

Orofacial anatomy

Anatomical aspects of odontogenic infections

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Illustrations:

Oral surgery (Fragiskos D. Fragiskos, DDS, PhD)

Regional anatomy (prof. Grim)

Atlas of Human Anatomy (Netter, MD)

Anatomie I, II, III (prof. Čihák)

Orofacial infections

- Infection of tissue surrounding alveolar process and jaw
- Typically polymicrobial infections
- Severity depends on type of infection, localization and patient's health status
- Spreading may lead to life-threatening conditions
- **Etiology: odontogenic**, trauma, fracture, salivary gland or lymph node lesions, iatrogenic, periimplantitis
- **Clinical manifestations:** dolor, tumor, rubor, calor, functio laesa (**pain, swelling, redness, heat, loss of function**), contracture, fatigue, fever, dysphagia

Orofacial infections

- **Odontogenic causes:**
 - Periapical, periodontal, dry socket, periimplantitis, pericoronitis...
- **Spreading:**
 - Per continuitem
 - Lymphatic vessels
 - Blood borne

This presentation is focused on odontogenic infections

Importance of anatomy?

Tooth localization

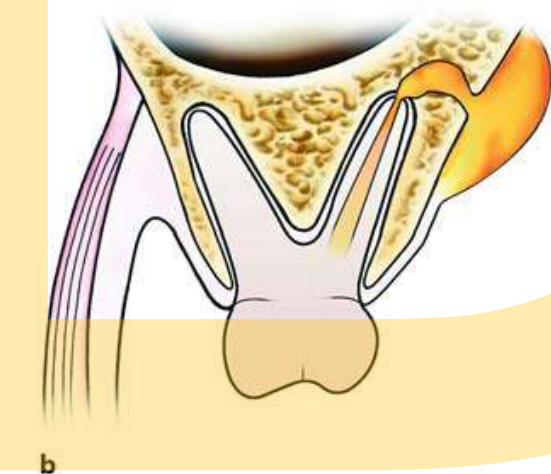
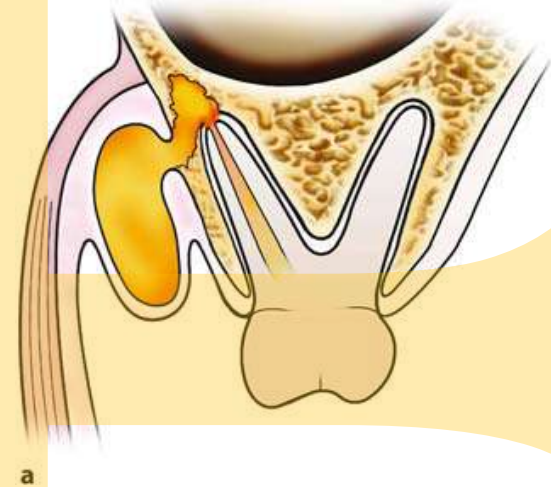
- Localisation of focus of infection

Borders of anatomical regions

- Ways of spreading

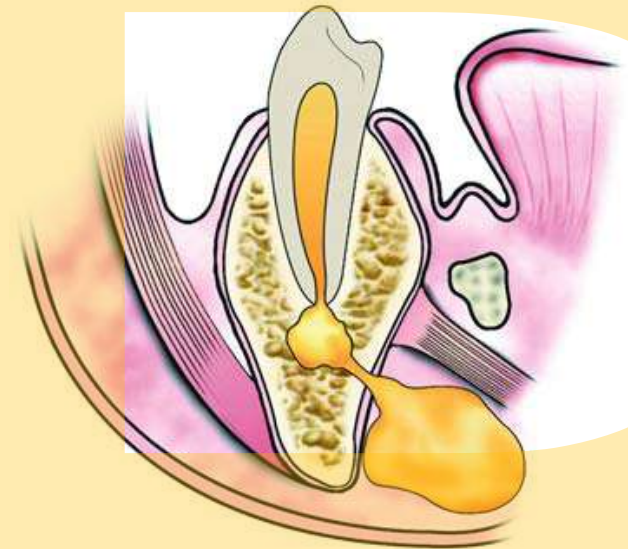
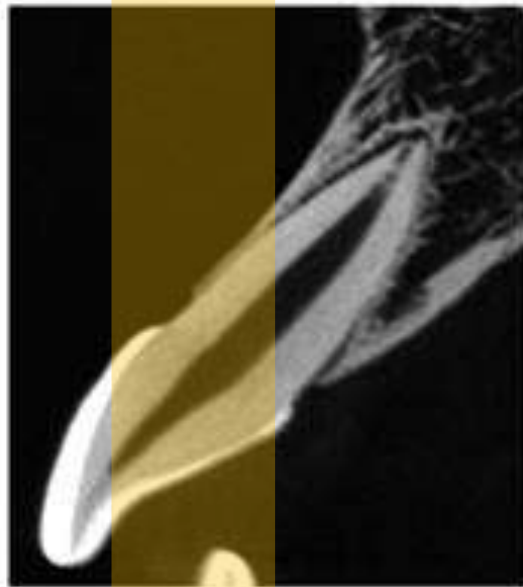
Treatment

- Access, important anatomical structures



Tooth anatomy and its position in alveolar process

- Number and orientation of roots?
- Thickness of surrounding bone?



