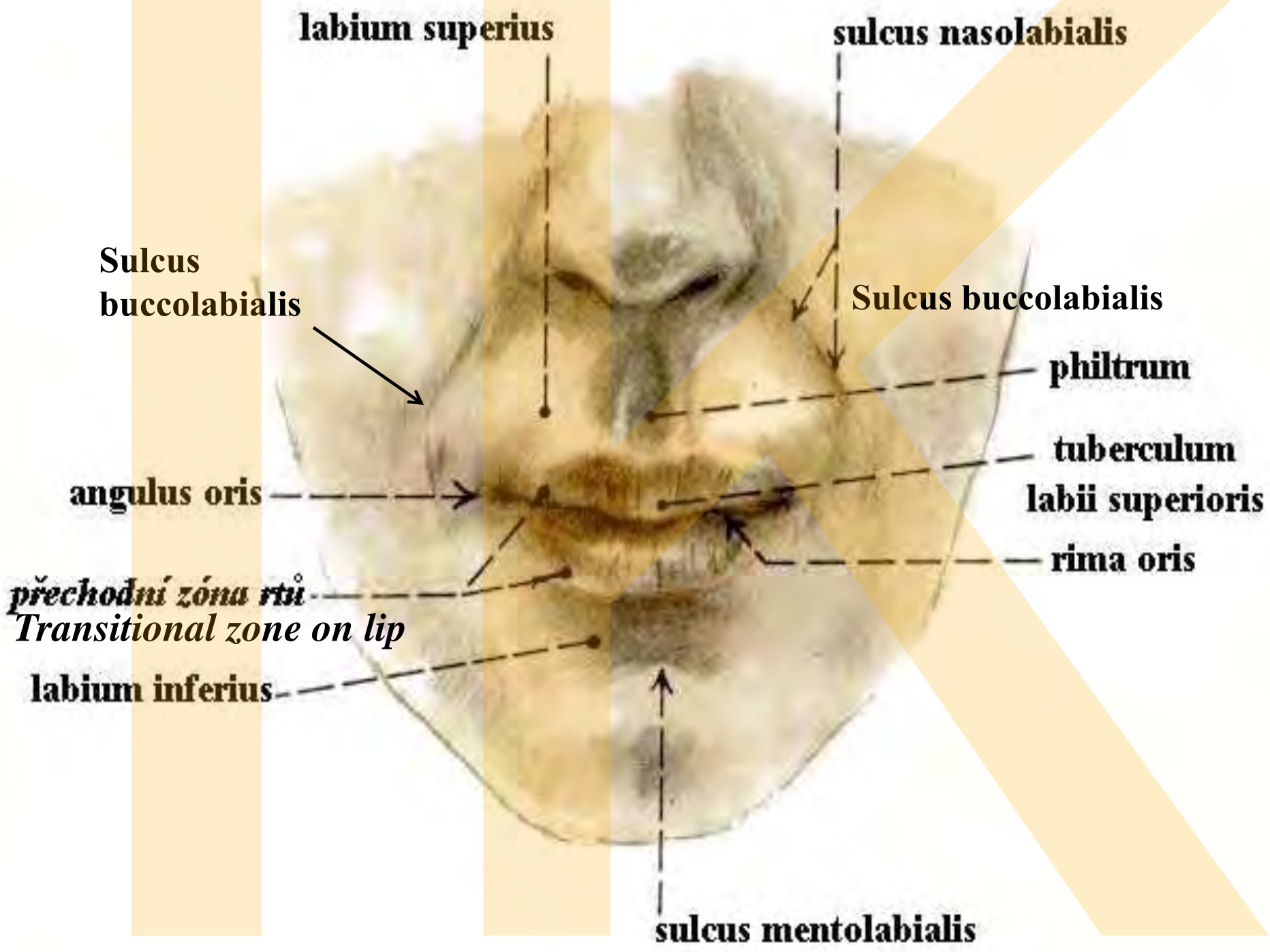


Fig. 1

Mrtvý ležící
Dead horizontal
position

Živý stojící
Erectile position



labium superius

sulcus nasolabialis

Sulcus buccolabialis

Sulcus buccolabialis

philtrum

tuberculum labii superioris

labii superioris

rima oris

angulus oris

přechodní zóna rtů
Transitional zone on lip

labium inferius

sulcus mentolabialis

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

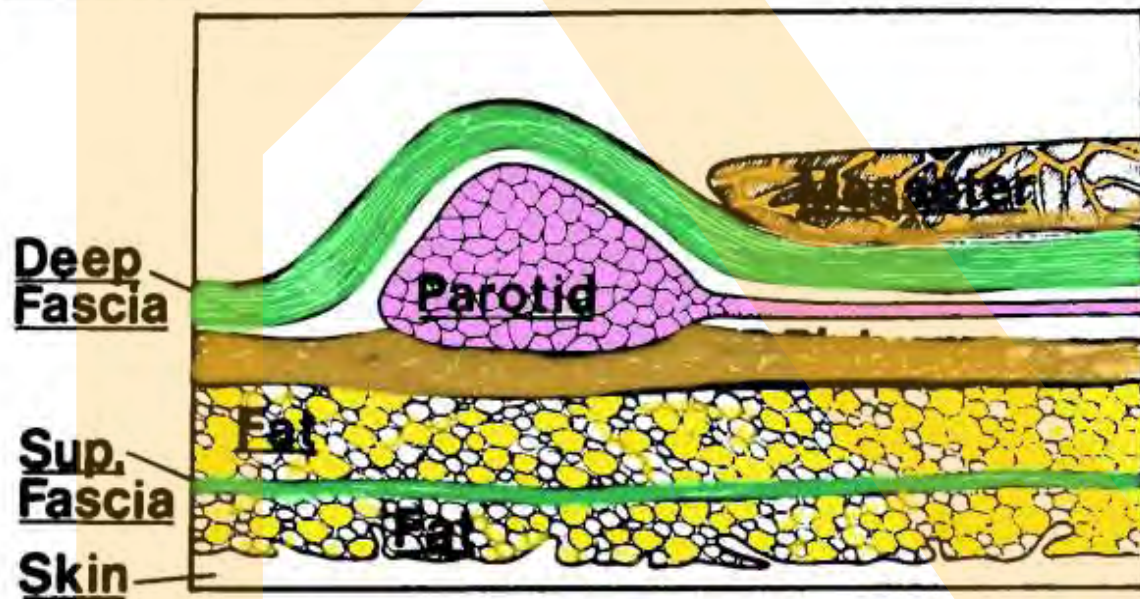
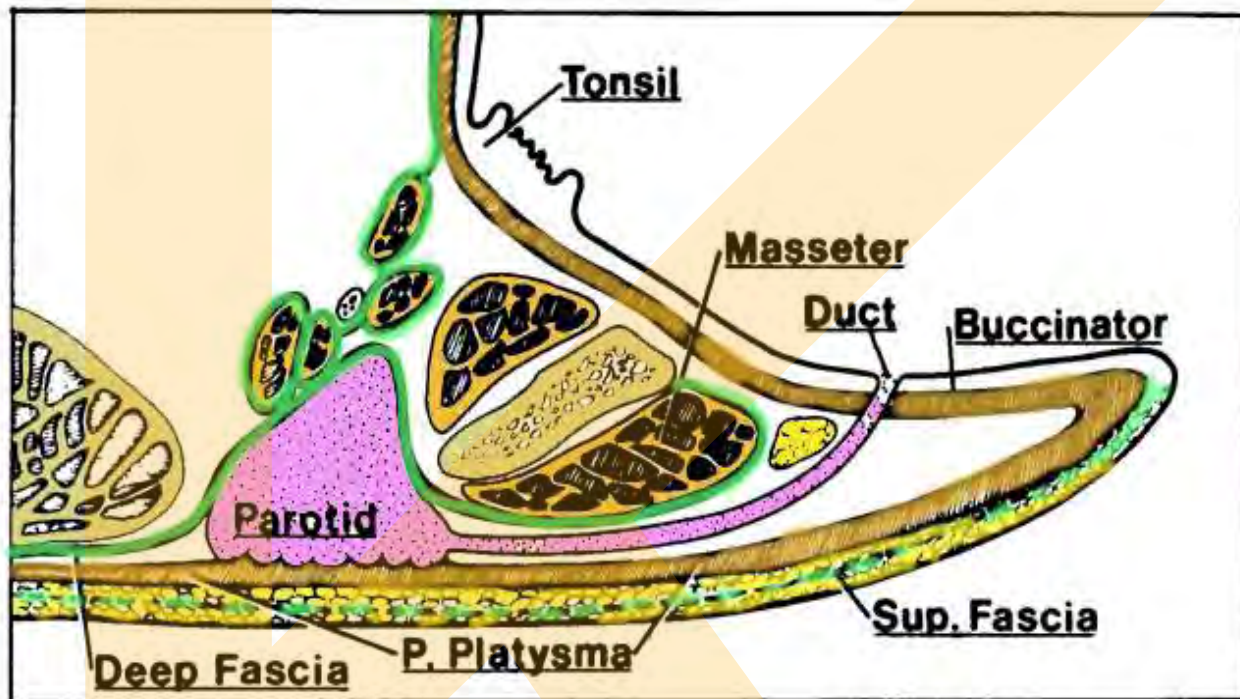
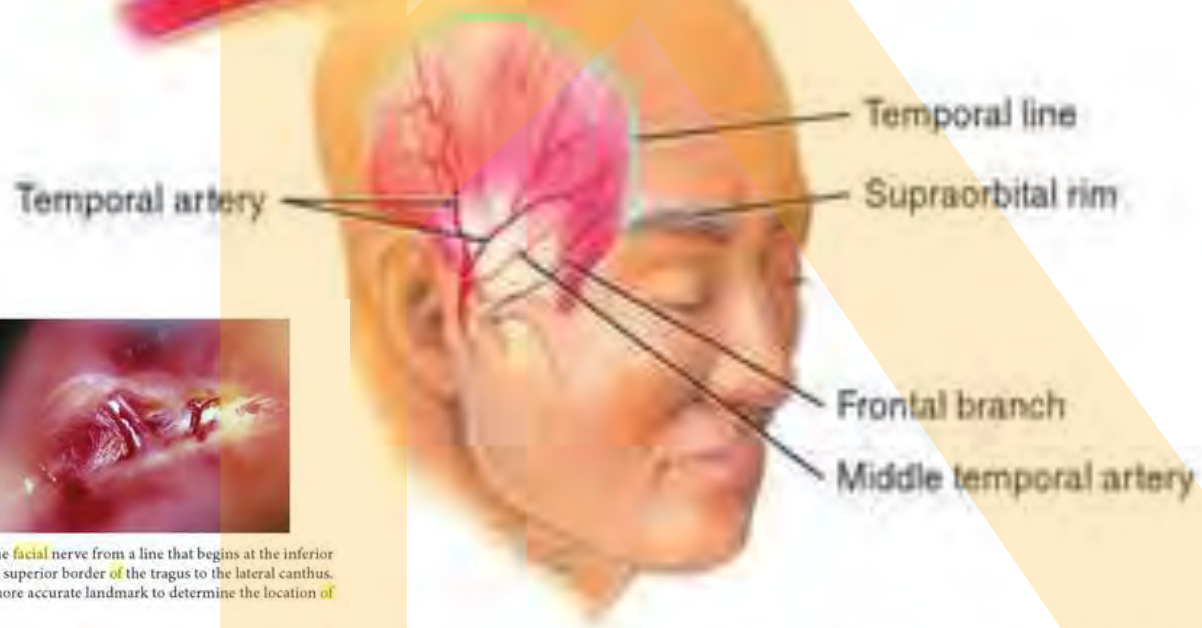
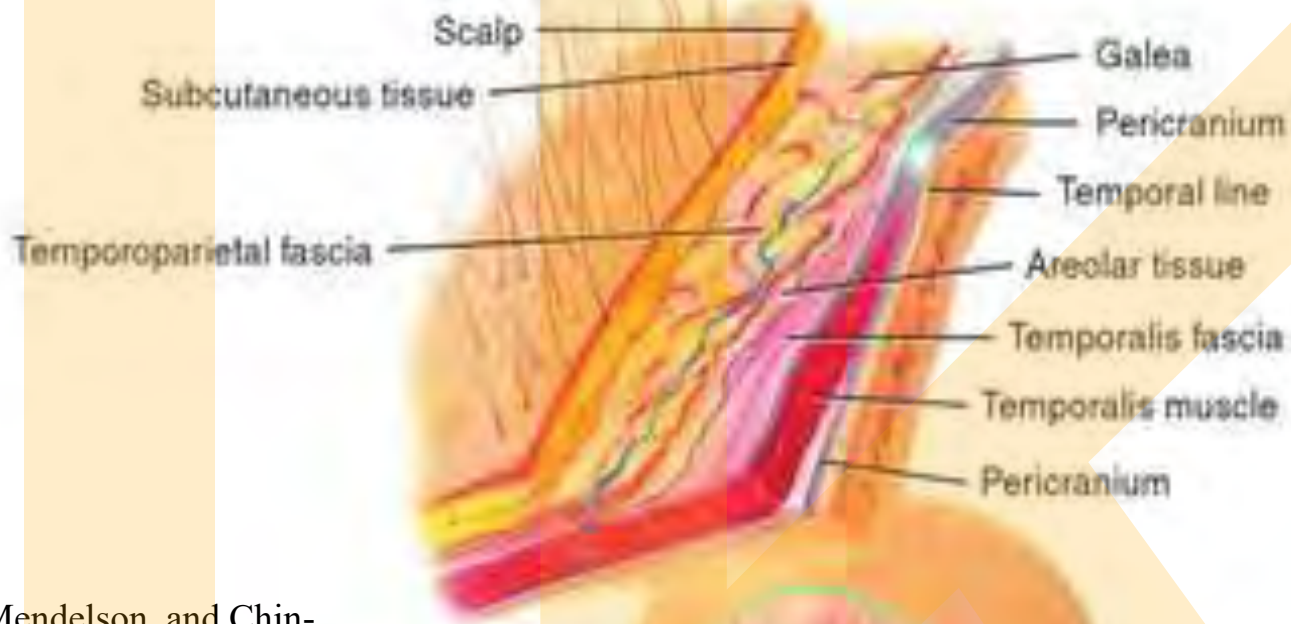


FIG. 4. Diagrammatic representation of the true anatomy of the masseter and parotid regions.

Cutis
Tunica subcutanea
Fascia temporoparietalis
Tunica areolaris
Fascia temporalis
Musculus temporalis
Pericranium



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.

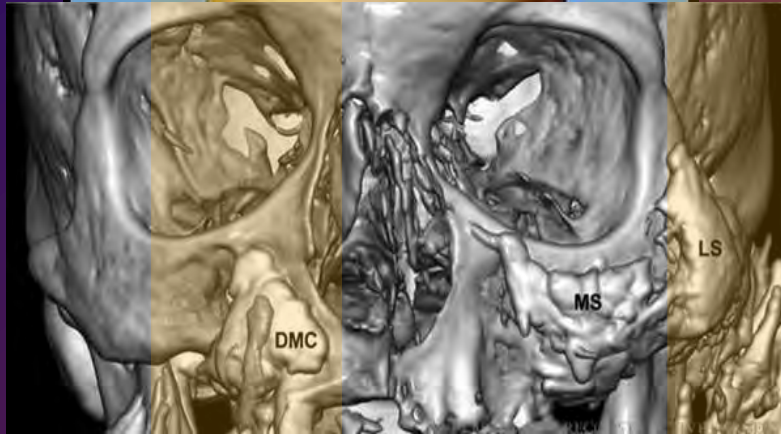
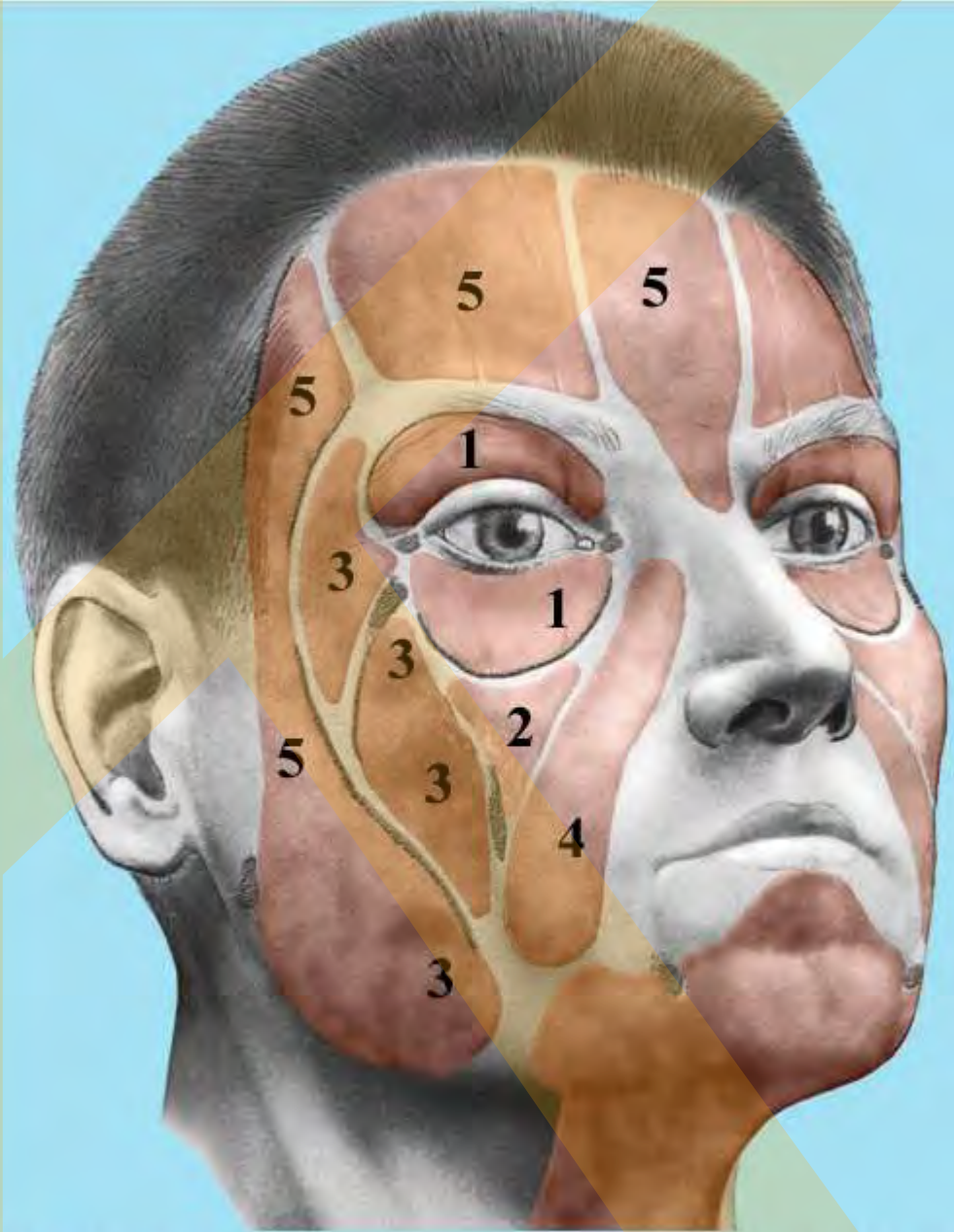
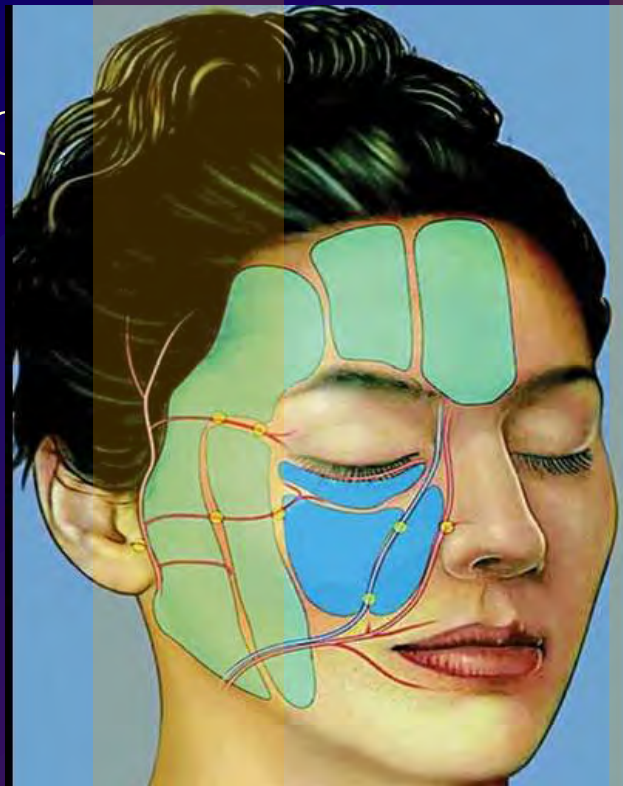


Fig. 3. The deep midfacial fat compartments. The deep medial cheek fat is composed of a medial part (DMC) and a lateral part (not shown). The medial part extends medially almost to the lateral incisor tooth. Augmentation of the deep medial cheek fat will consequently elevate and efface the nasolabial 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.

Fat in face is missing due to age gradually

- The subcutaneous fat of the face is divided into numerous, anatomically separable clusters.
- Sulcus nasolabialis is a fine groove with well-defined anatomical borders.
- Face fat (not Bichat's pillow) is divided into three sections: internal, middle and side.
- In the area of the forehead, three fat sections can be identified: the middle, side and intersecting sections between the middle and the lateral.
- Ophthalmic fat can be divided into three parts separated by septa.
- Grease in the chin is the lowest stored fat area of the face.
- Some structures between the skin and the periosteum are described as so-called "retaining ligaments "; and form a septum link between adjacent fatty regions.