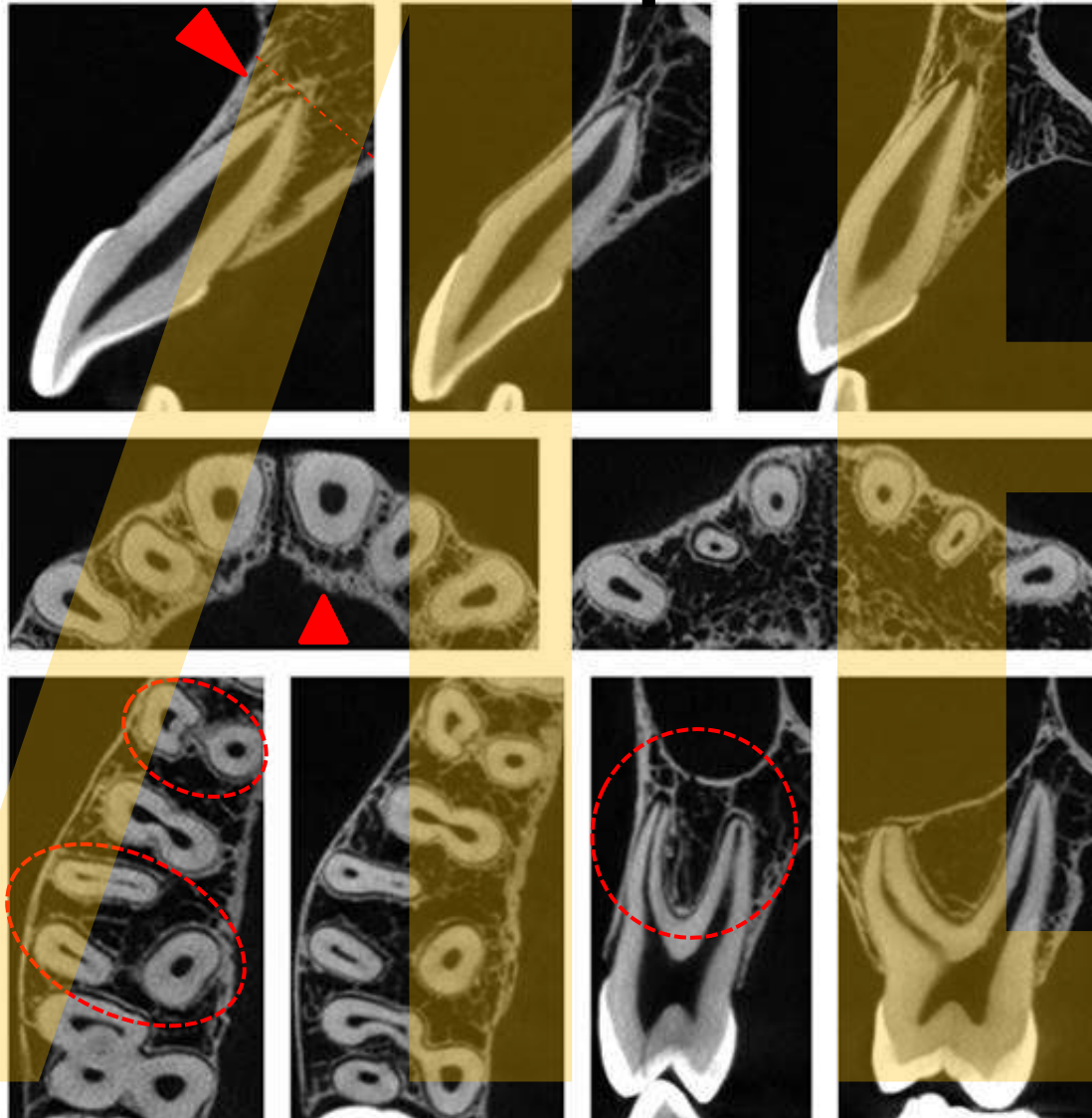
Tooth anatomy and its position in alveolar process

- Thin vestibular compact bone
- Thicker bone palatally
- Roots position



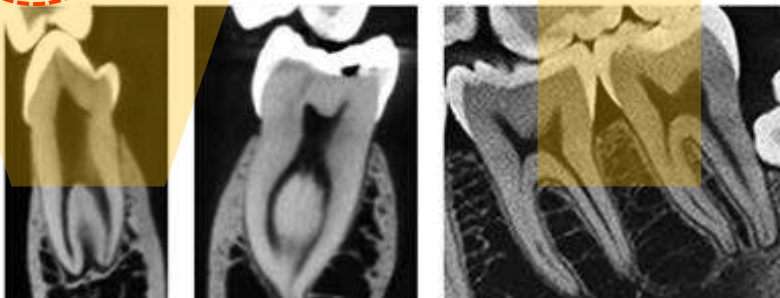
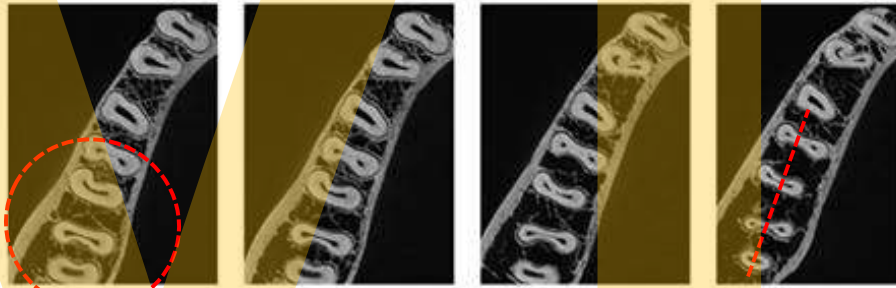
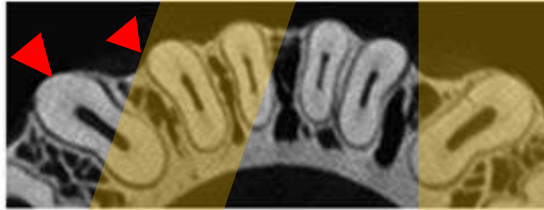
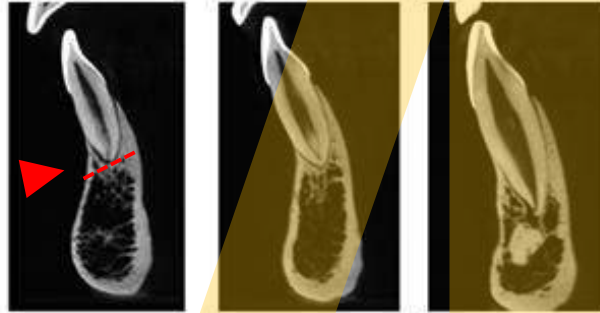
CBCT: tooth anatomy and its position in alveolar process

Maxilla



CBCT: tooth anatomy and its position in alveolar process

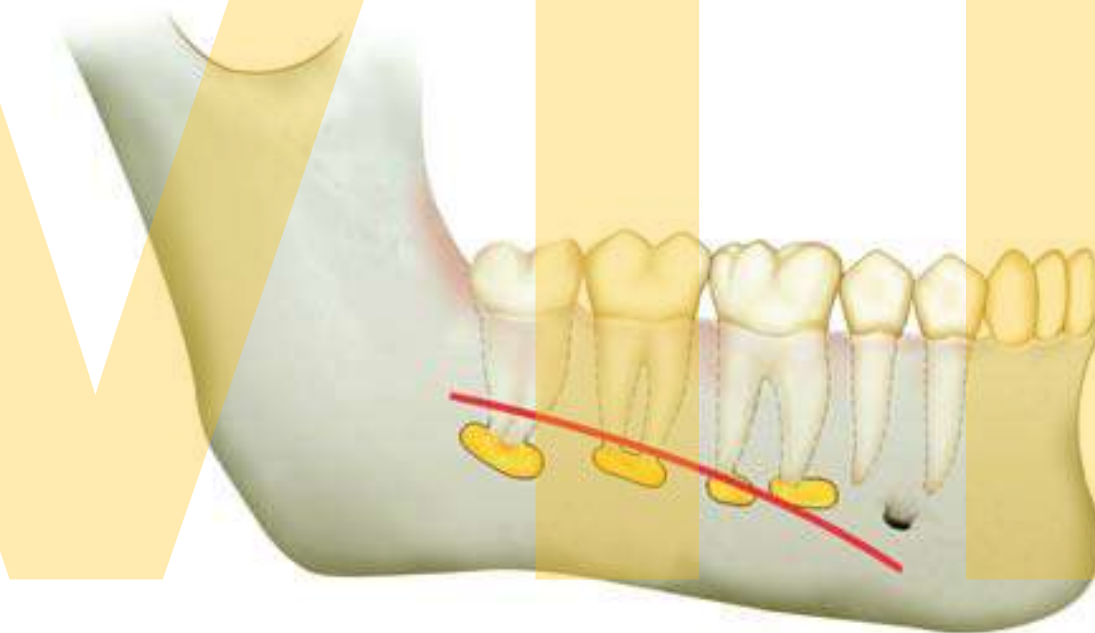
Mandible



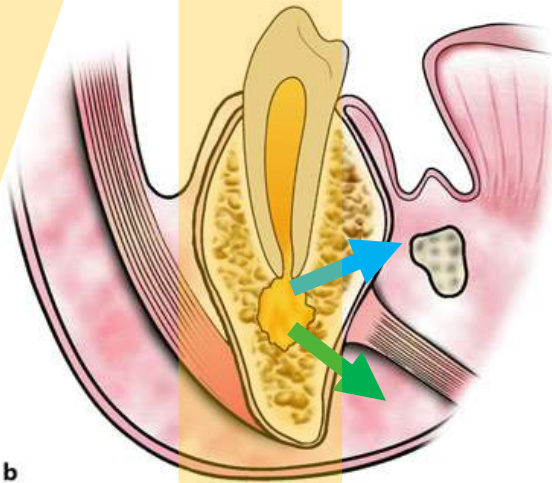
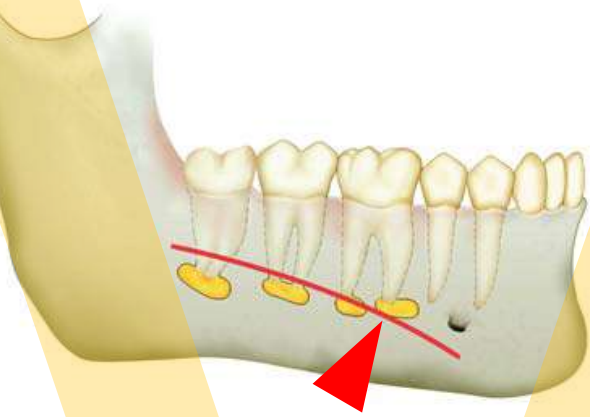
Distal molar roots are
More lingually

Anatomical borders and muscle insertions

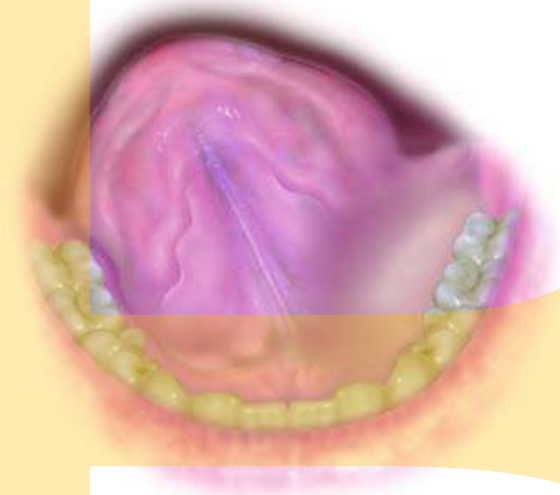
- Muscle insertions forms borders in many anatomical regions
- e.g.: *m. mylohyoideus* insertion on *linea mylohyoidea*
 - separation of sublingual and submandibular space
- Spreading of the infection between muscles