+

11. Lips lose substantial volume and get thinner

Platysma

size: 8x12 cm

origin: Fascia upper part of the mm. pectoralis major and deltoideus

insertion: skin and subcutaneous layer of the lower face part.

! No direct connection with skull periosteum !

Vascular supply:

main source: a. submentalis

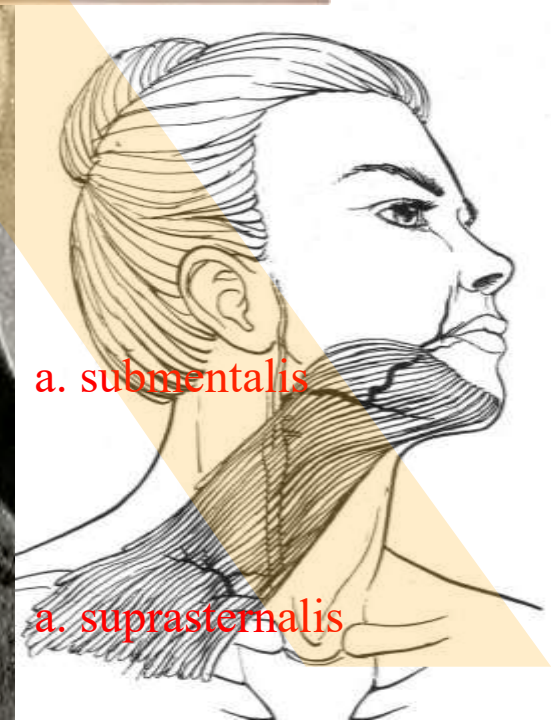
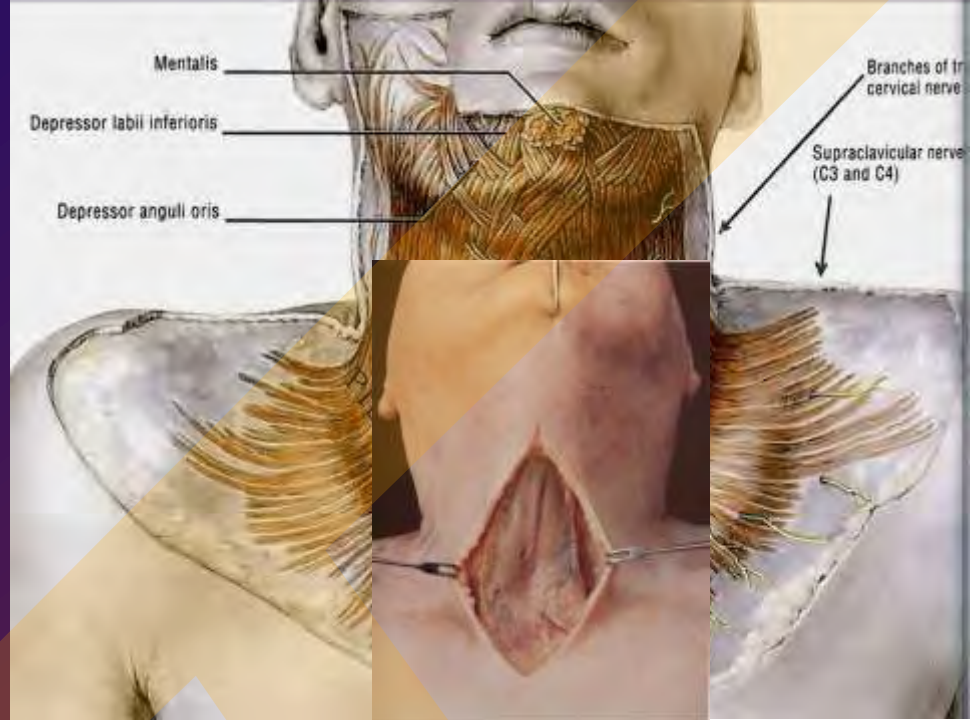
small source: a. suprasternalis

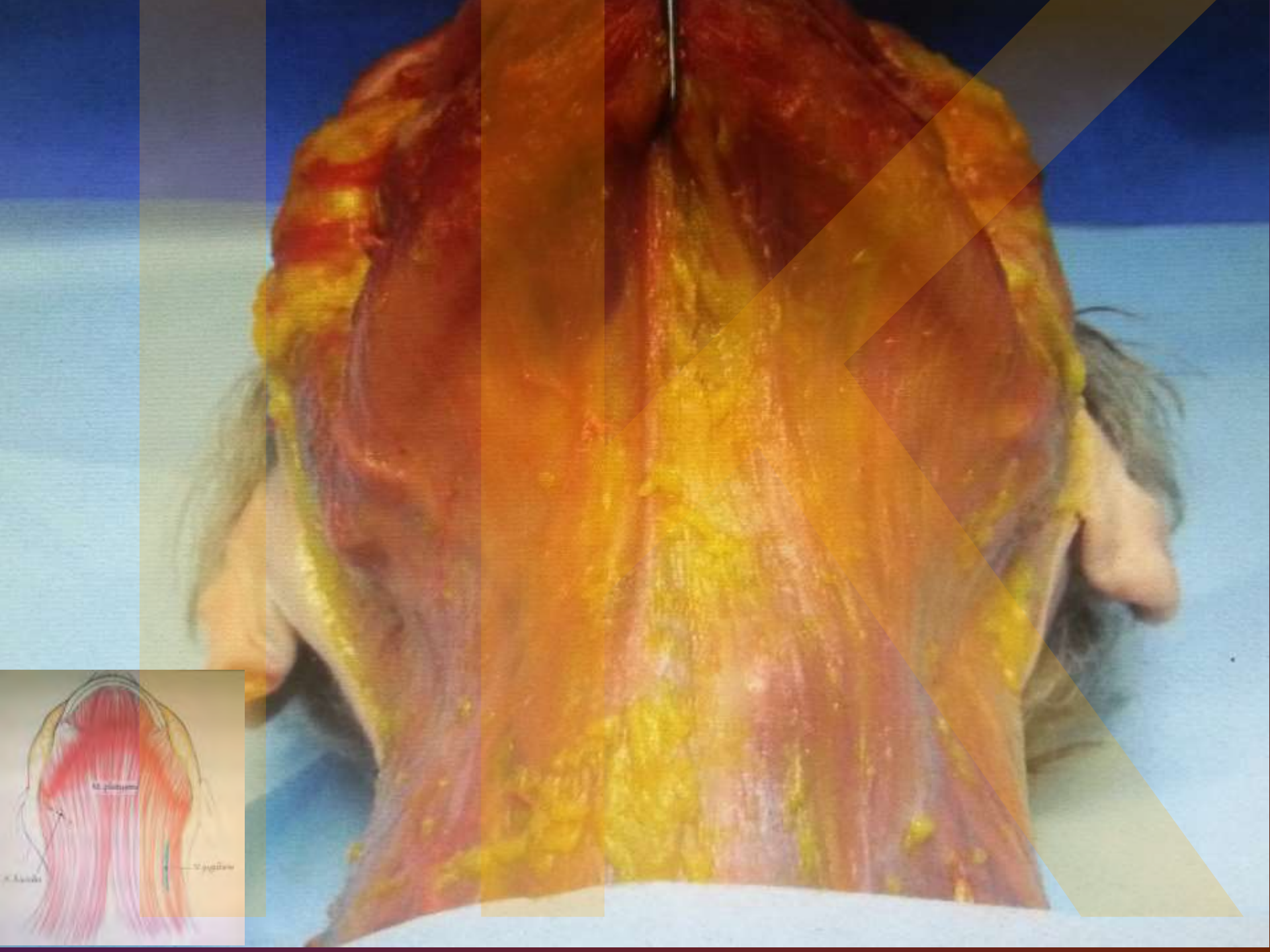
Nerve supply:

Motor: cervical branches of n. VII

Sensory:

n. cervicalis transversus





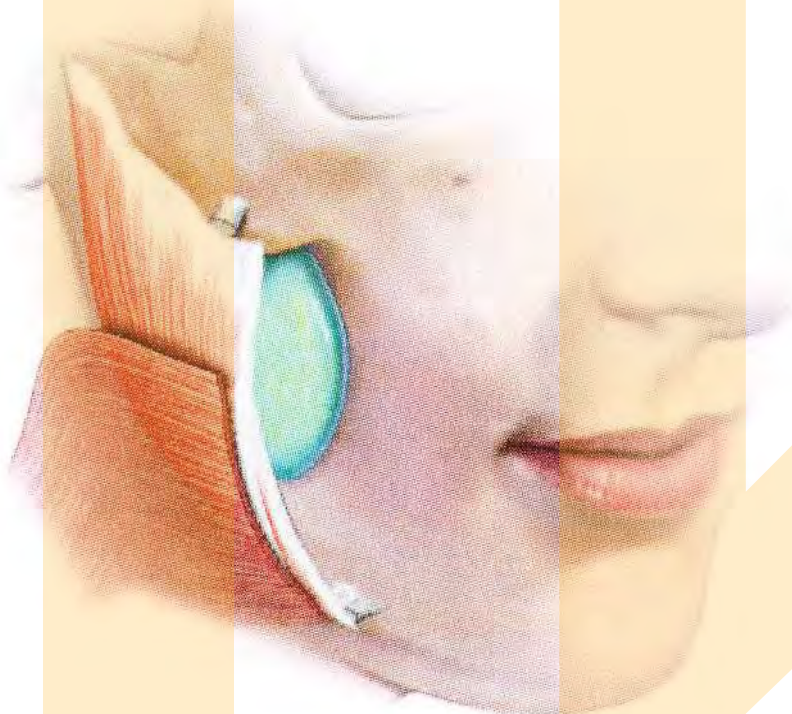
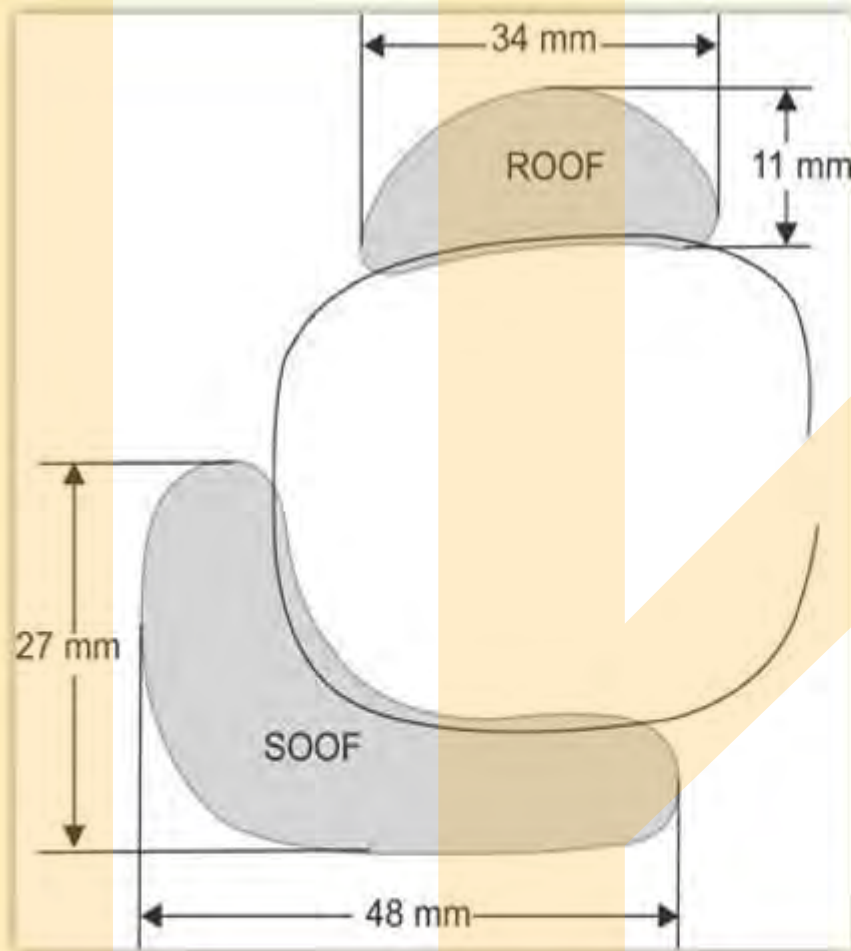
A**B**

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.

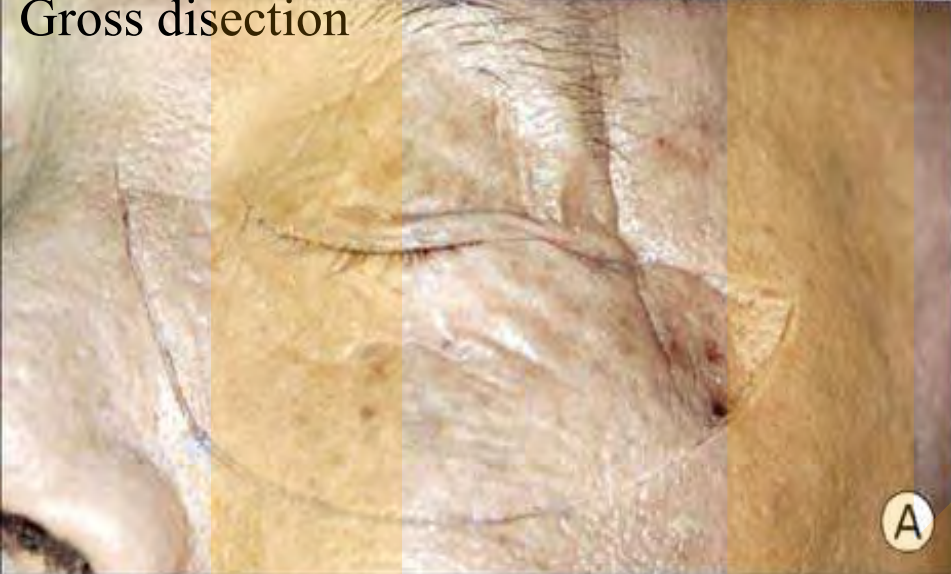
Dimensions of the SOOF. The length of the SOOF horizontal part is almost equal to a transverse orbital dimension. The height of the SOOF vertical part was about three fourth ($b \times 3/4$) of the vertical orbital dimension and the width of the vertical part was one fourth ($a/4$) of a transverse orbital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

FIG
me
mr
to

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.



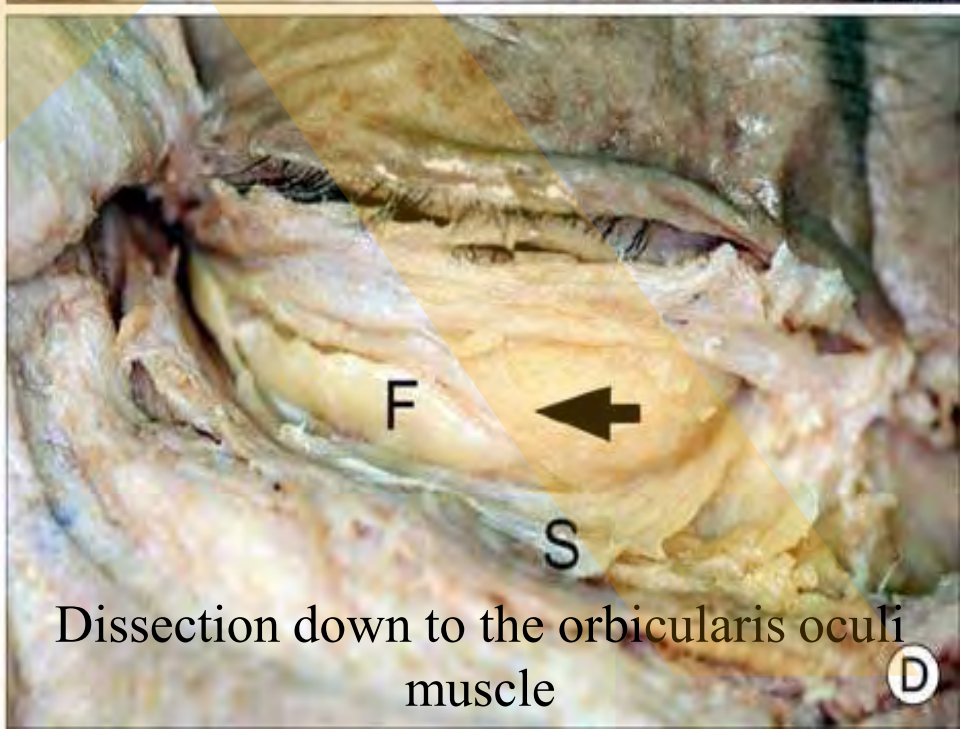
Gross dissection



A skin incision 1 cm away from the orbital rim.



m. orbicularis oculi is separated from the orbital septum



Dissection down to the orbicularis oculi muscle

Muscles around nose

❖ M. nasalis

- ❖ from ventral maxilla surface to nose root; pars transversa (constrictor) et pars alaris (dilatator)

❖ M. levator labii superioris alaequae nasi

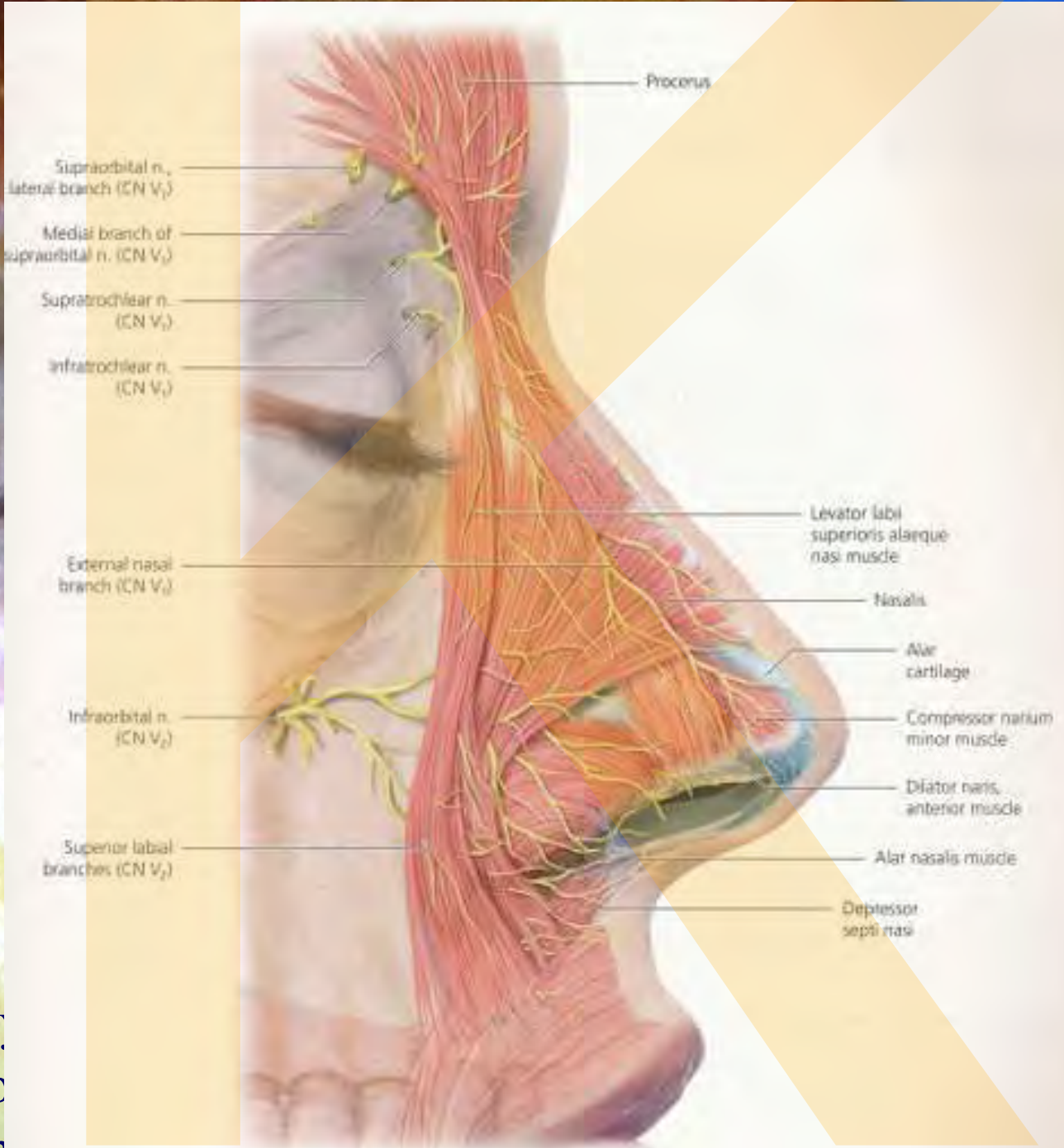
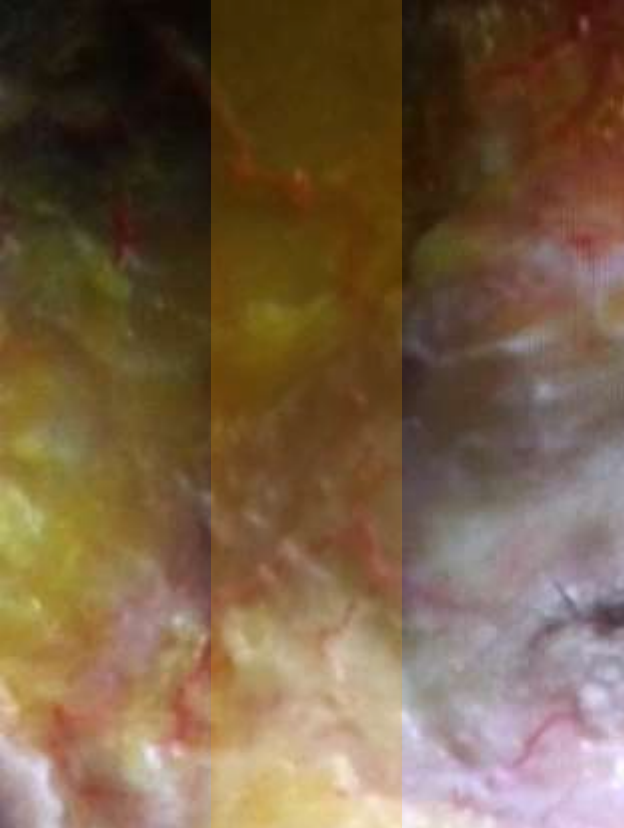
- ❖ Pars nasalis et pars labialis