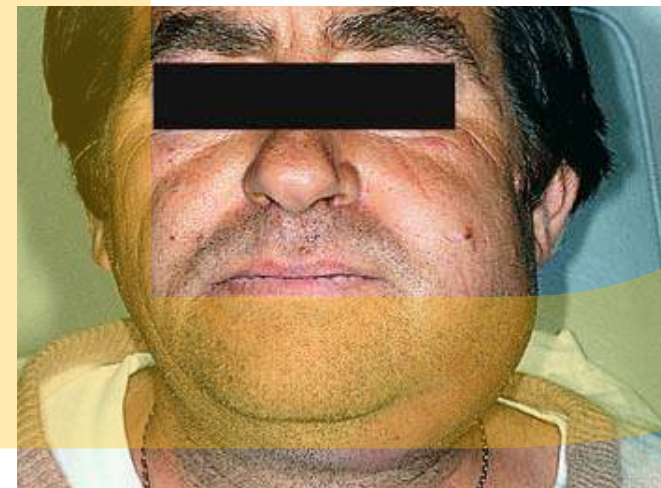
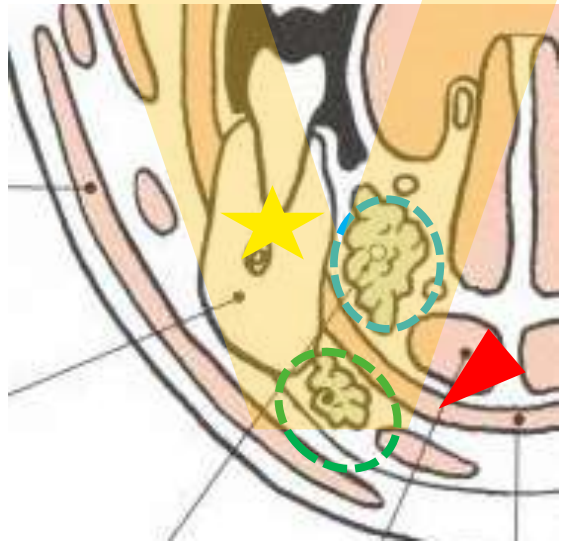
Anatomical borders and muscle insertions



Sublingual space
m. mylohyoideus
Submandibular space



abscessus sublingualis



abscessus submandibularis

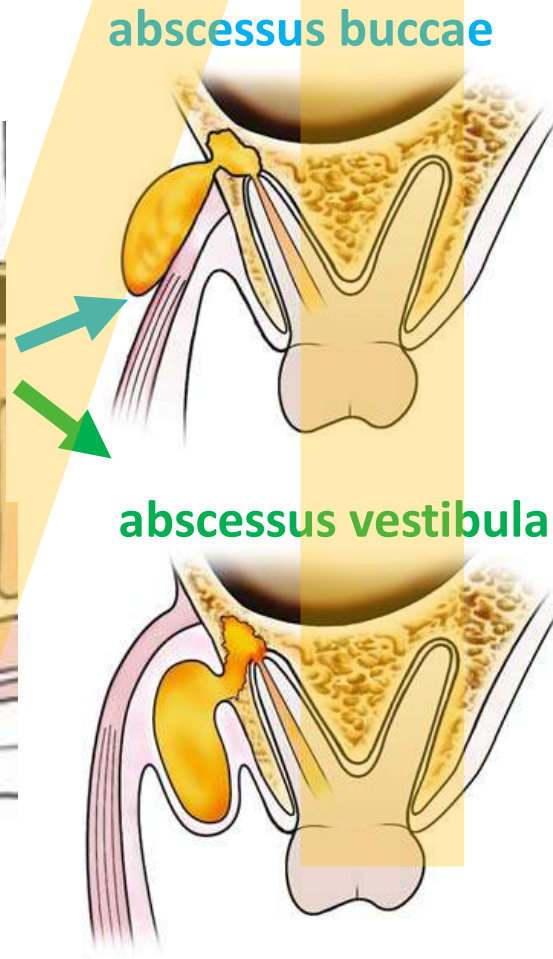
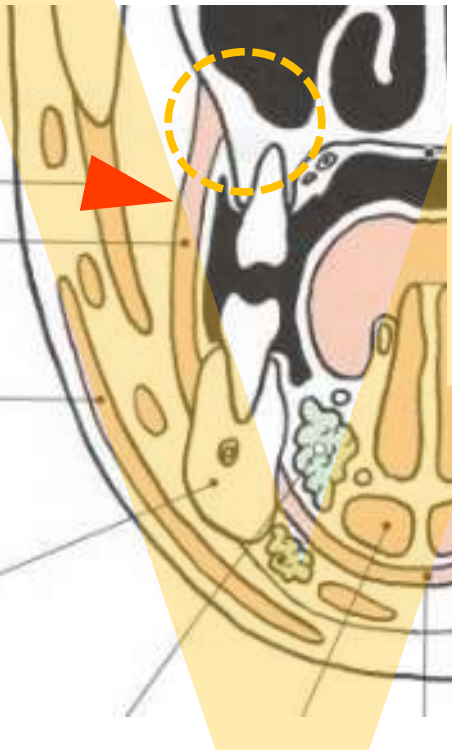
Anatomical borders and muscle insertions