❖ M. depressor septi nasi

- ❖ from ventral maxilla surface (fossa incisiva maxillae) to nose root and glabella

❖ M. procerus

- ❖ from nose root (aponeurosis septi nasi) to glabella



1
C
n

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

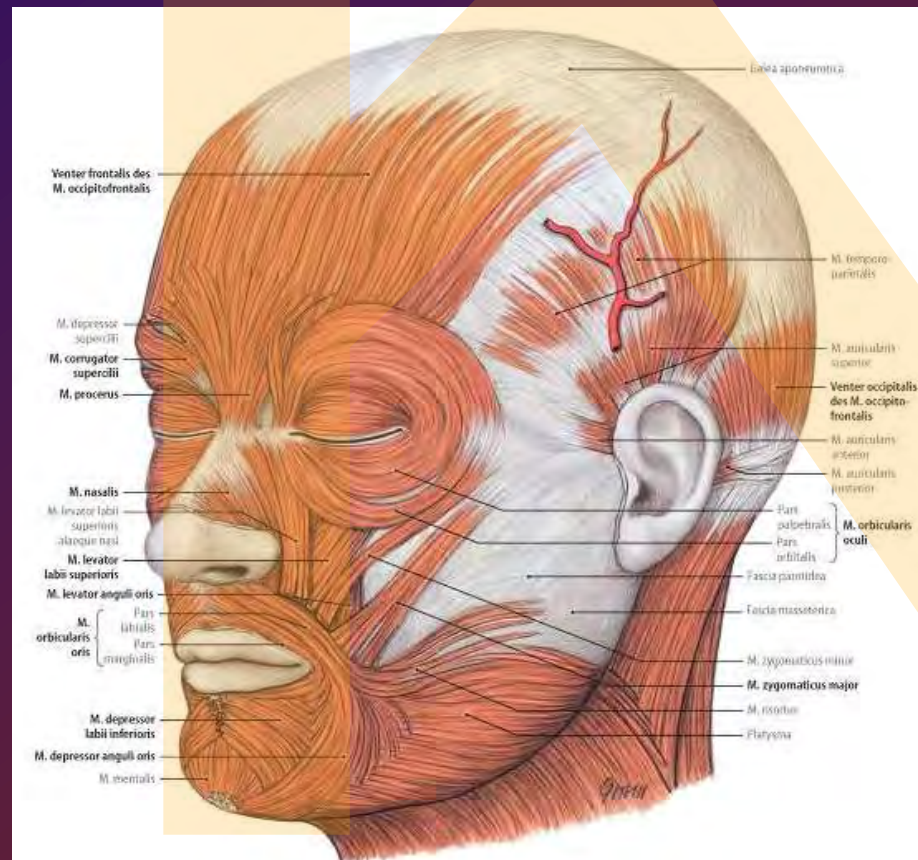
- ❖ Pod margo infraorbitalis
- ❖ Do kůže u sulcus nasolabialis

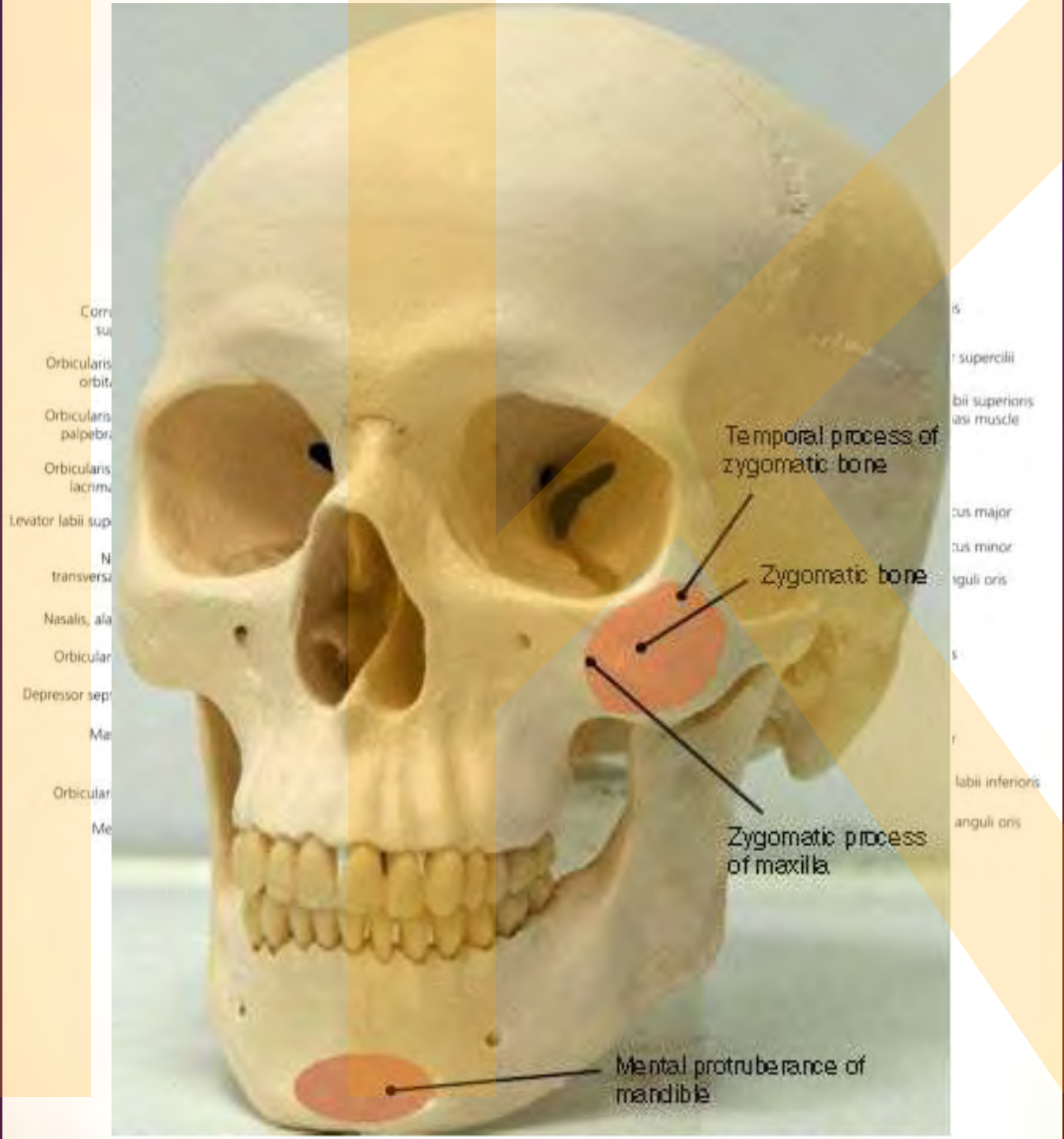
❖ M. zygomaticus minor

- ❖ Os zygomaticum
- ❖ K distálnímu okraji sulcus nasolabialis

❖ M. zygomaticus major

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





Cor
su
Orbicularis
orbit
Orbicularis
palpebr
Orbicularis
lacrim
Levator labii sup
N
transvers
Nasalis, ala
Orbicular
Depressor sept
Me
Orbicular
Me

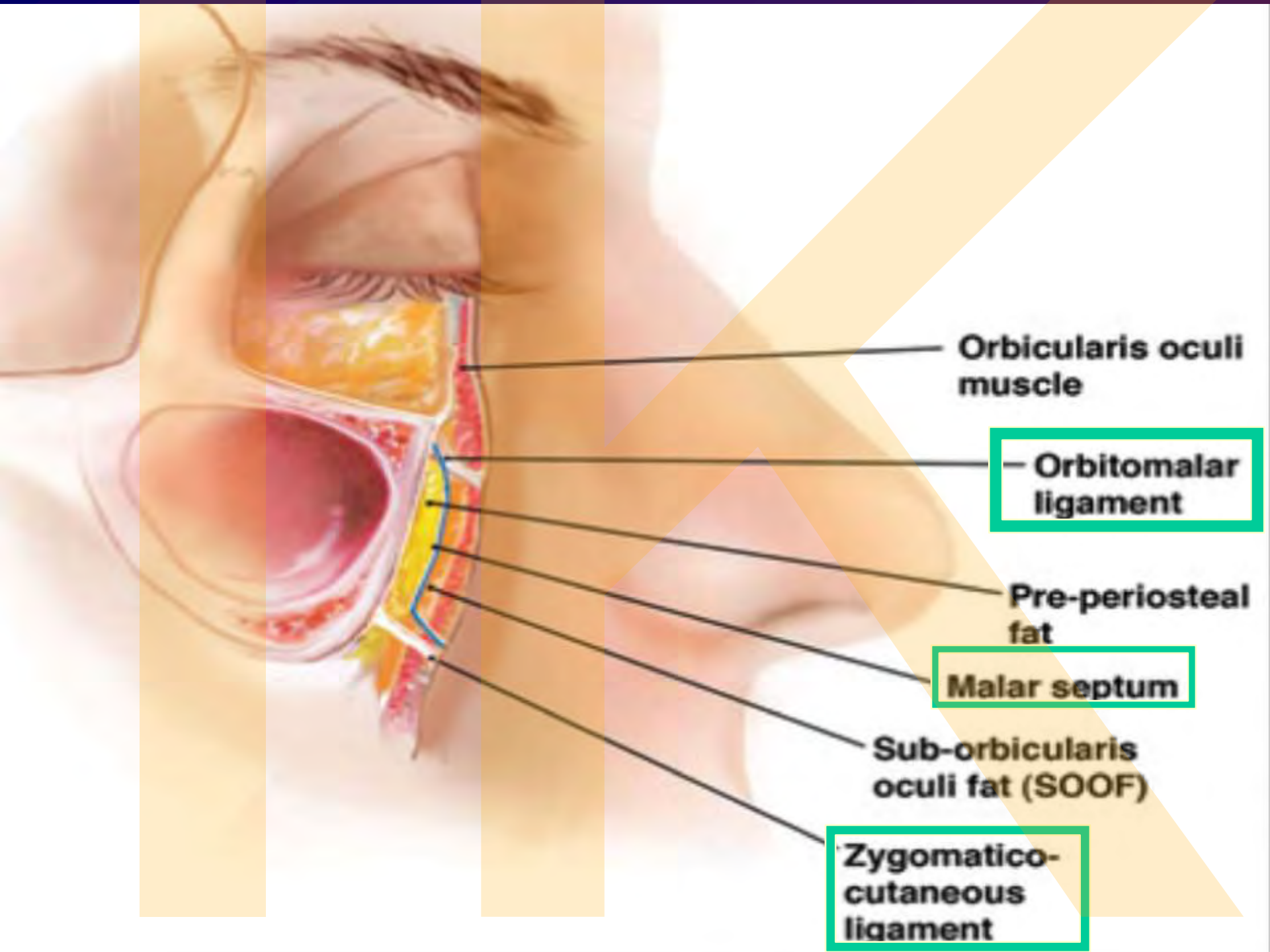
is
r supercilli
bii superioris
asi muscle
cus major
cus minor
nguli oris
s
r
labii inferioris
anguli oris

Temporal process of
zygomatic bone

Zygomatic bone

Zygomatic process
of maxilla

Mental protuberance of
mandible



Orbicularis oculi muscle

Orbitomalar ligament

Pre-periosteal fat

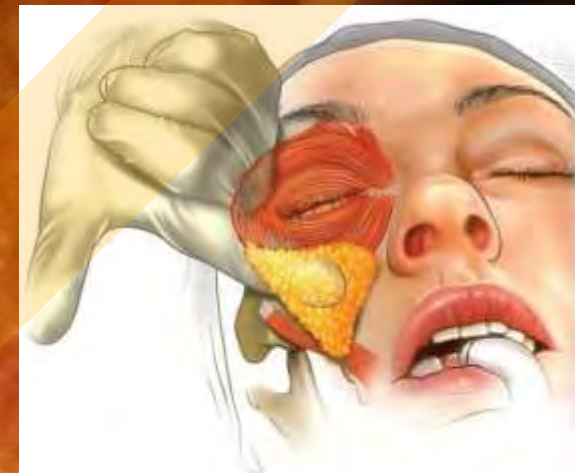
Malar septum

Sub-orbicularis oculi fat (SOOF)

Zygomatico-cutaneous ligament

Face tvář

malar fat expansion



external malar pad

Vnější tvářové tukové těleso

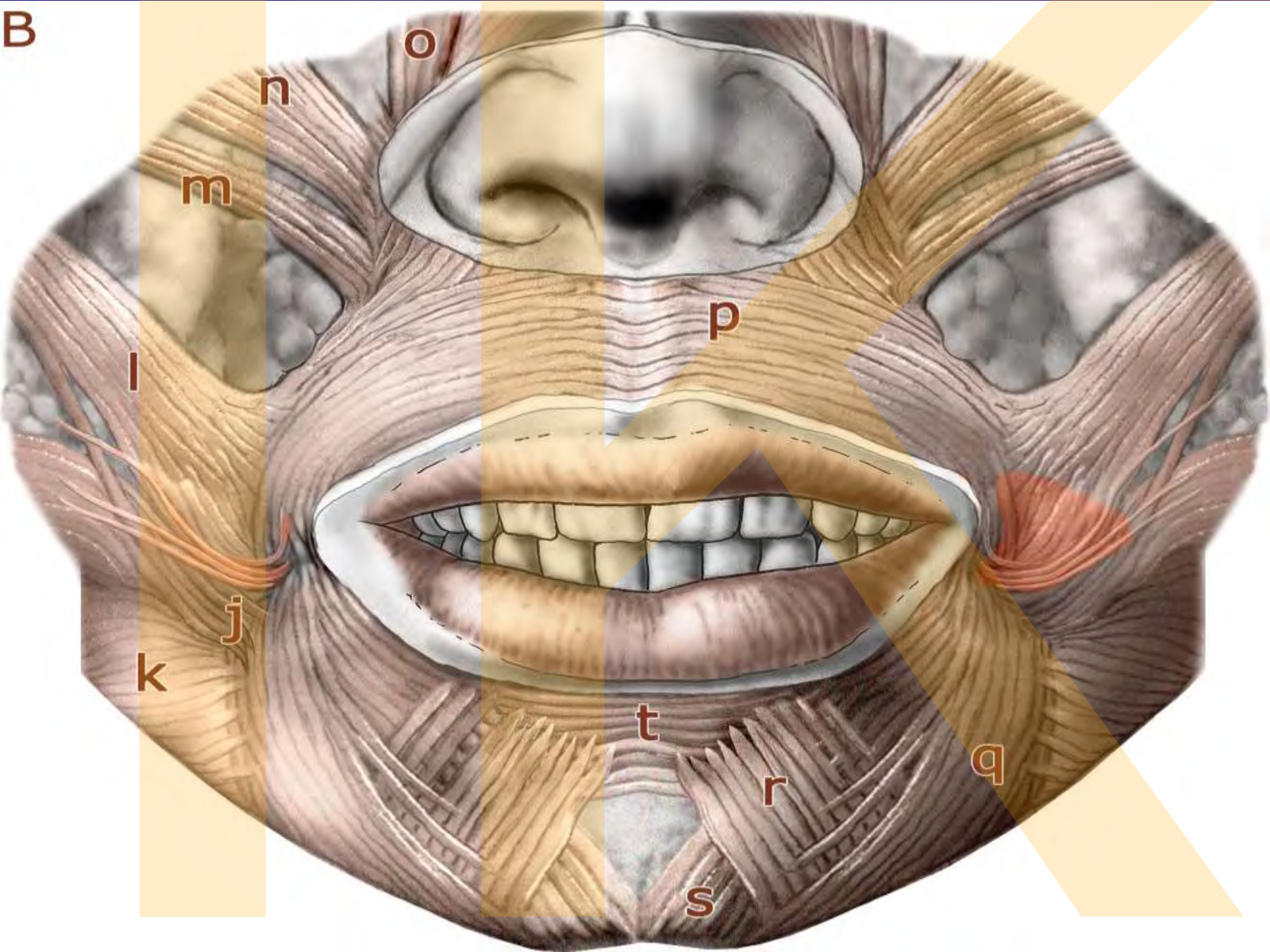


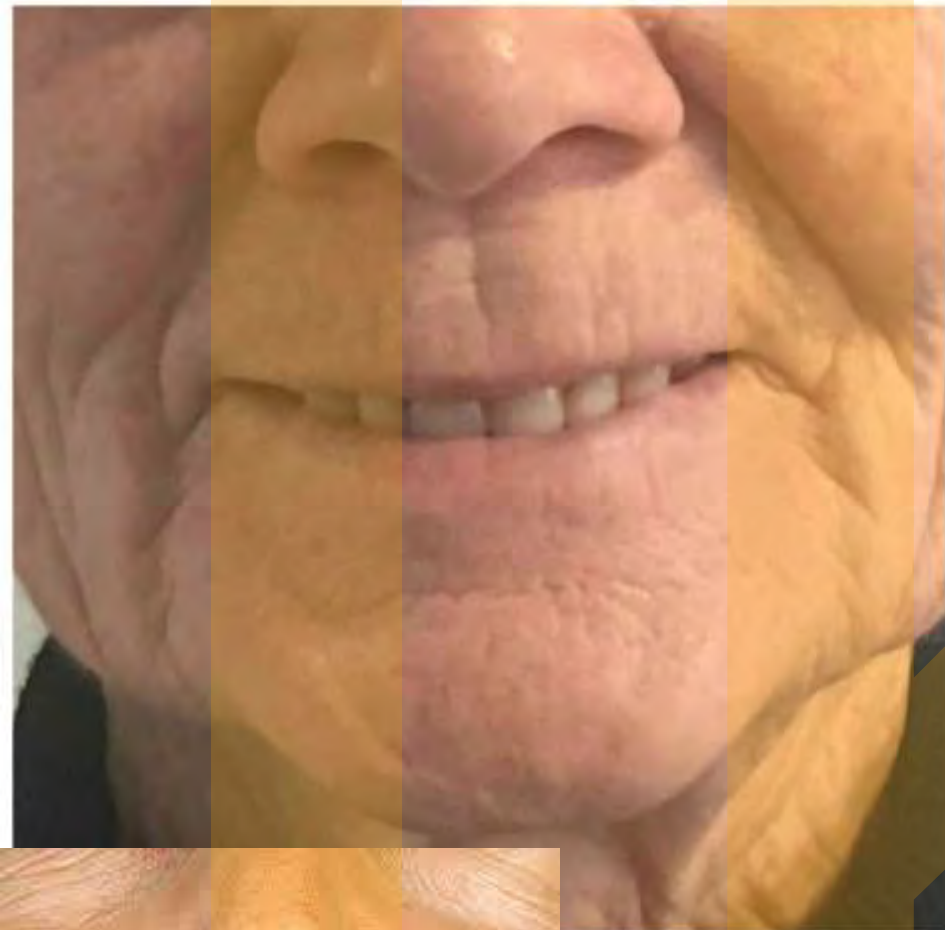
Zygomaticus major – variations

cca 12 mm

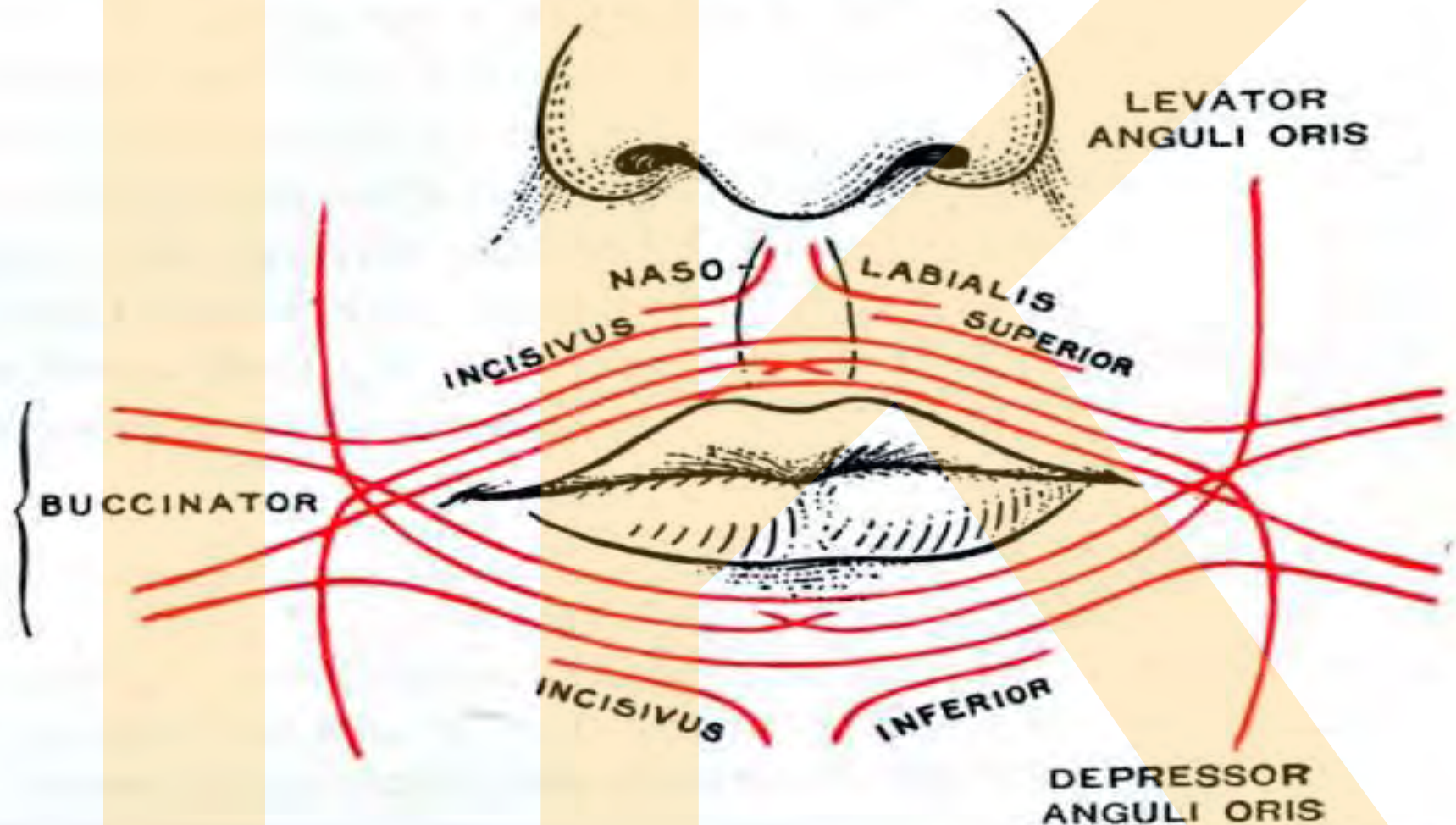
Duplicat form (zygomaticus duplex)
Rarely connected with s m. marginalis oculi



B

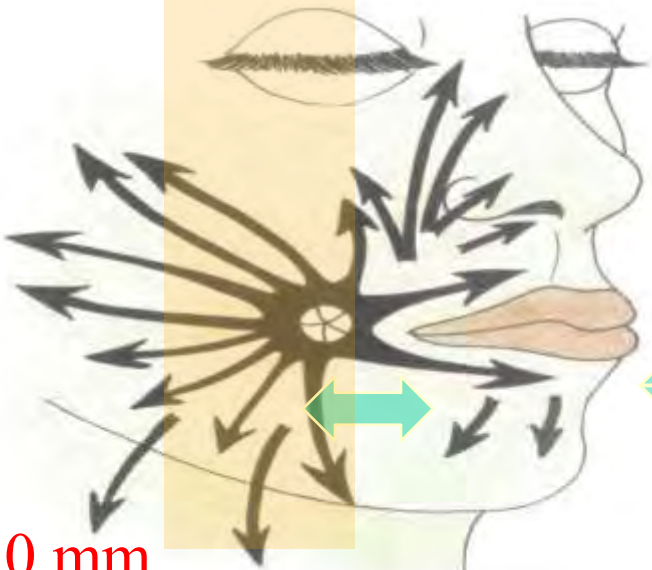
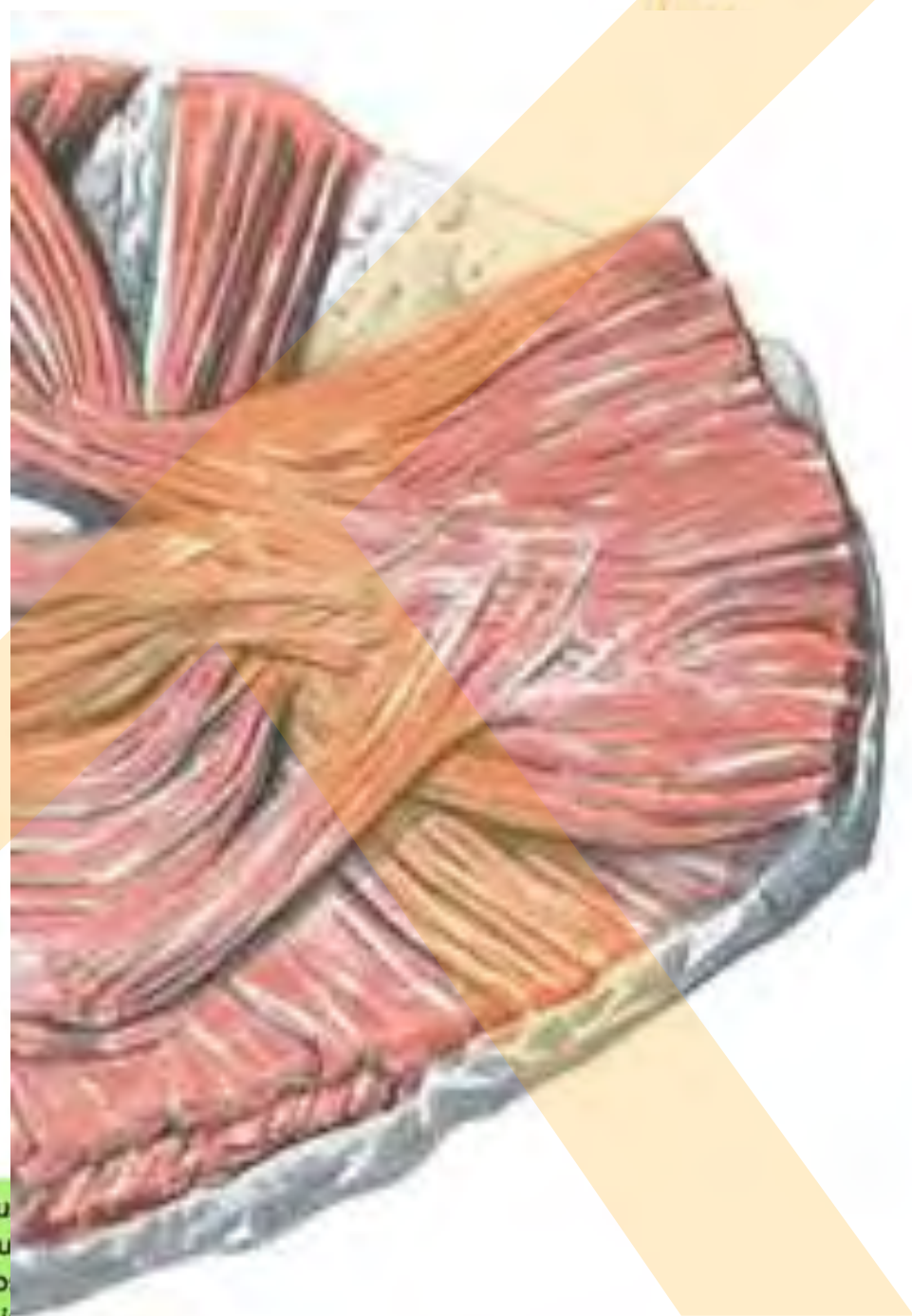
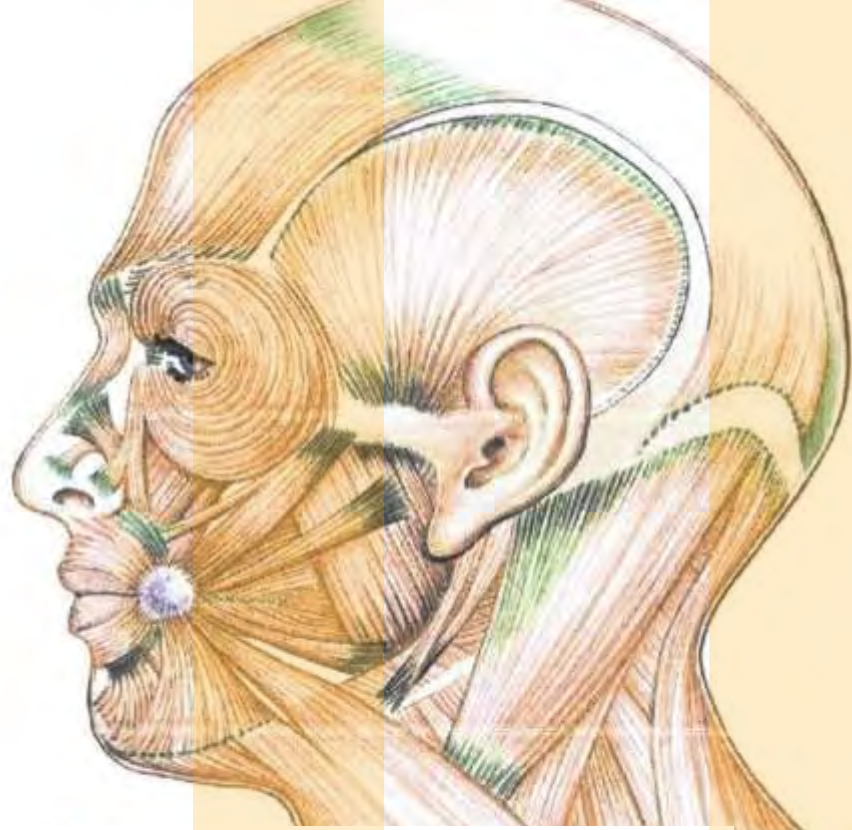


Traction muscles: pars labialis m. levator labii superioris alaequae nasi, levator labii superioris, zygomaticus minor, depressor labii inferioris, pars labialis platysmatis
Perpendicularly connect lip (depression, protraction, eversion)



Muscles around corner: 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

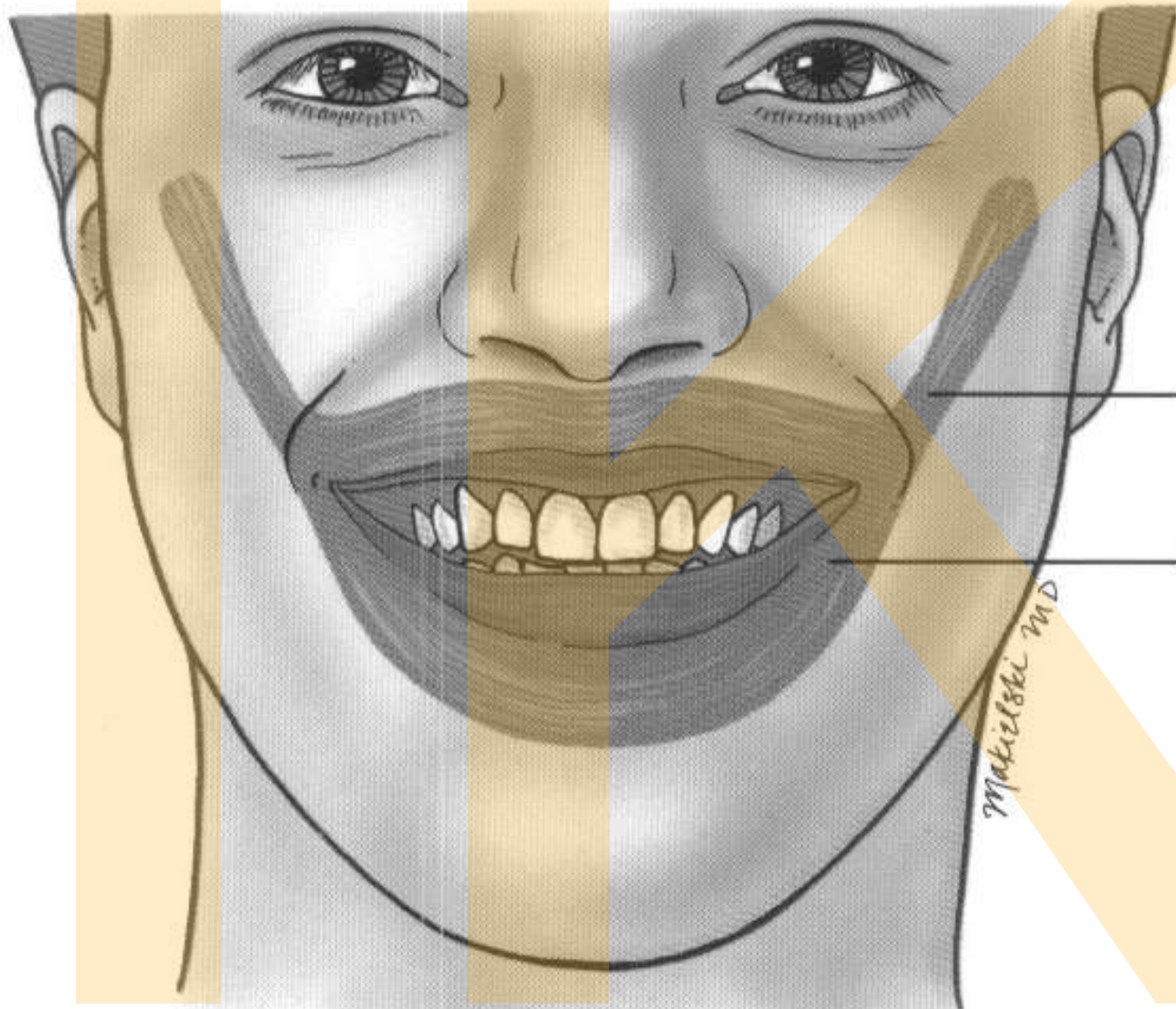
Movement with mouth corner (elevation, depression, constriction and dilation rima oris)



5 mm

The modiolu
conelike stru
buccal muco
of the cone i

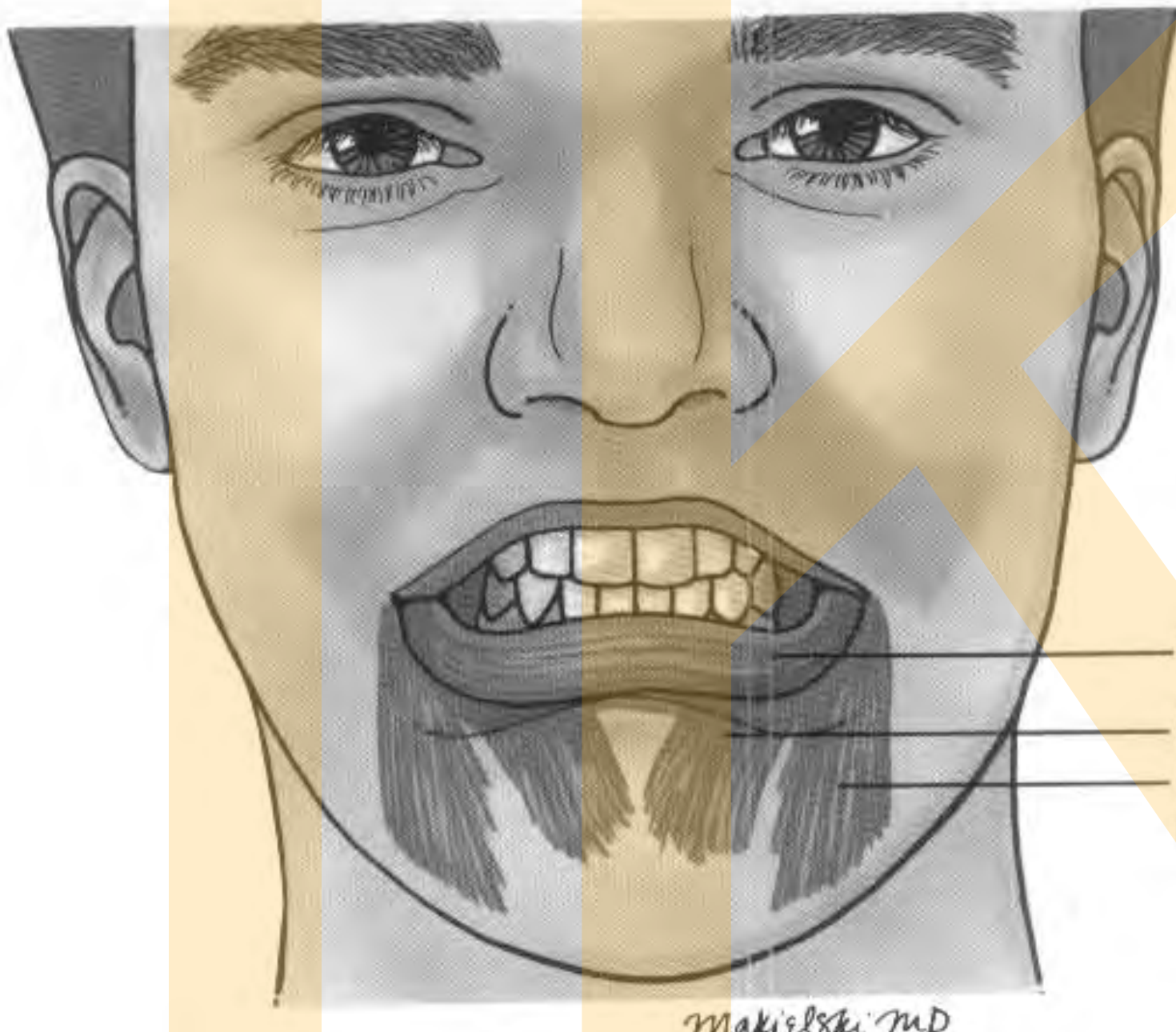
10 mm



Major zygo

Orbicularis

Makielski MD

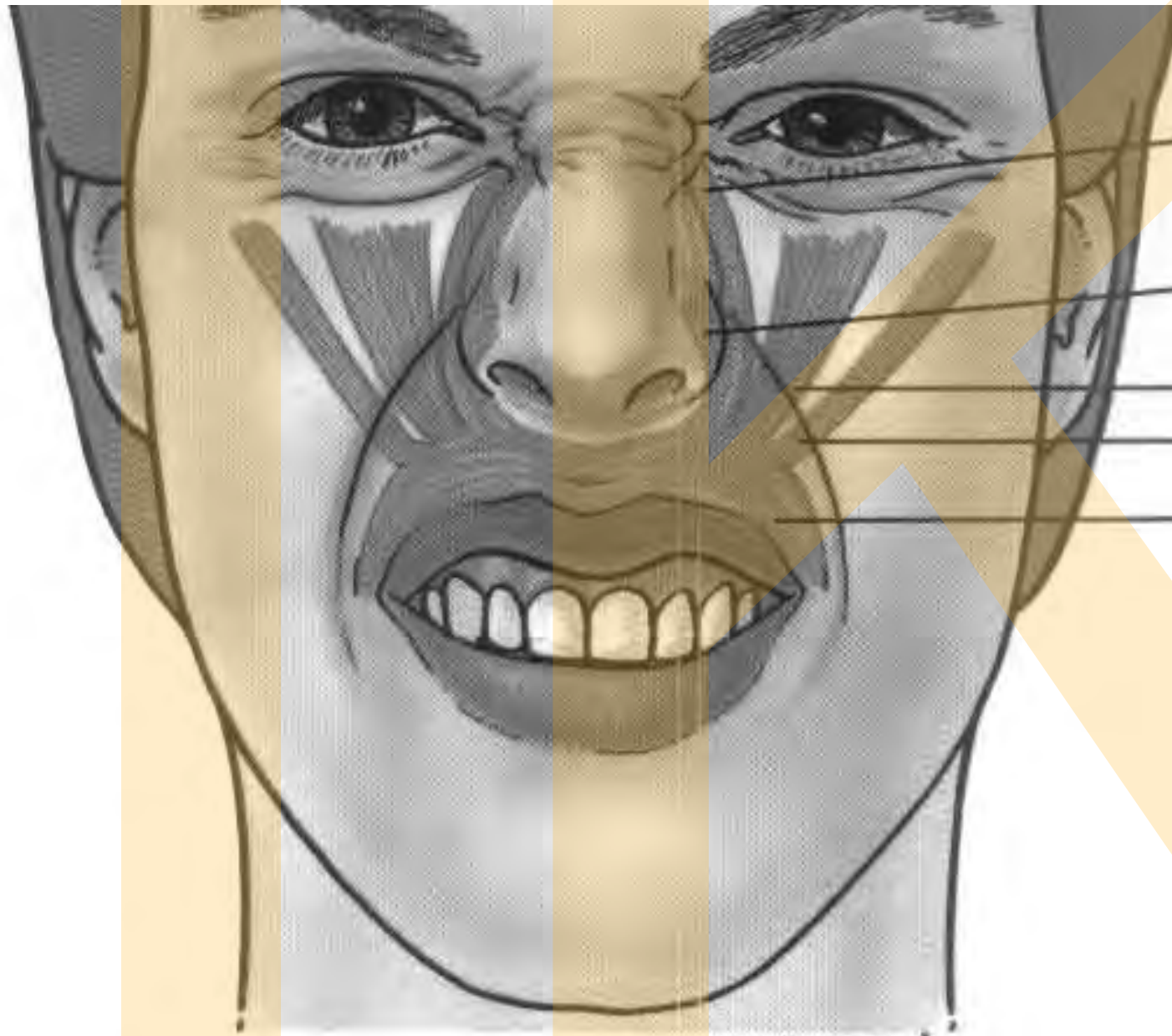


Orbicularis oris m.

Mentalis m.

Depressor anguli
oris m.

Makielski MD



Levator labii superioris
alaeque nasi m.

Dilator naris
Portion of nasolabialis m.

Levator labii medialis m.

Minor zygomatic m.

Orbicularis oris m.