- e.g.: insertion of *m. buccinator* – relation to root apex

m. buccinator

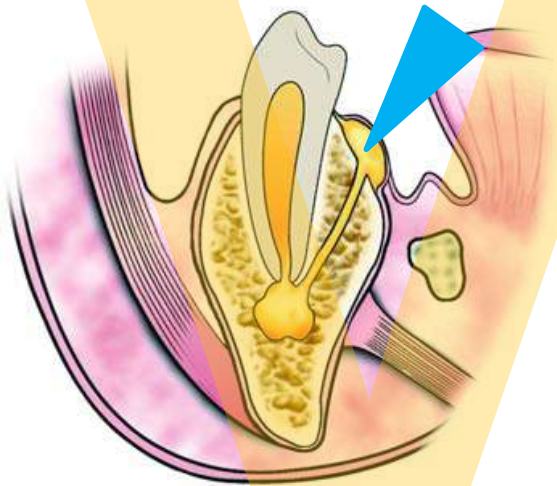
abscessus buccae

abscessus vestibularis

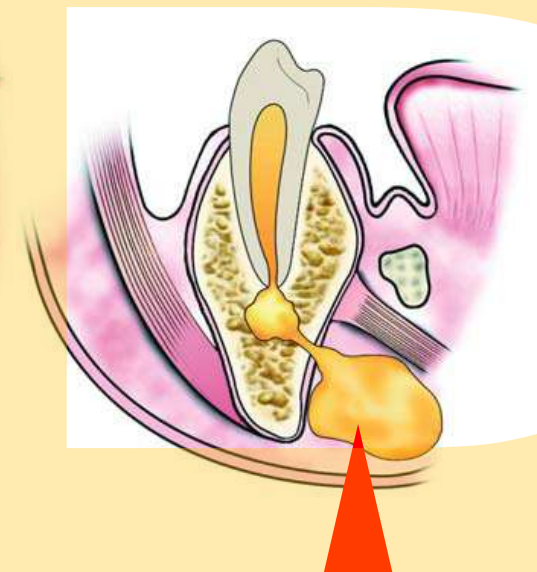
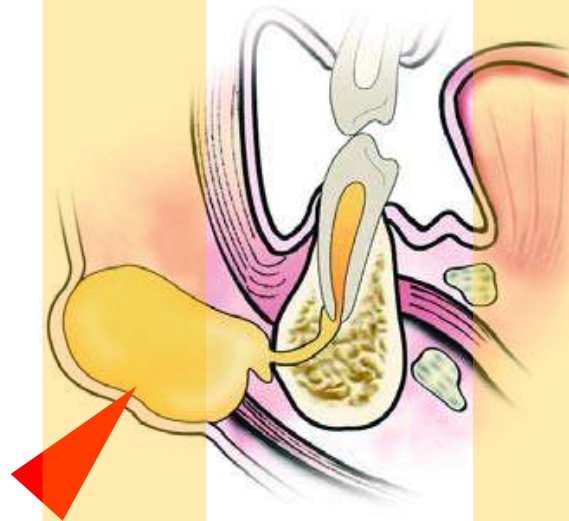


Anatomy and treatment

- Surgical intervention usually needed = incision and drainage
- Is there need for intraoral or extraoral incision?



X

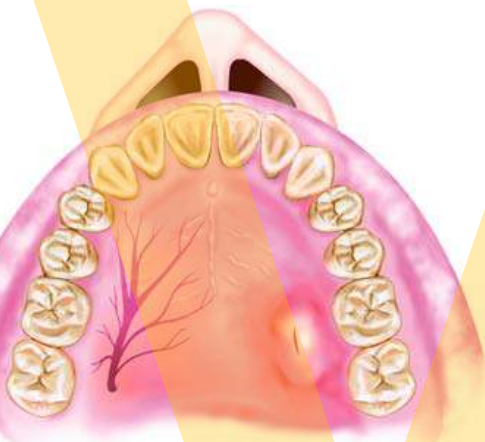


Intraoral incision

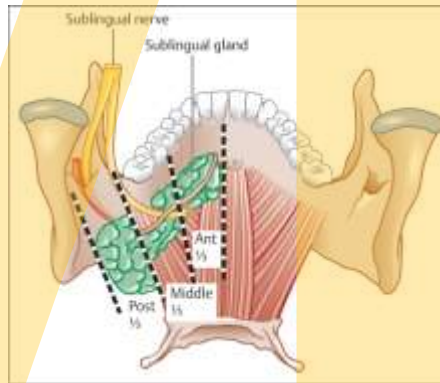
Extraoral incision

Anatomy and treatment

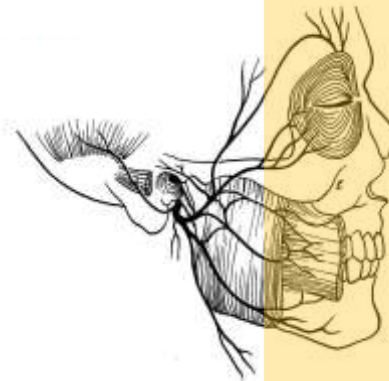
- Risk of traumatization of surrounding structures?