Makiel'ski mD

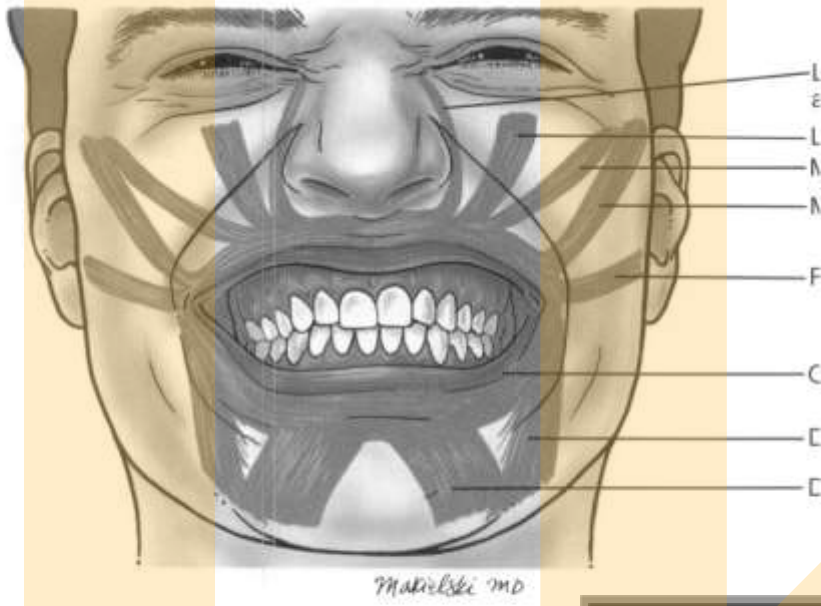


FIG. 6.9. Musculature of the mouth and the lips. The multiple functions (chewing, taste, speech, social expression) require a complex set of motions facilitated by the interplay between the circular contraction of the orbicularis oris and the radial elevators and depressors.

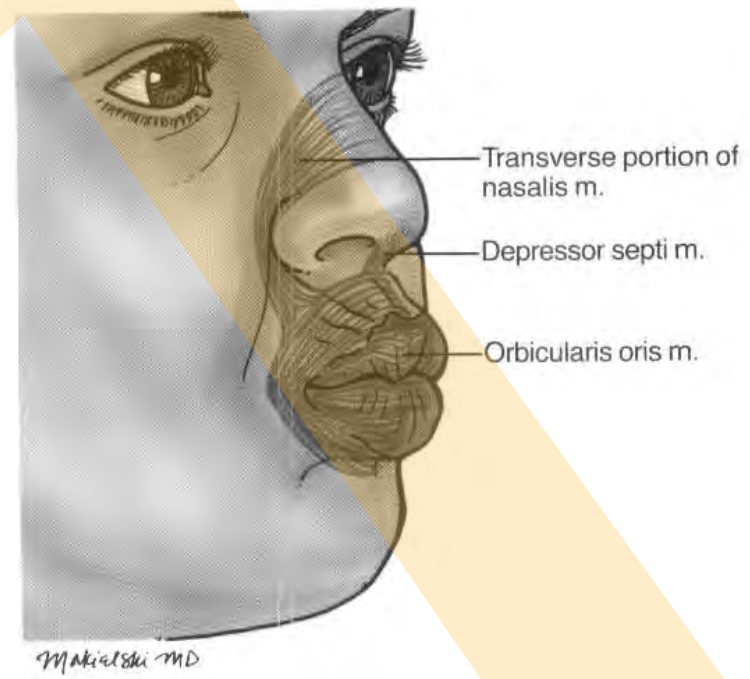
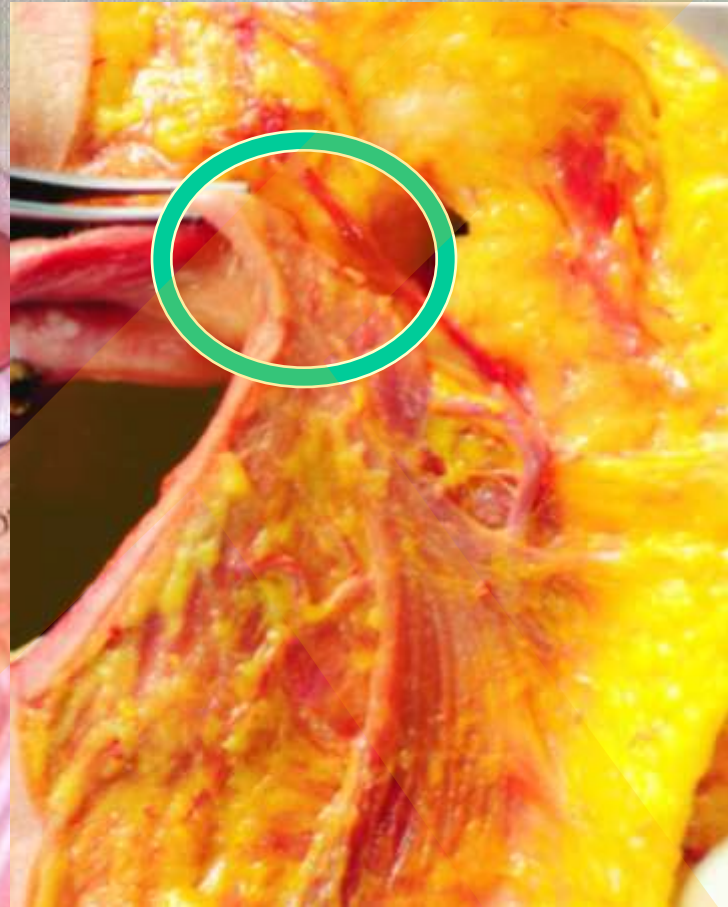
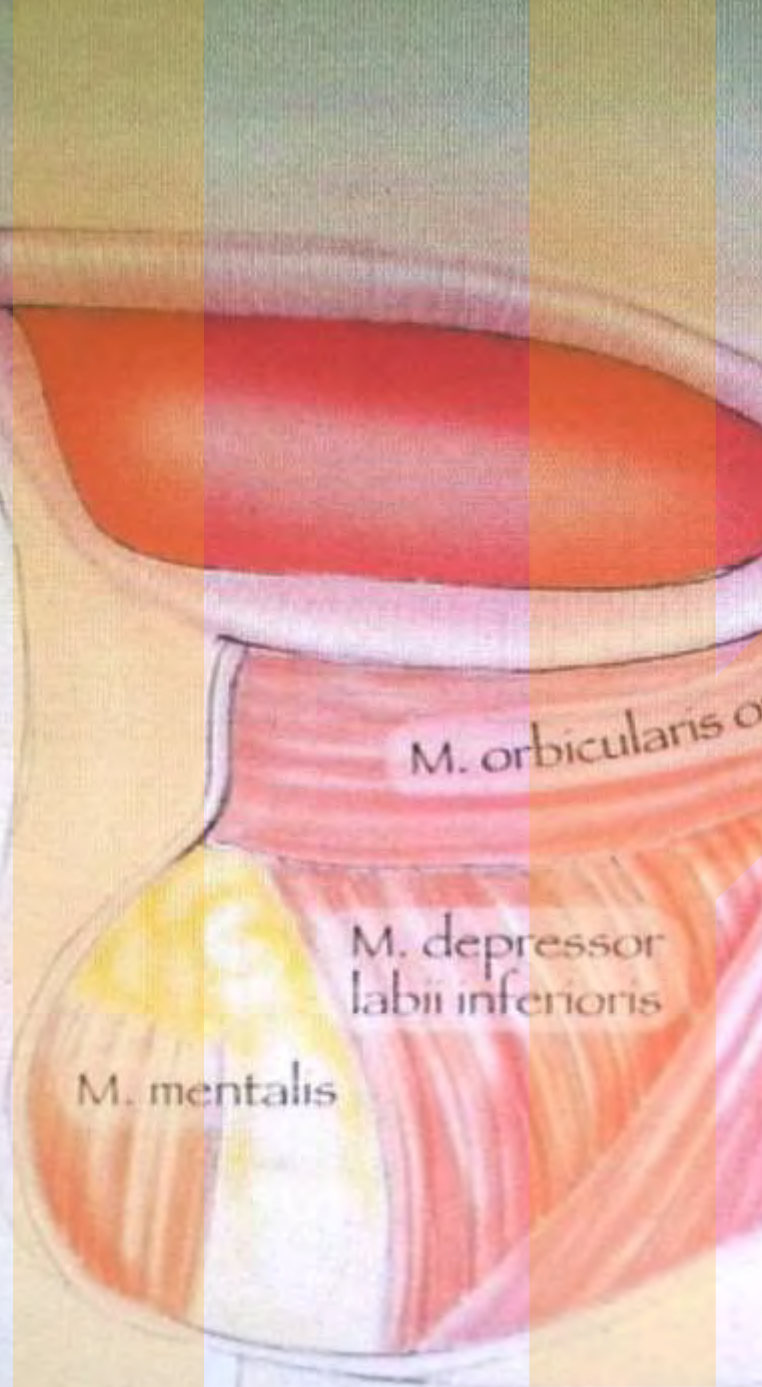
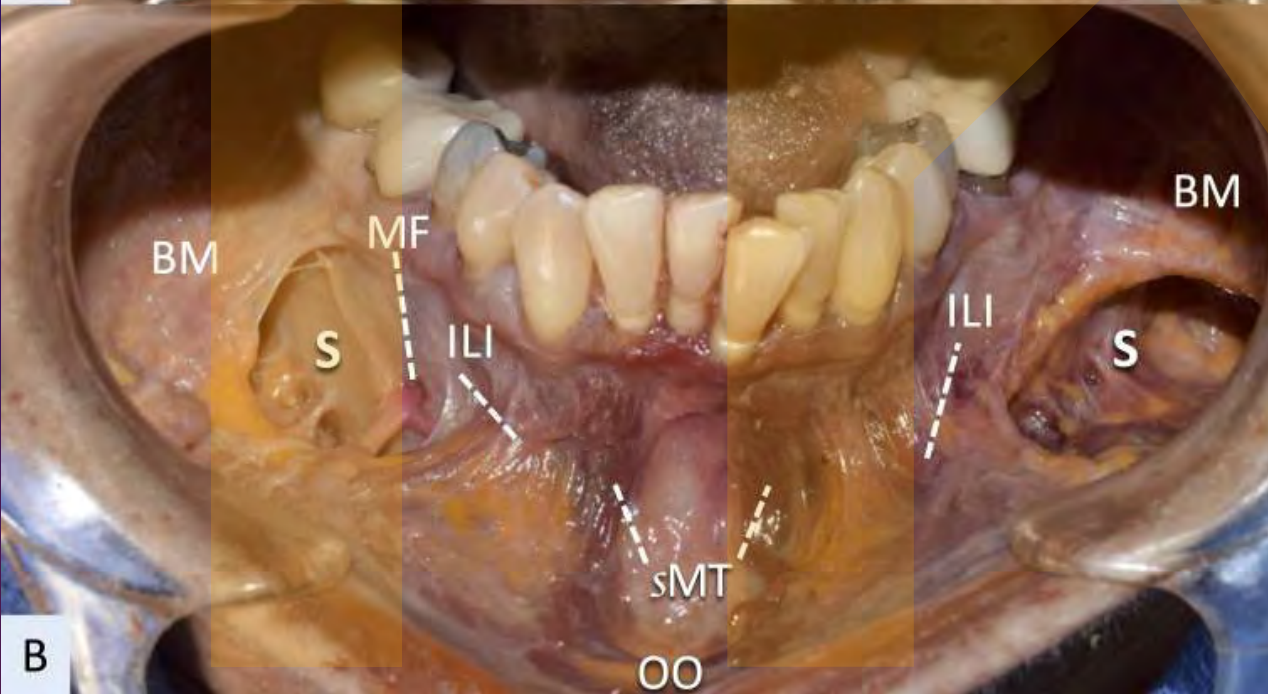
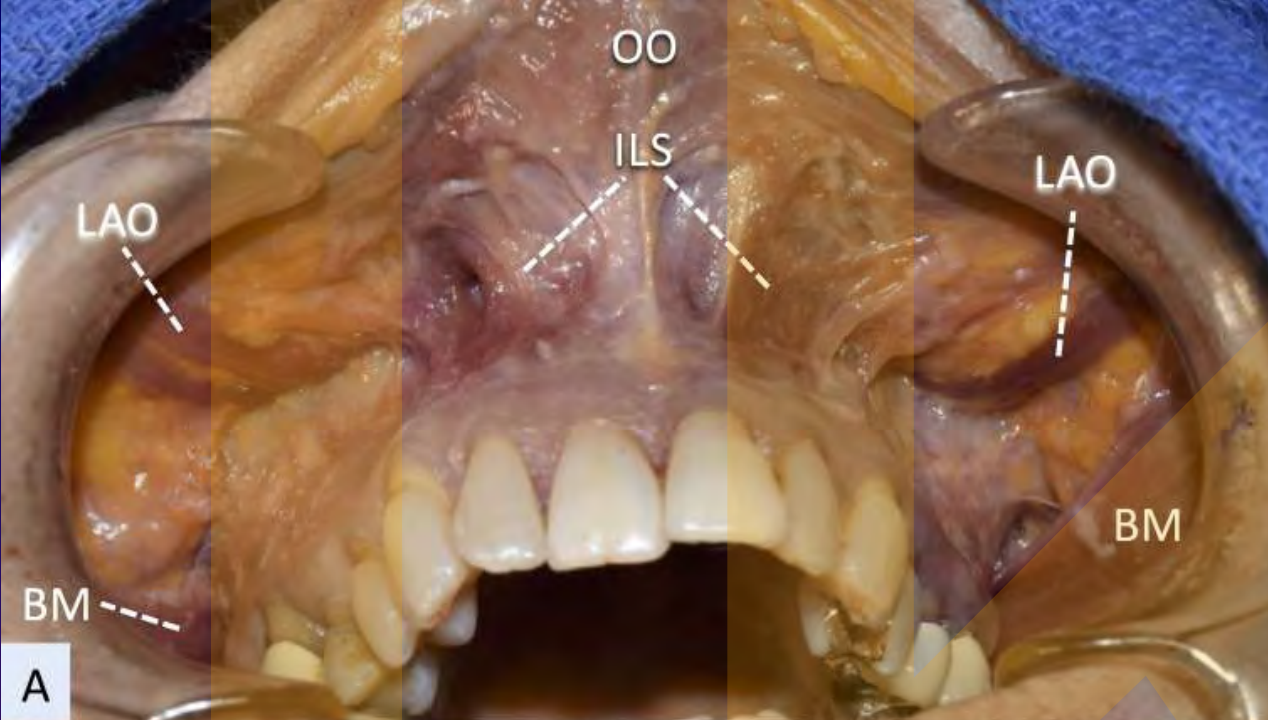


FIG. 6.8. Orbicularis oris and nasal musculature. The nasalis and the depressor septi muscles interdigitate with the orbicularis oris muscle. A strong depressor septi muscle depresses the nasal tip with smiling and can be interrupted during rhinoplasty surgery to decrease active tip rotation.





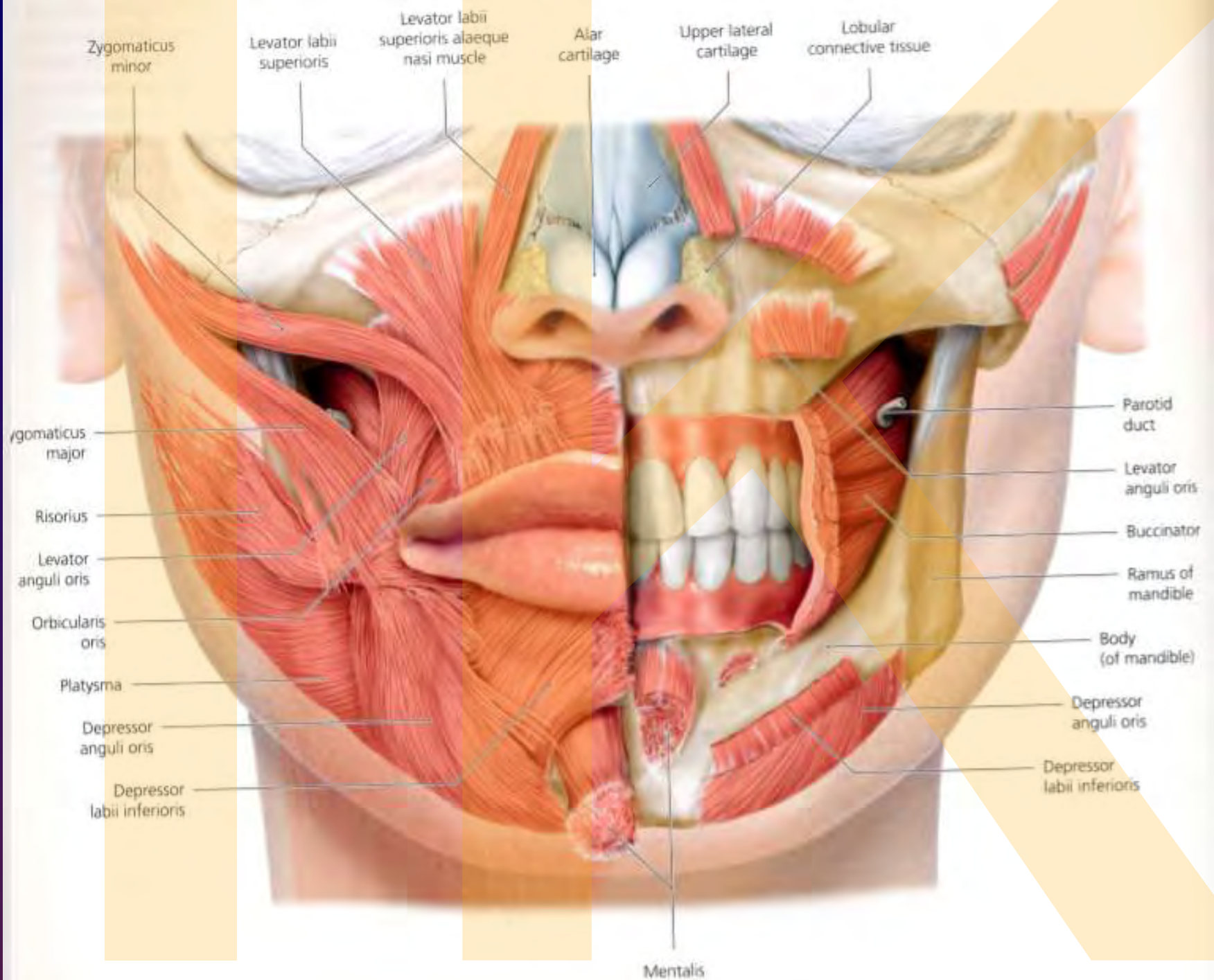


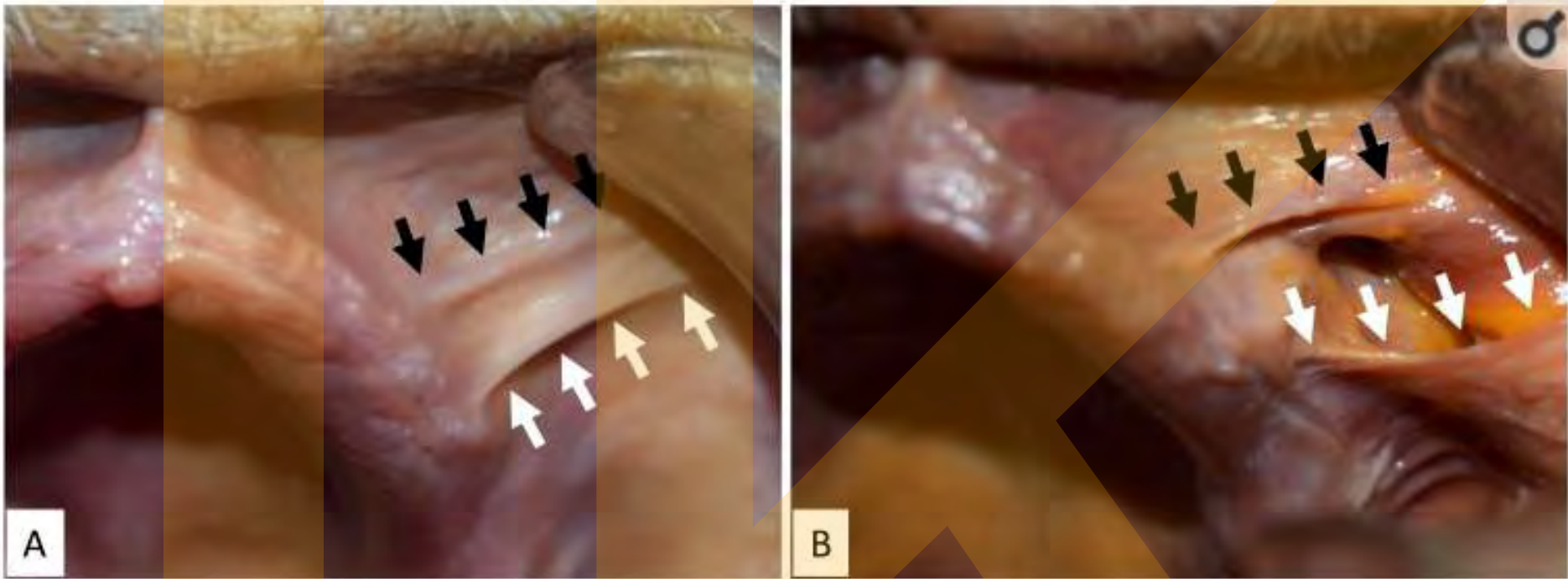
intraoral dissection of the mimetic muscles using a fresh cadaver

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

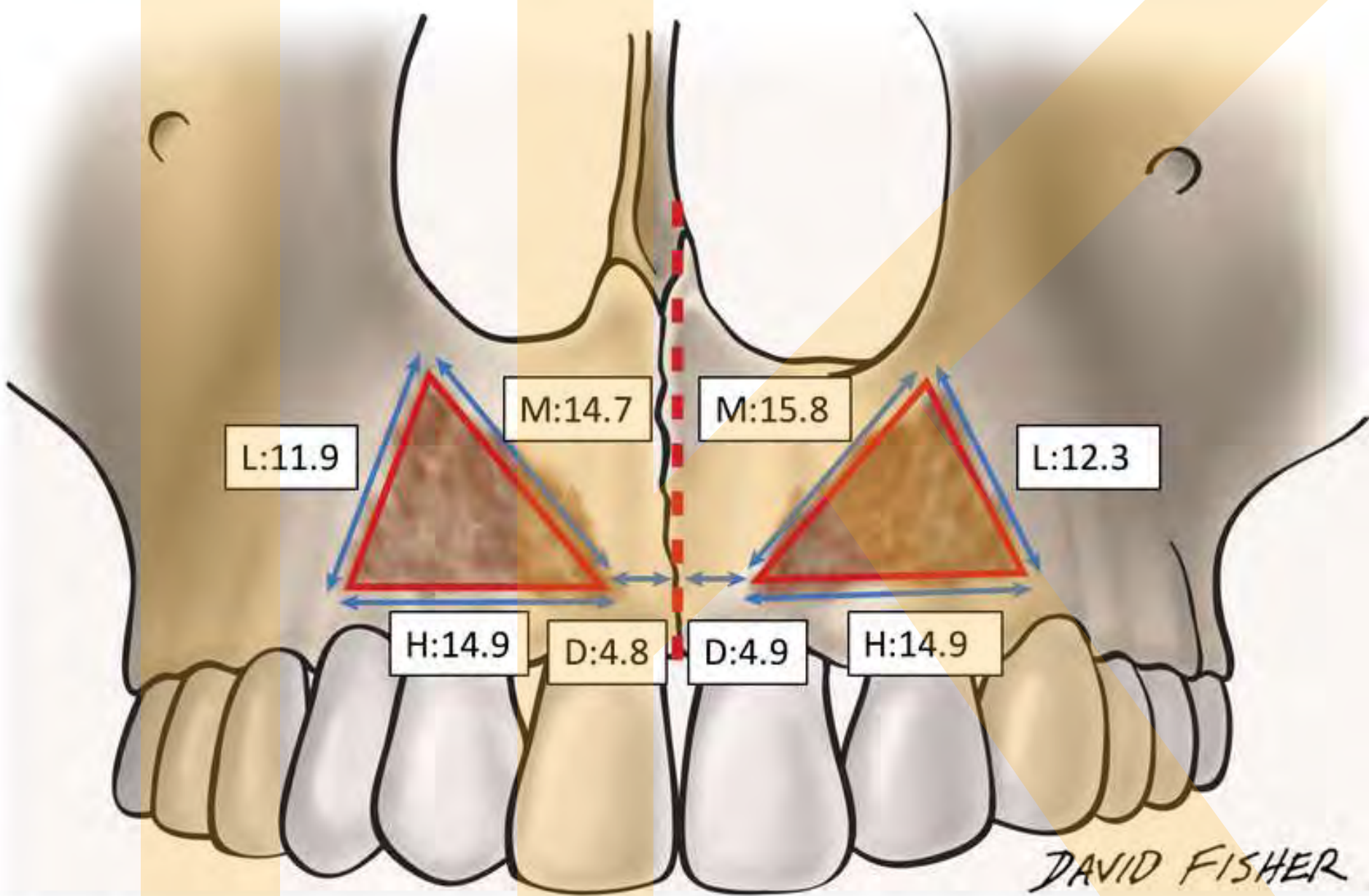
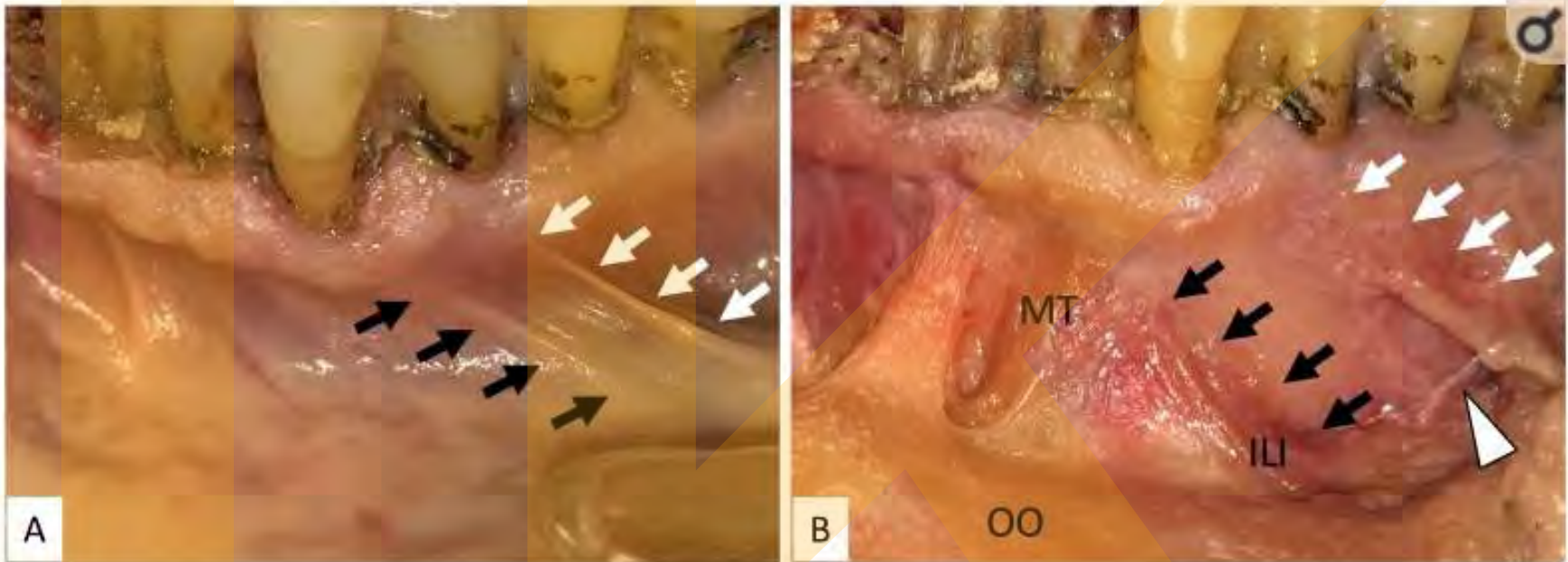


Figure 7: The measurement of the distance and circumference of the bony attachment. D: the distance from mid-line to innermost part of the bony attachment, H: length of horizontal part, L: length of lateral part, M: length of medial part (mm).

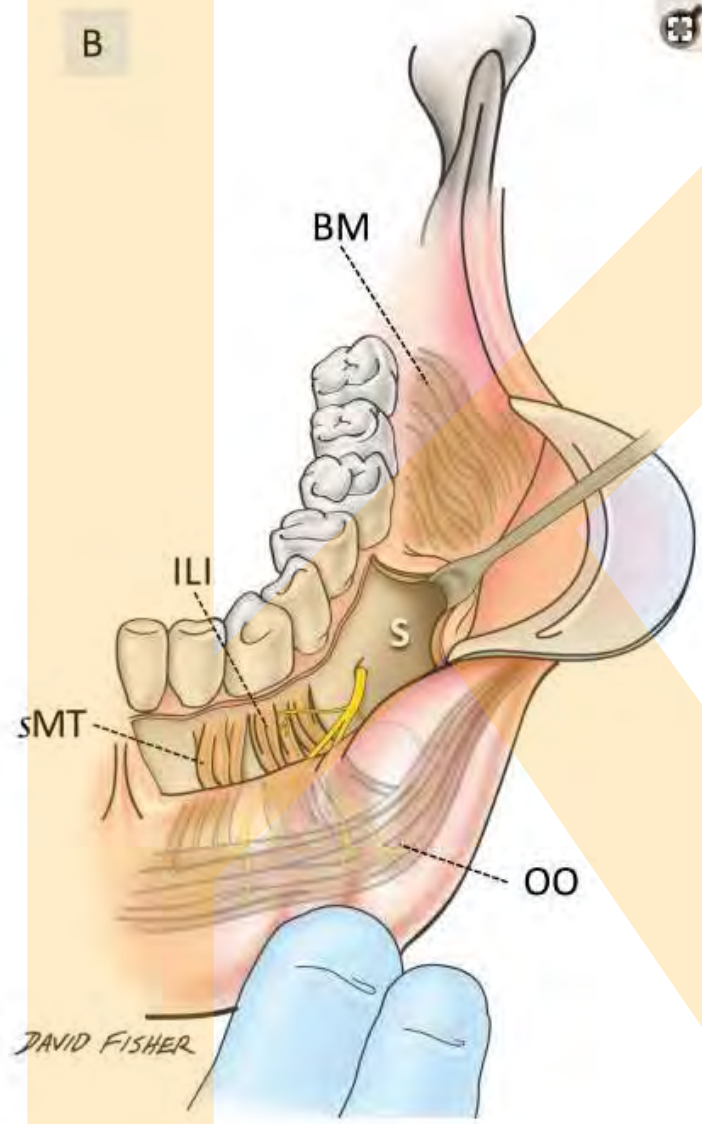
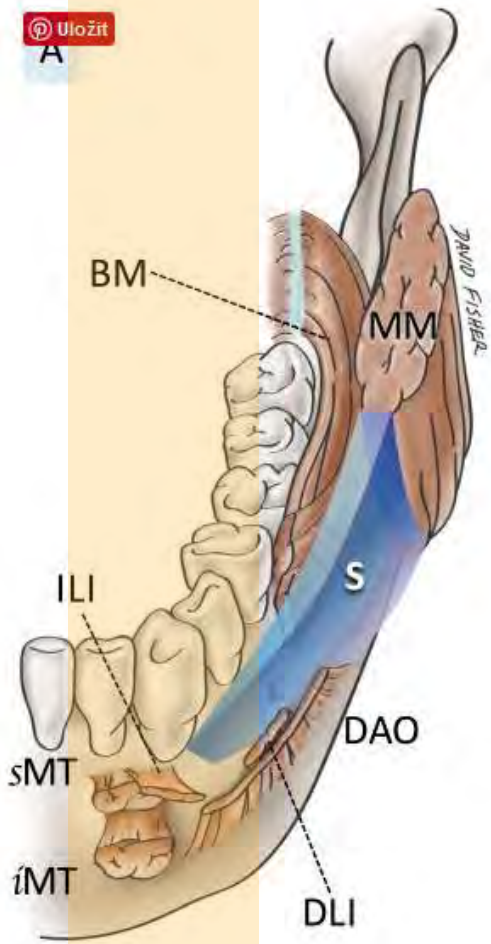


Buccal frenulum of the left mandible

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)

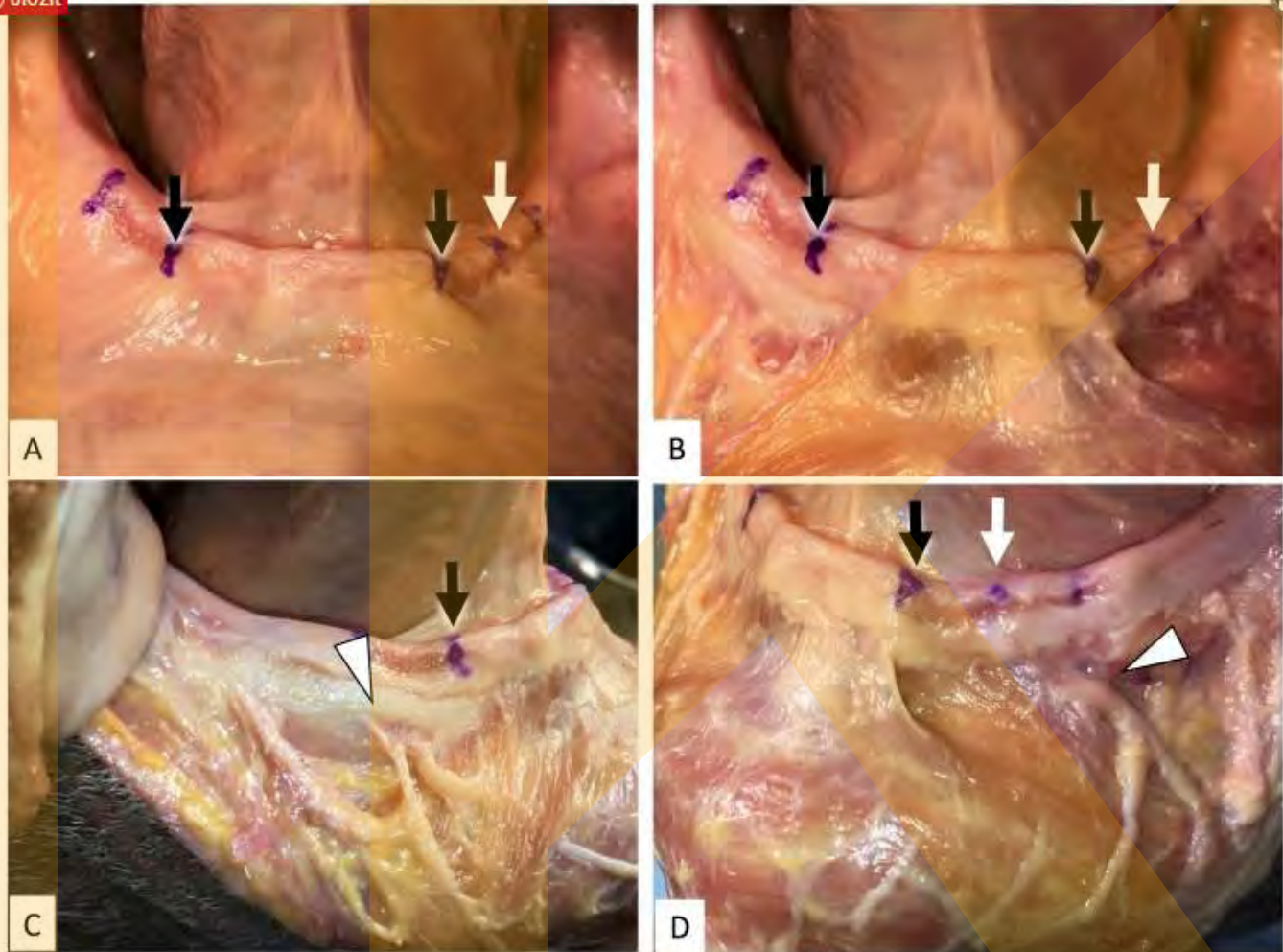
Black arrows: lateral border of the upper part of the MT and ILI, white arrows: anterior border of the buccinator, arrowhead: mental foramen, ILI: incisivus labii inferioris muscle, MT: mentalis, OO: orbicularis oris



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

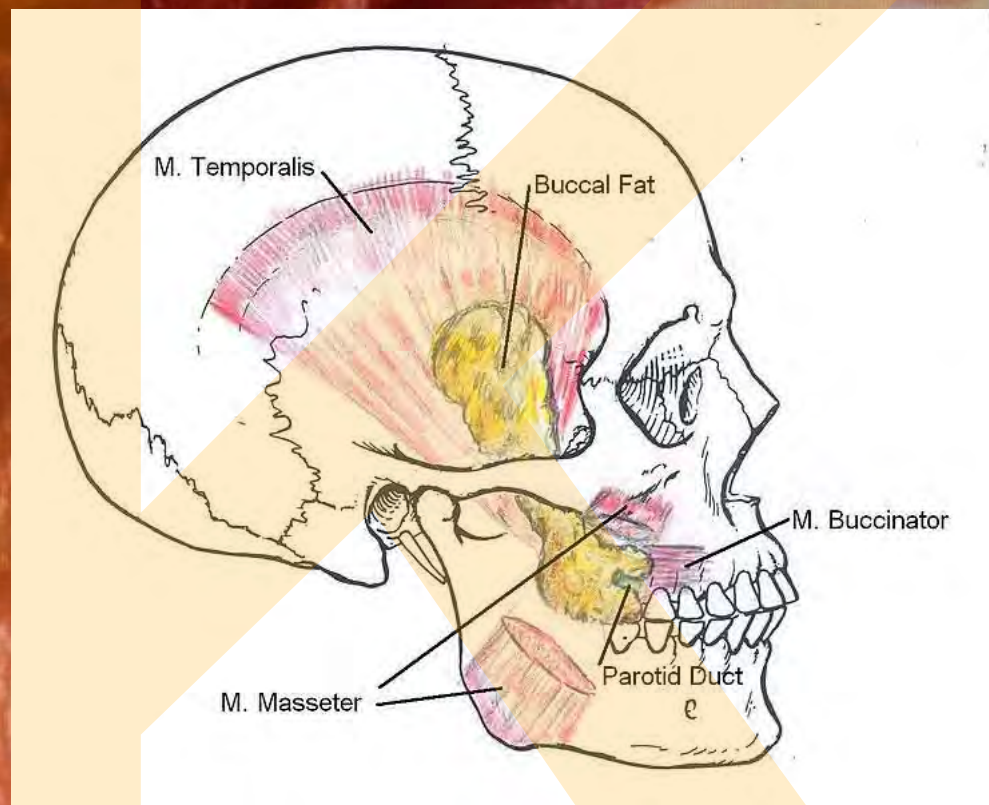
C: Lateral view (right) of the buccal frenulum of the mandible