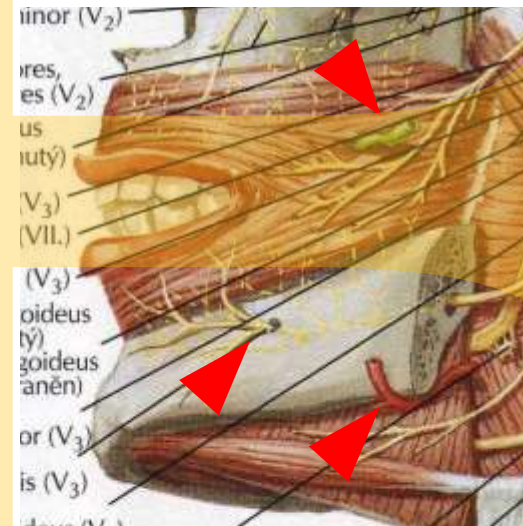
a. palatina



n. lingualis
duct. gl. submandibularis



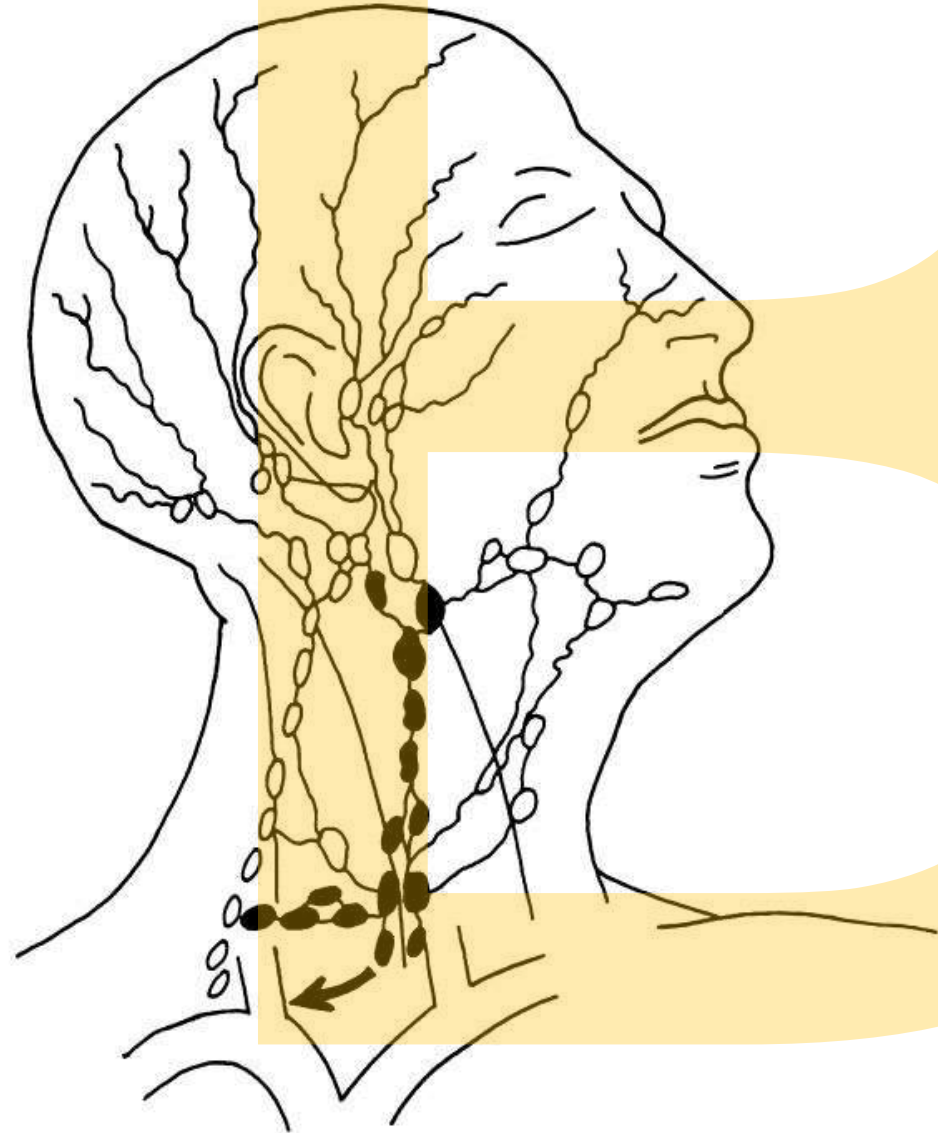
n. VII



n. mentalis
duct. parotidus
a. facialis

Lymphatic vessels and nodes

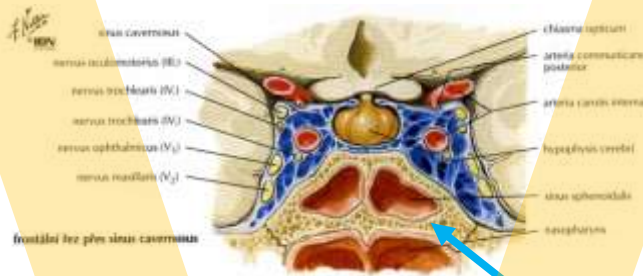
- Activation of regional nodes
- Infection spreading



Vascular supply - veins

- Possibility of infection spreading; incl. intracranial propagation

(*sinus cavernosus*)