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

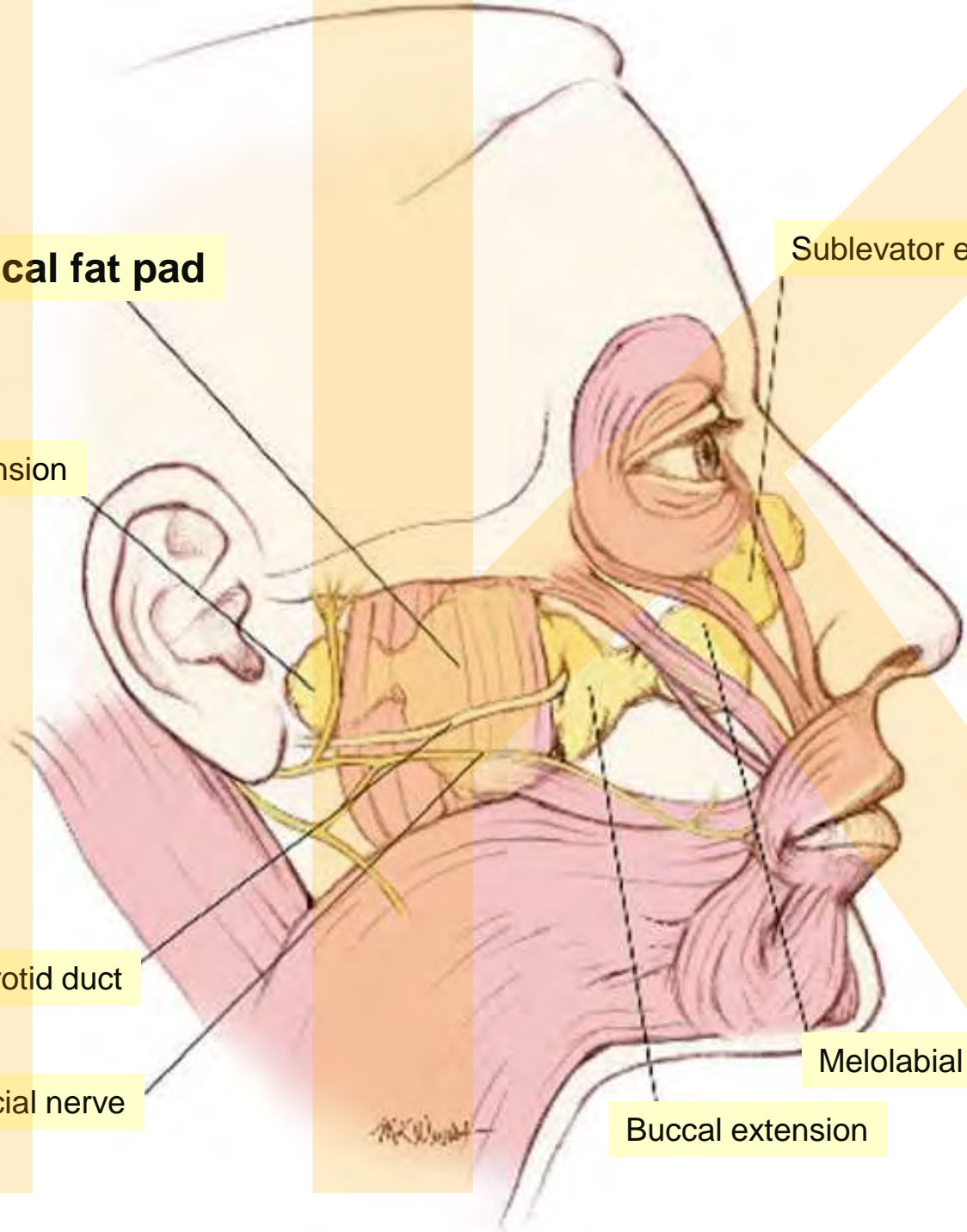
Pterygoid extension

Parotid duct

Facial nerve

Melolabial extension

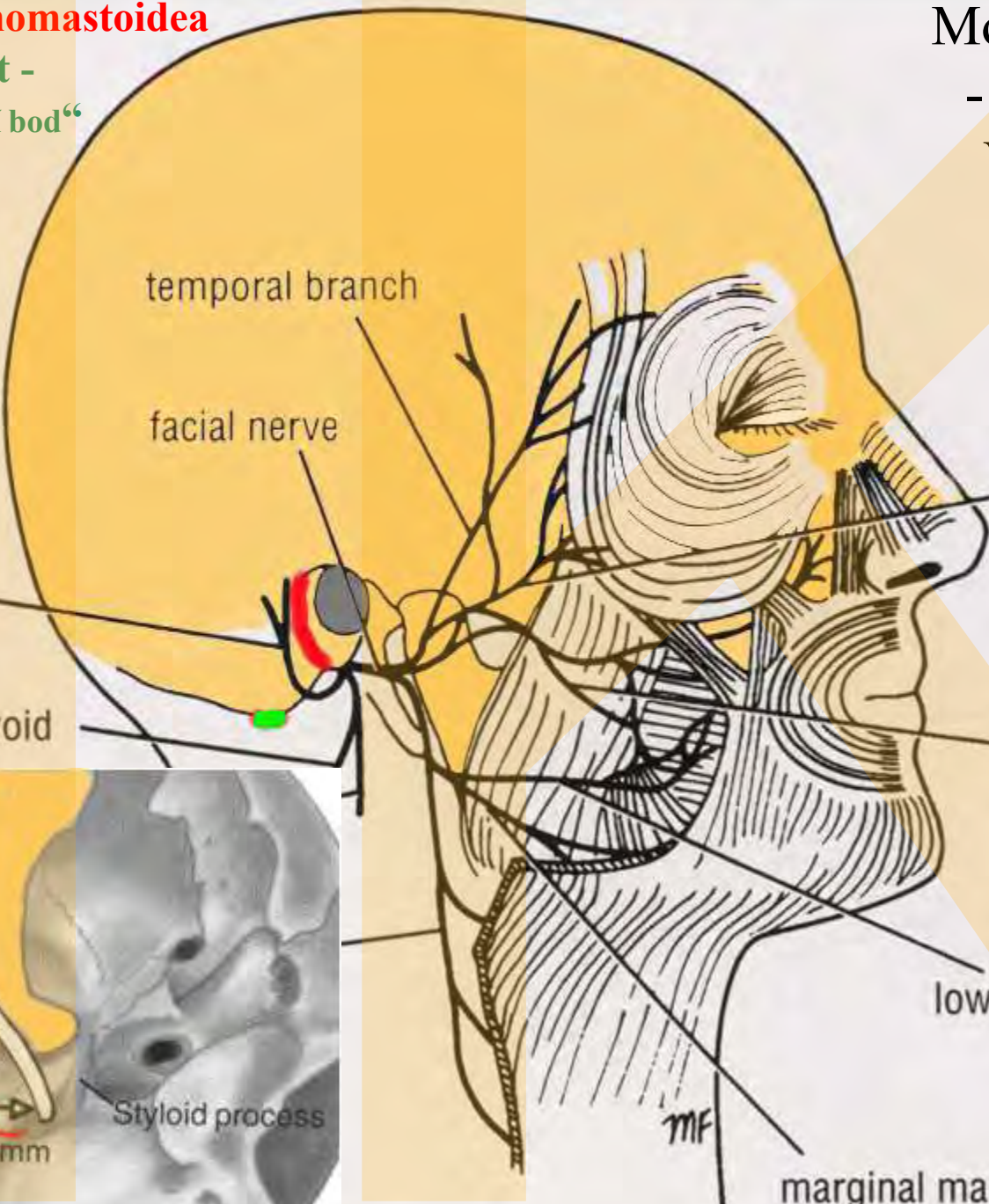
Buccal extension



sutura tympanomastoidea

“drop off point -
nejvíce vystupující bod“

Motori innervation
- nervus facialis
VII. CN nerve



posterior
auricular
branch

temporal branch

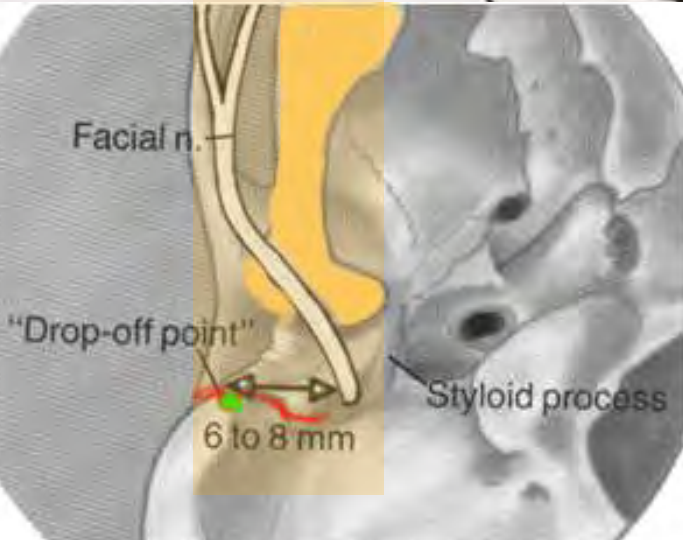
facial nerve

zygomatic branch

upper buccal branch

lower buccal branch

marginal mandibular branch



Facial n.

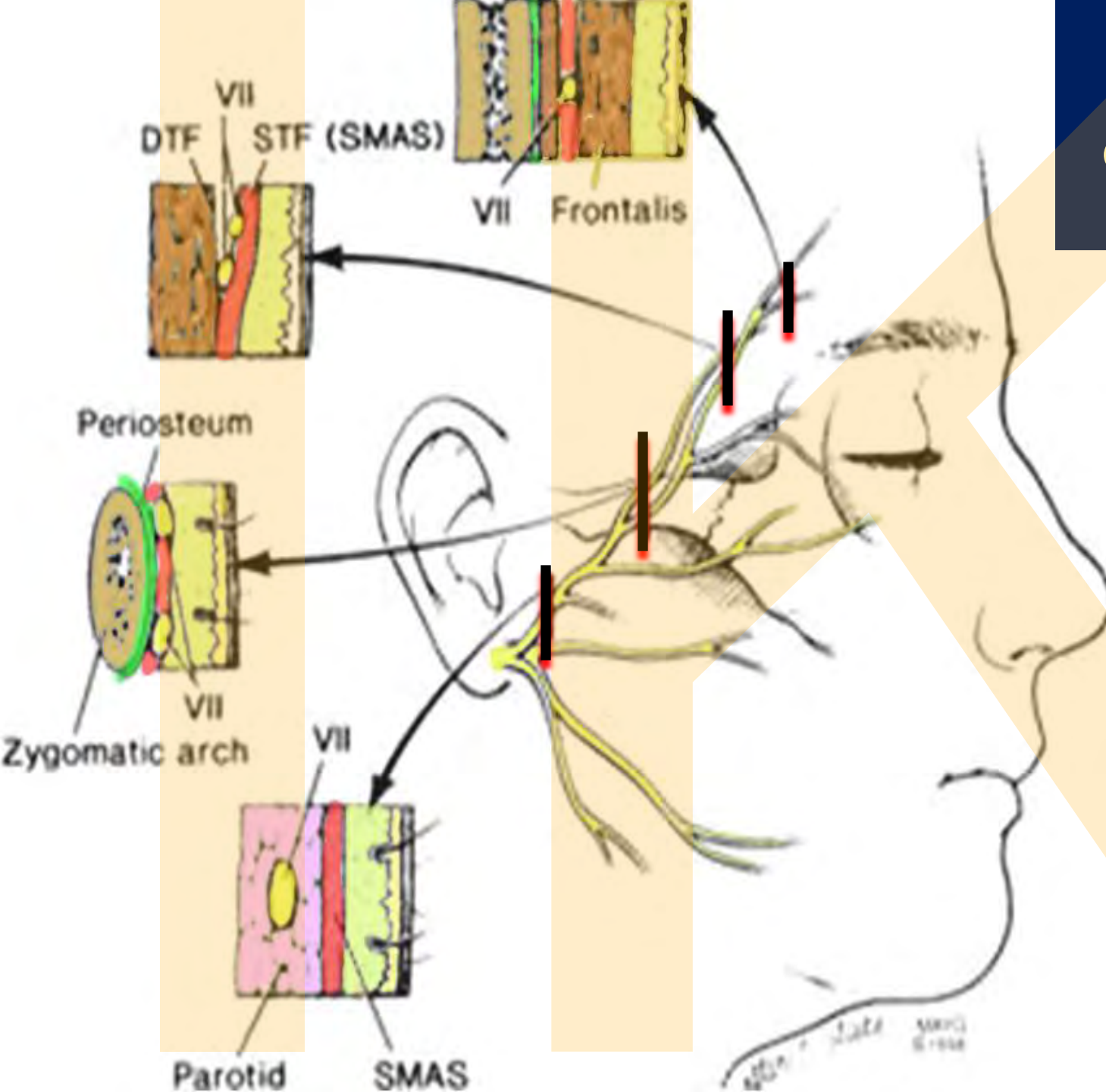
“Drop-off point”

6 to 8 mm

Styloid process

MF

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



kůže skin
musculus muscle
-----*-----

kůže skin

*
musculus muscle

kůže skin
-----*-----
kost bone

kůže skin

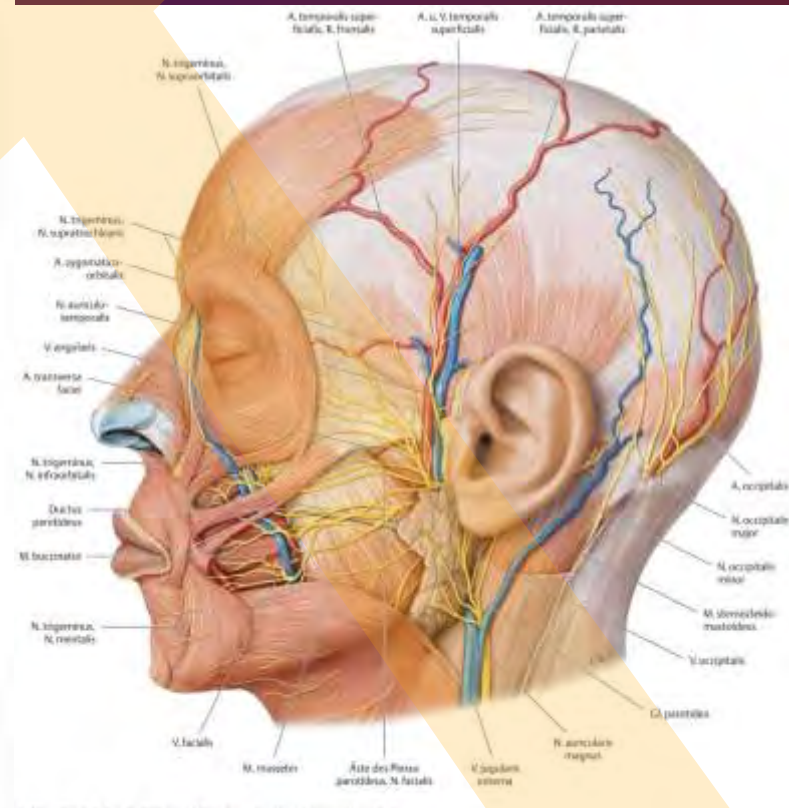
parotis * parotid

n. VII. :
tzv. „facial
danger
zones“ -
Nerves and
vessels are
closer to face
surface – they
can be
wounded



Fig. 3.1 Danger zone I. 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

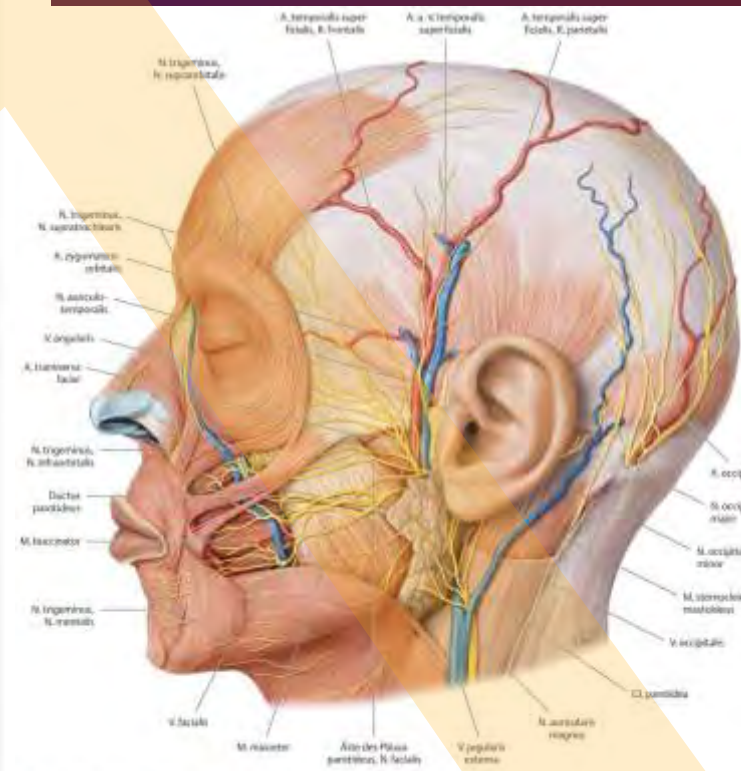
I.



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.

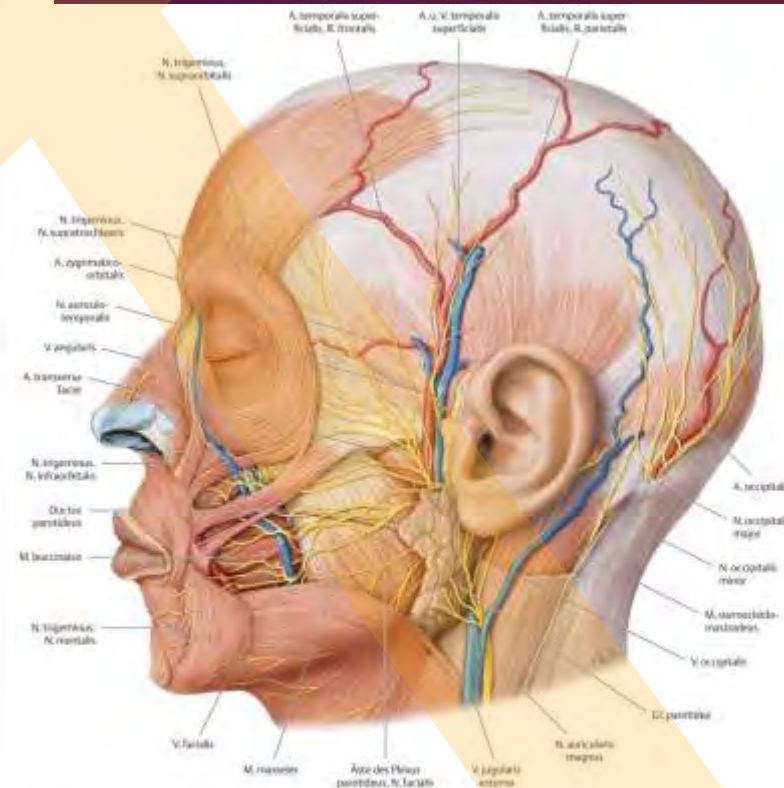


A Oberflächliche Gefäße und Nerven des Kopfes von der Seite
Ansicht von links



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

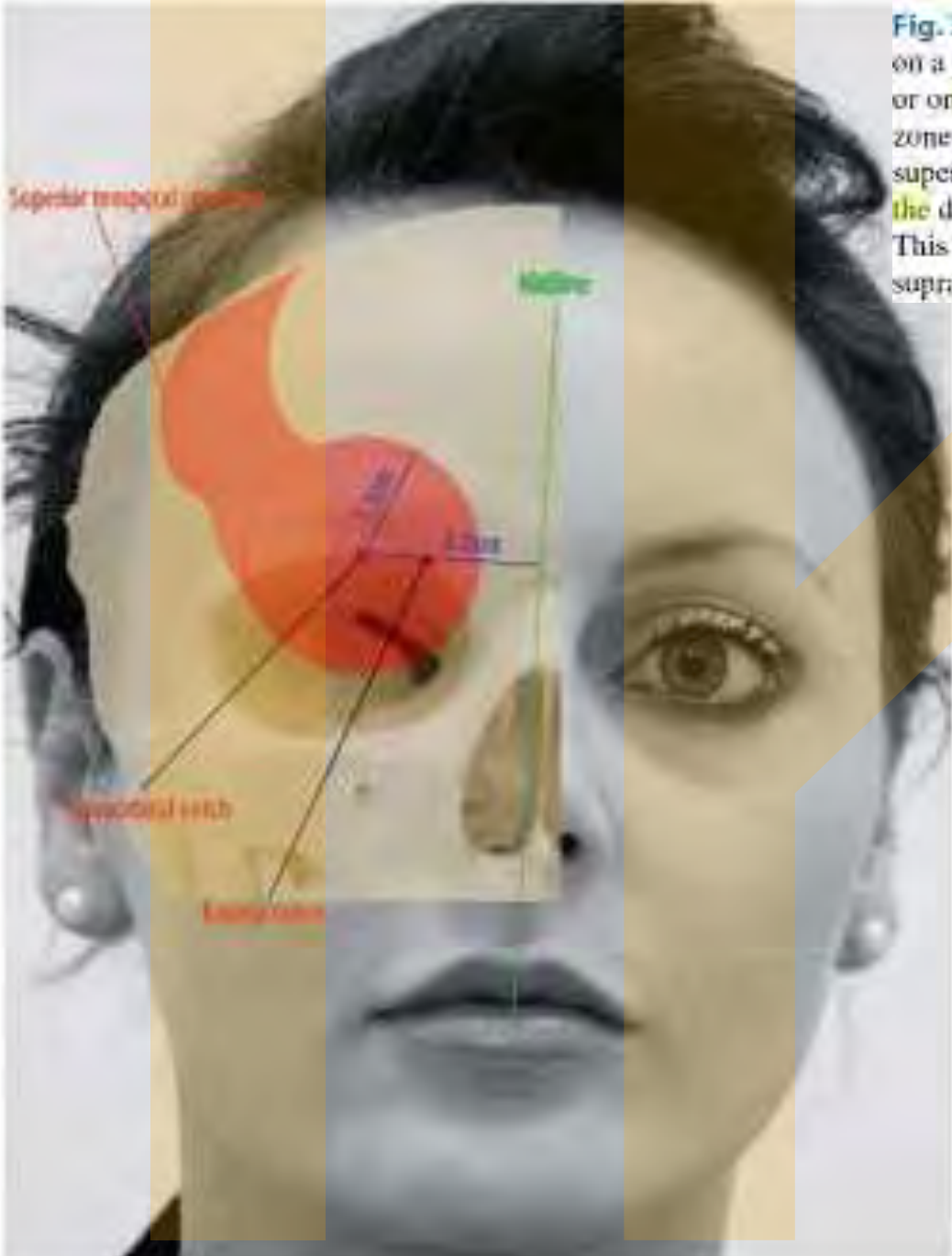
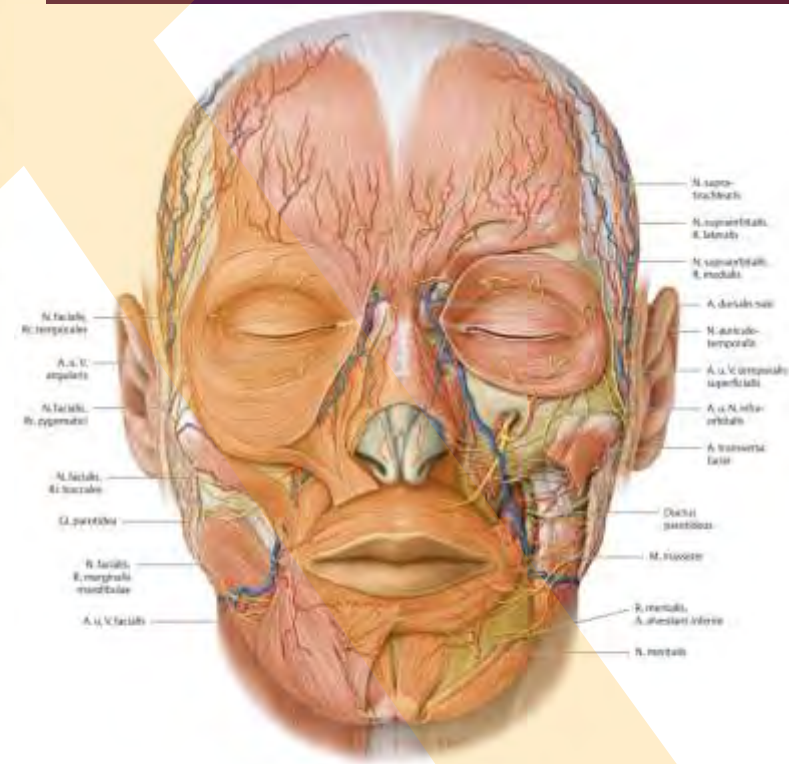


Fig. 3.4 Danger zone 4. A circle of 1.5 cm diameter is centered on a point 2.5 cm from the midline along the supraorbital ridge, or on the supraorbital foramen or notch if palpable. The danger zone extends from the superolateral part of the circle along the superior temporal crest lines and for 1.5 cm 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

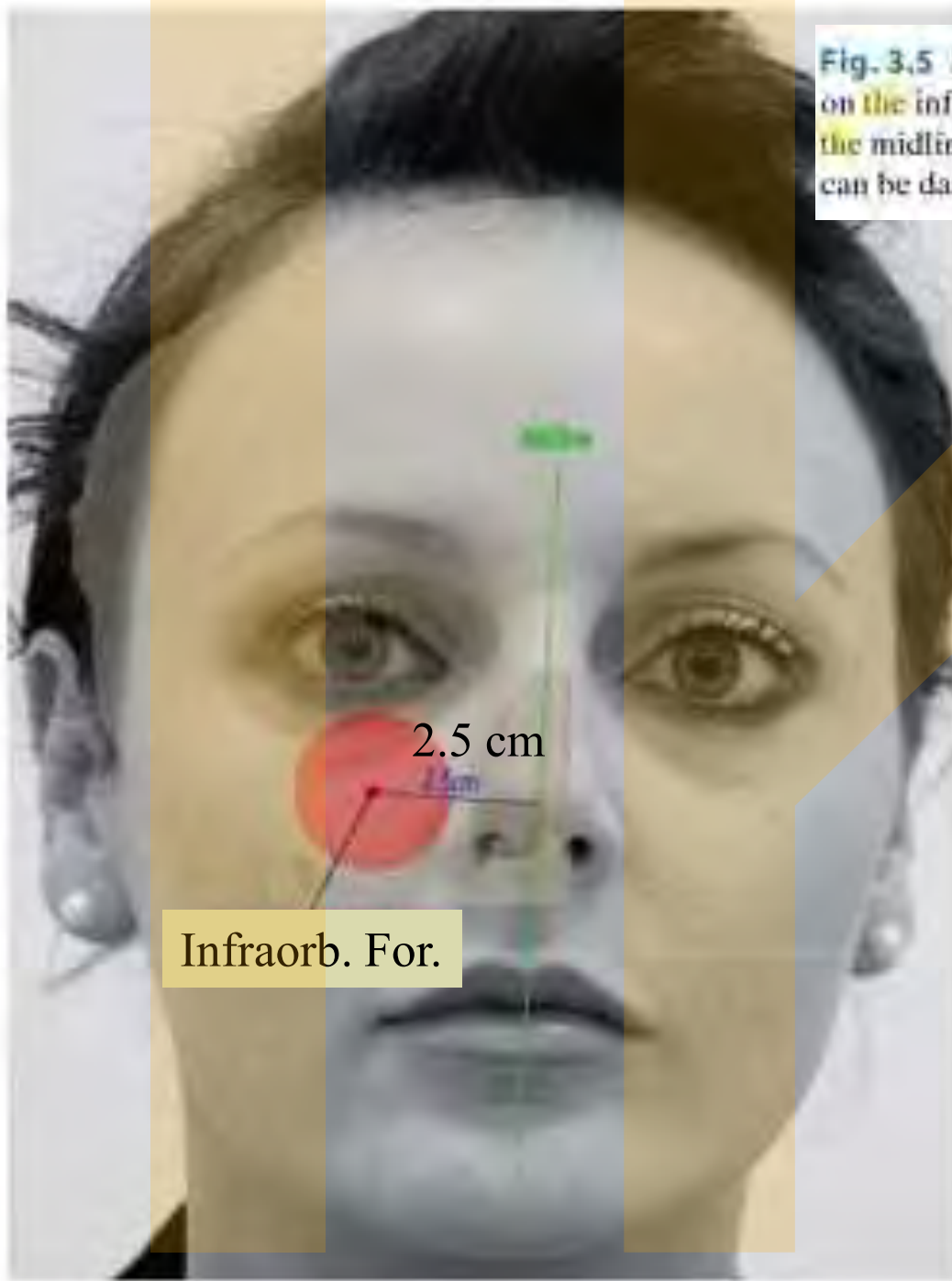
IV.



A Oberflächliche Nerven und Gefäße der vorderen Gesichtregion

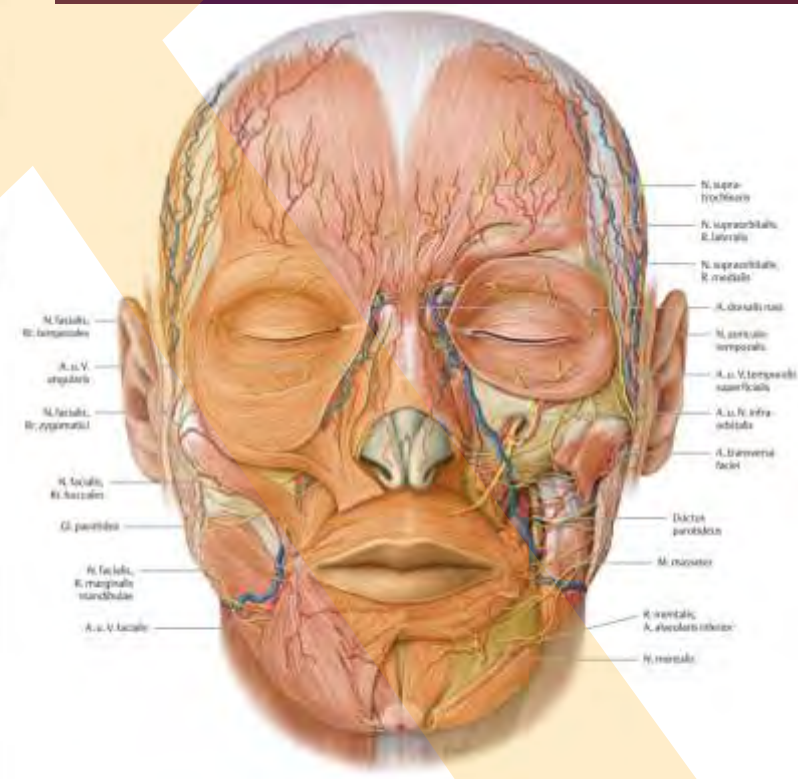
Fig. 3.5 Danger zone 5. This danger zone is circular, centered on the infraorbital foramen. The foramen is usually 2.5 cm from the midline, close to the midpupillary line. The infraorbital nerve can be damaged here during deep dissections over the maxilla.

V.



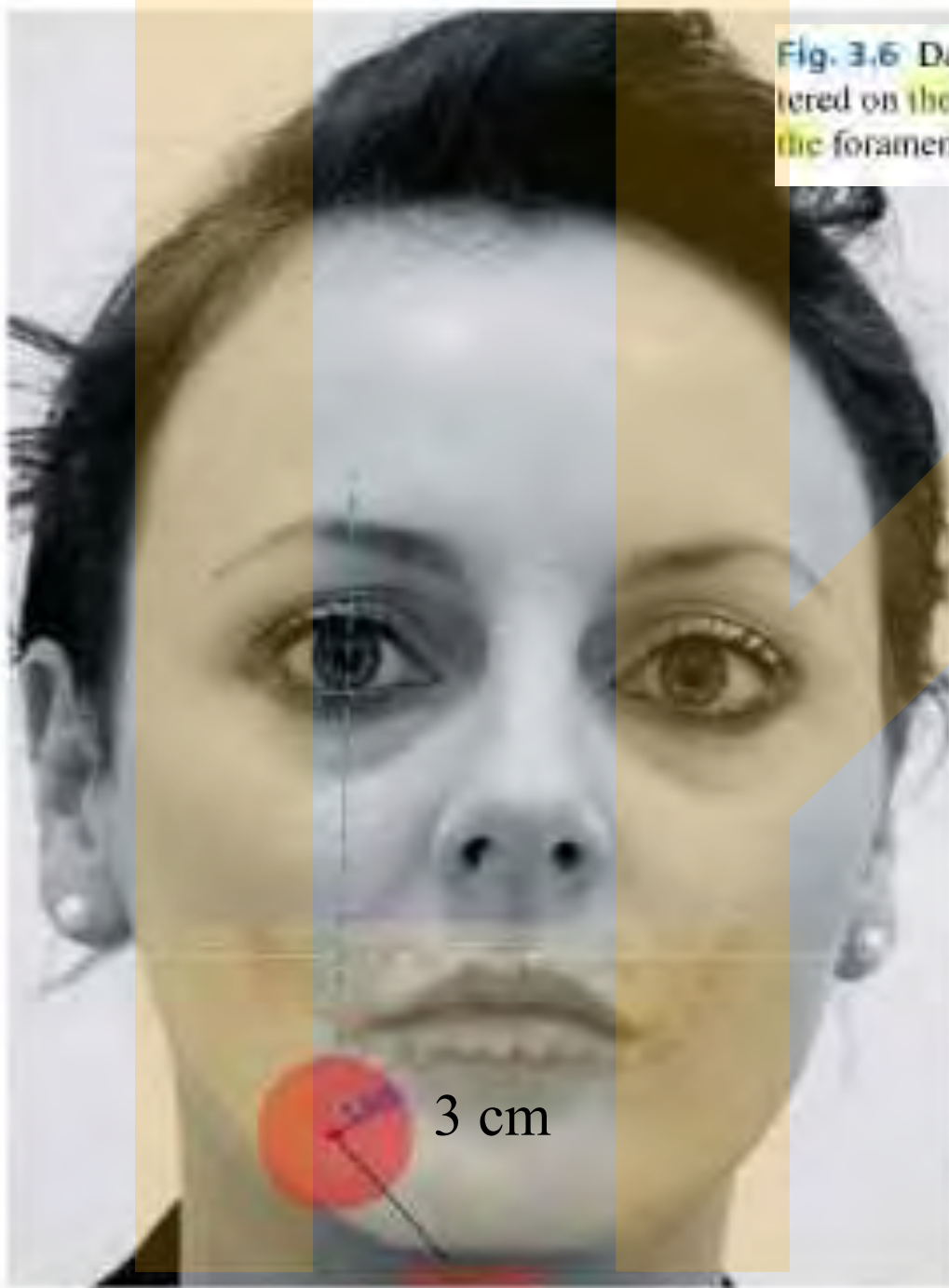
2.5 cm

Infraorb. For.

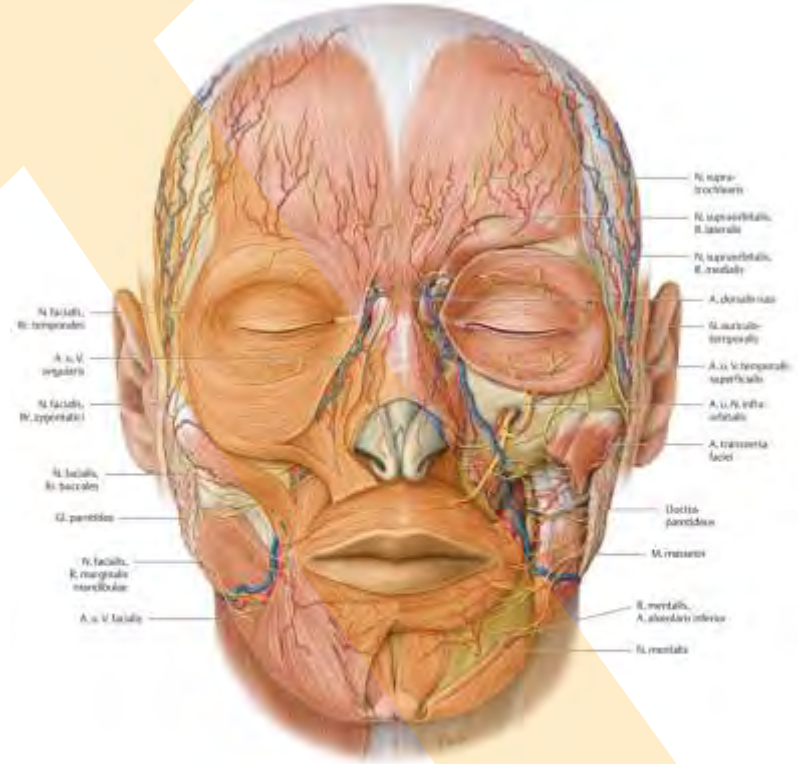


A Oberflächliche Nerven und Gefäße der vorderen Gesichtszion

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.



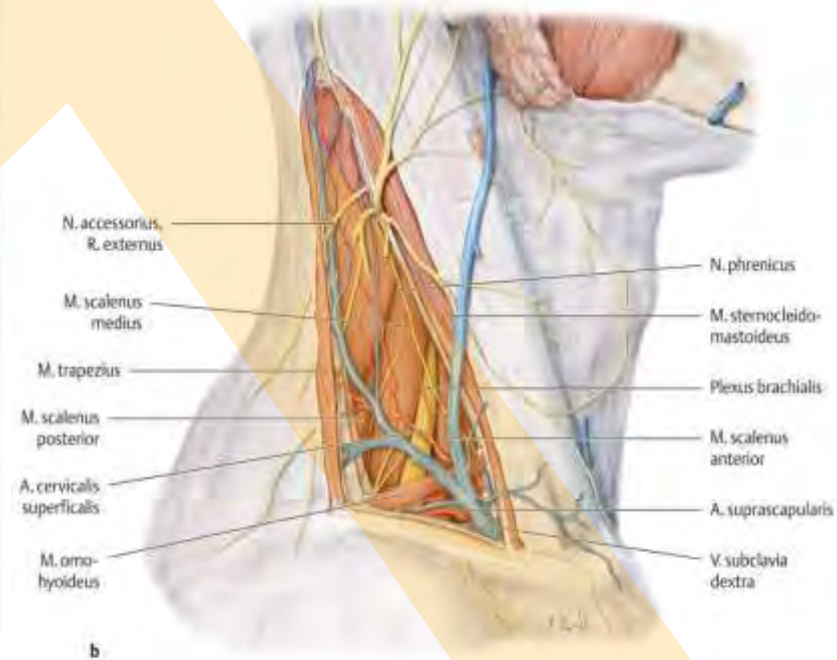
A Oberflächliche Nerven und Gefäße der vorderen Gesichtregion

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

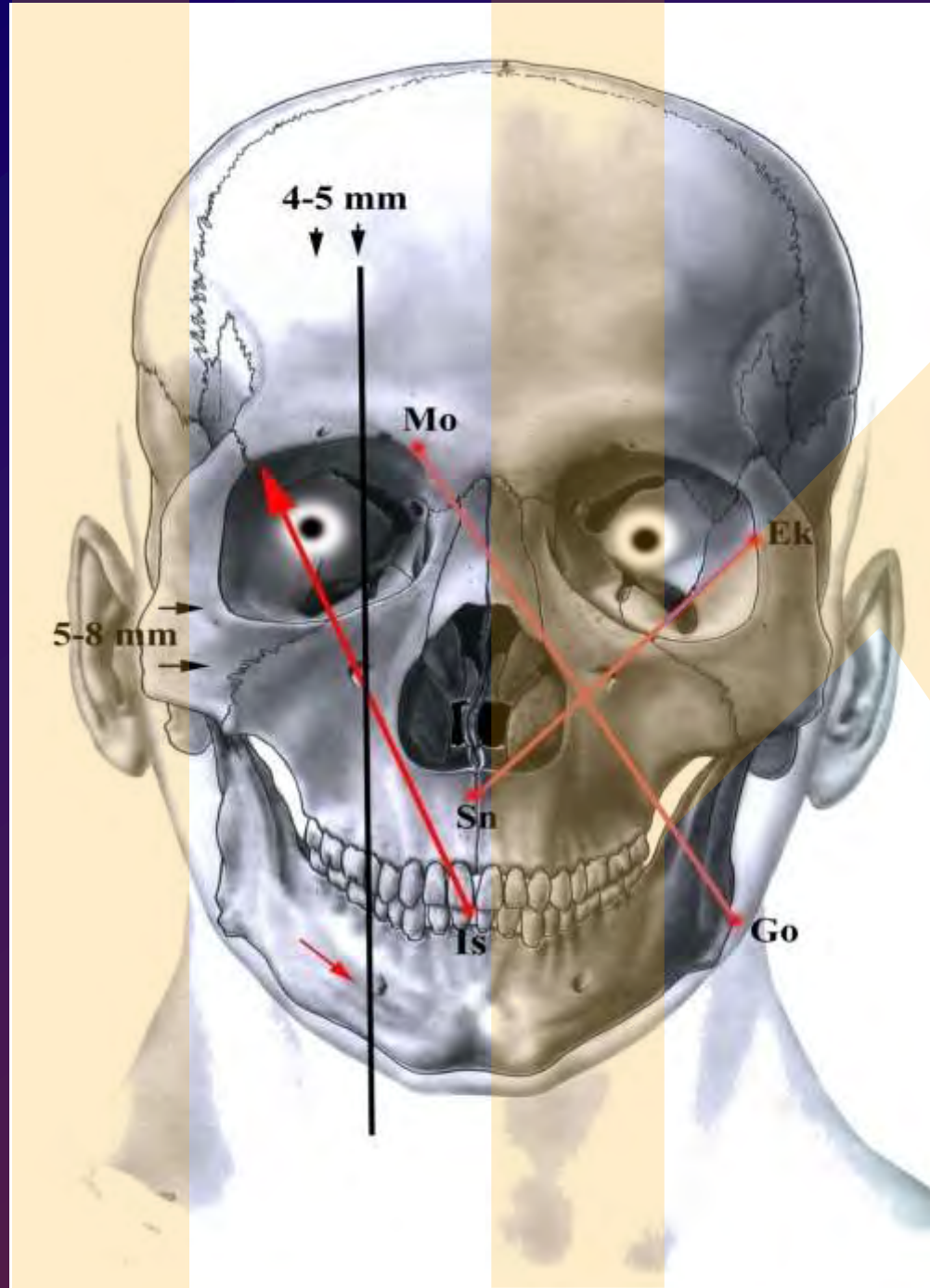
Ext. Jug. vein



C Laterales Halsdreieck

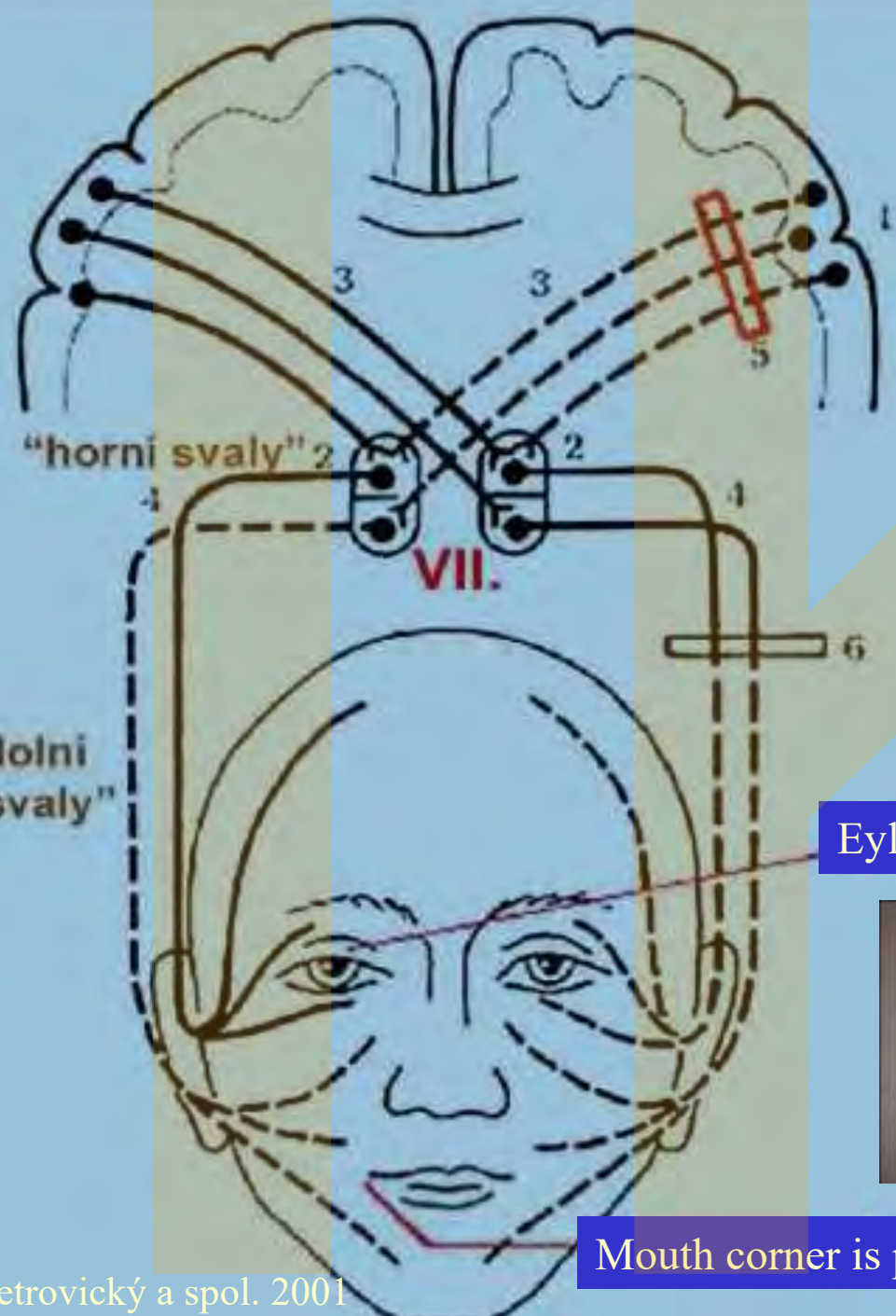
b Tiefste Schicht mit Sicht auf den Plexus brachialis, Ansicht von rechts





How to id
identify openings
in the facial part
of the skull
where nerves
and arteries
come to
periphery

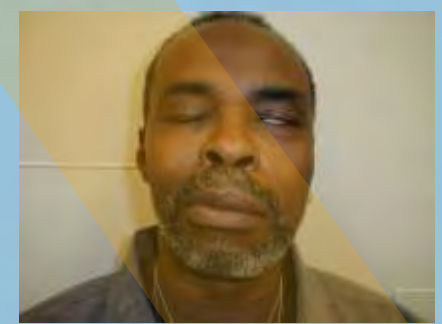
Central and peripheral palsy of the CN VII.
 Full line – nerve fibers are not affected
 Interrupted line – nerve fibers are affected
 Peripheral palsy affects full one half of face



- 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

Eyelid is pushed down

má jen 1/2 aferentů



Mouth corner is pushed down

nemá žádné aferenty

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