v. ophthalmica sup.
- *fissura orbitalis sup.*
do *fossa cranii media*

v. ophthalmica inf.
- *fissura orbitalis inf.*
do *fossa infratemporalis*

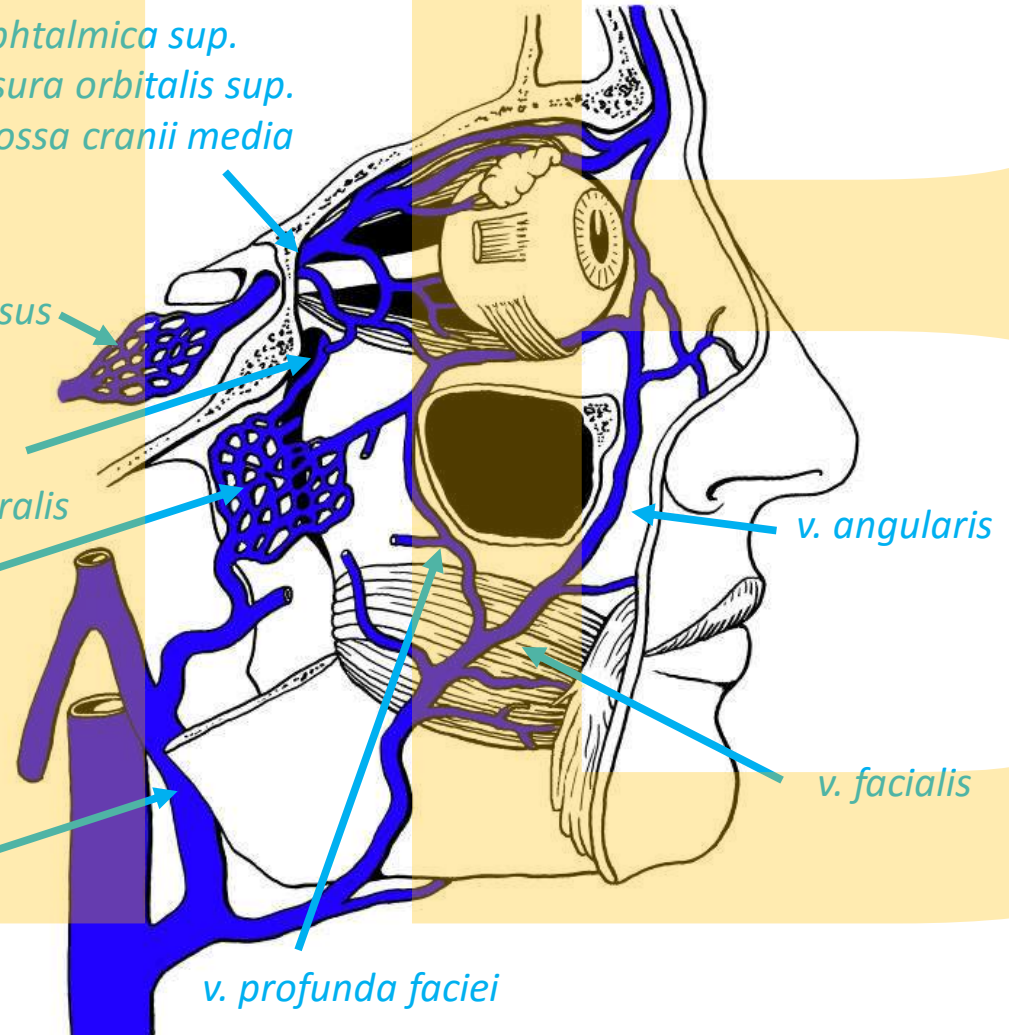
plexus pterygoideus

v. retromandibularis

v. profunda faciei

v. angularis

v. facialis



Maxilla

- Usually vestibular spreading – abscessus vestibularis
- Palatal roots – abscessus palatinus
- Possible spreading to *sinus maxillaris*

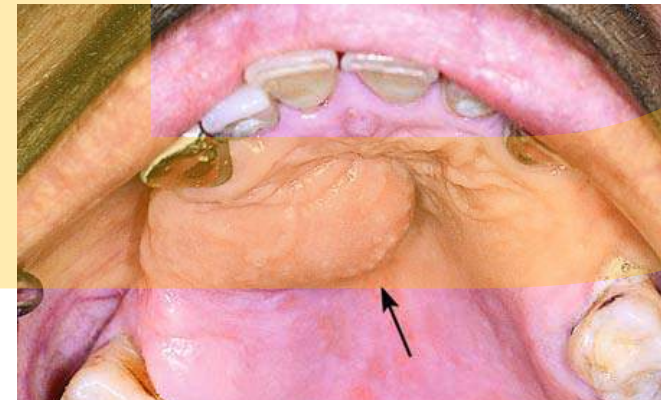
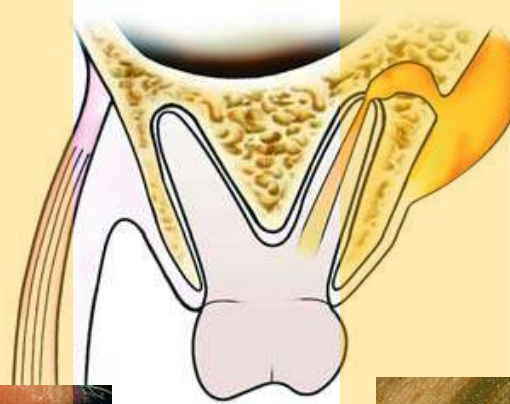
abscessus vestibularis



a



abscessus palatinus

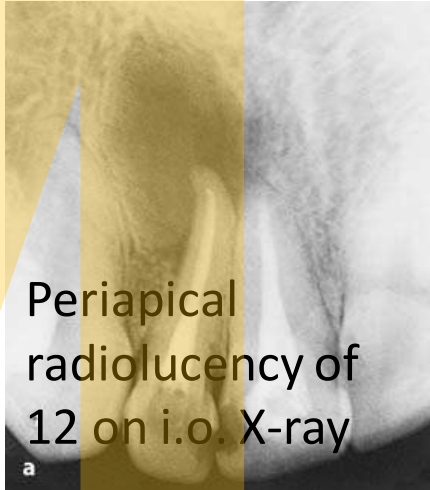


Abscessus vestibularis

Vestibular spreading of infection

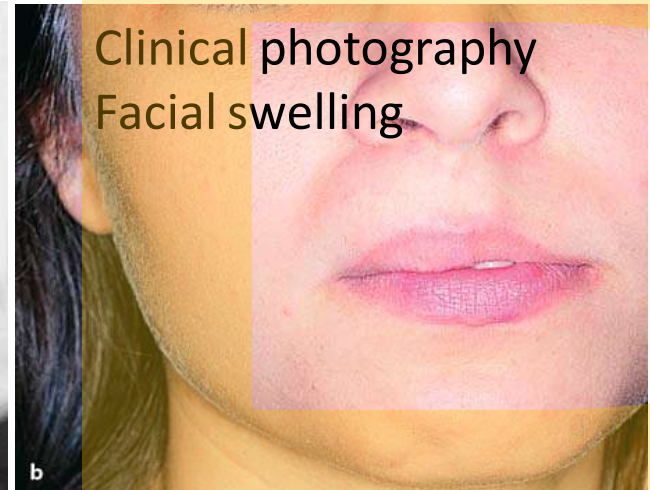


a



Periapical radiolucency of 12 on i.o. X-ray

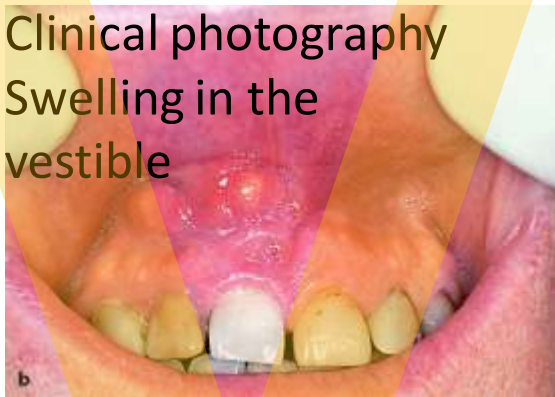
a



Clinical photography
Facial swelling

b

Clinical photography
Swelling in the vestibule



Drainage



Intraoral incision



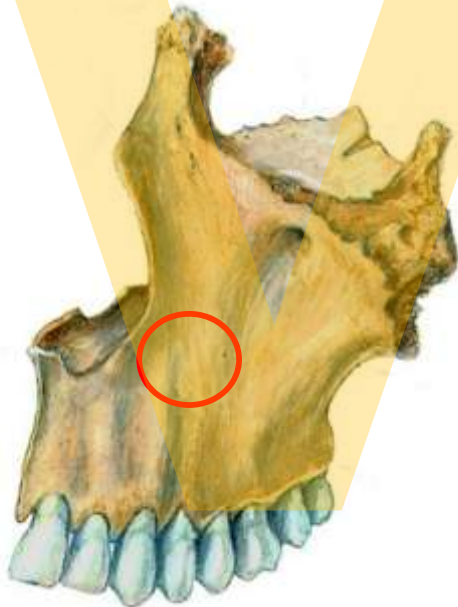
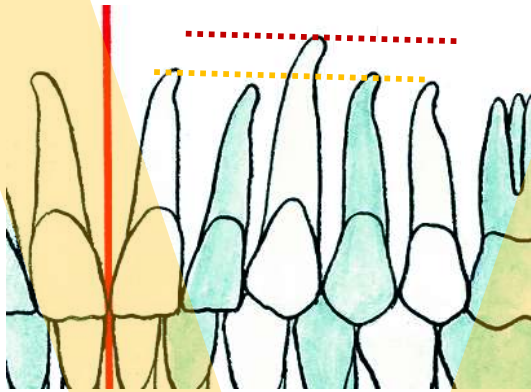
a

Intraoral incision



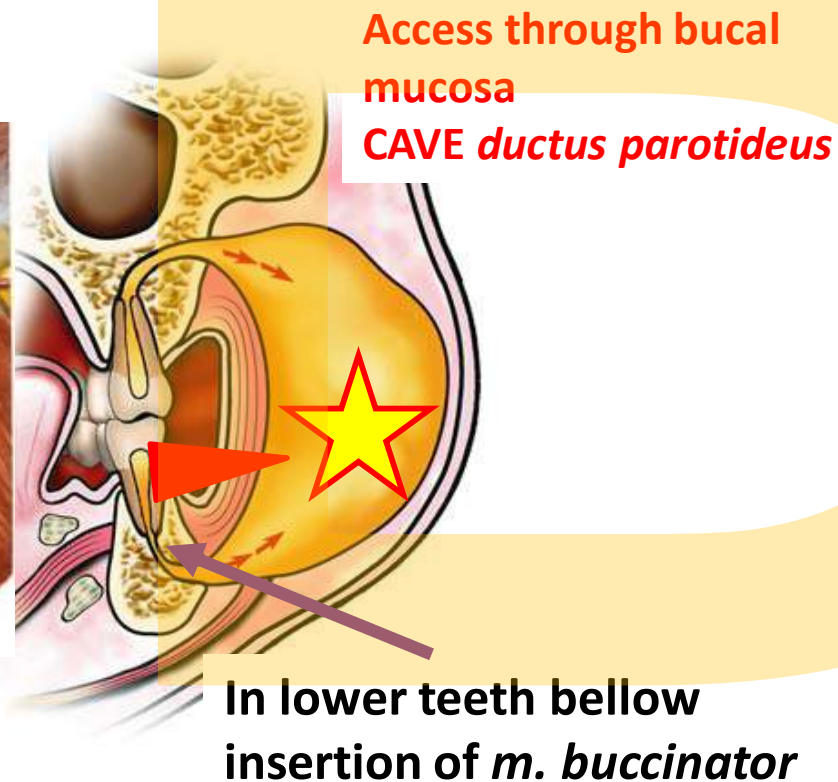
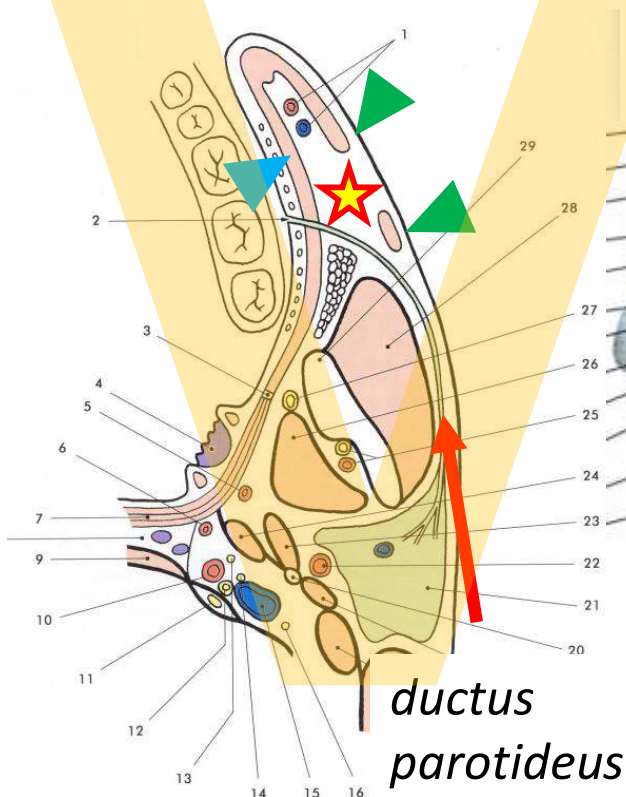
b

Canine – inflammation above *fornix vestibulae* (apex position) – abscessus fossae caninae



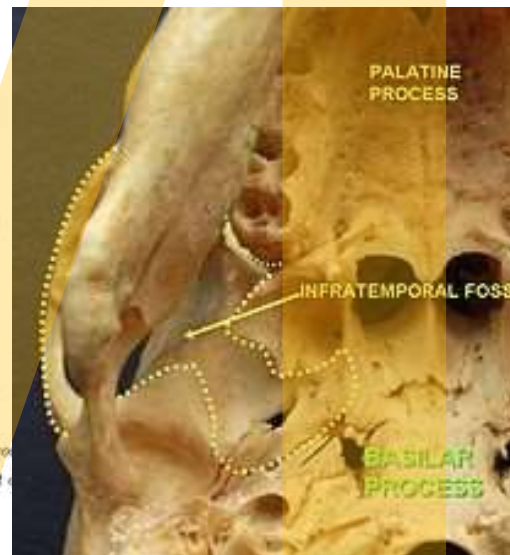
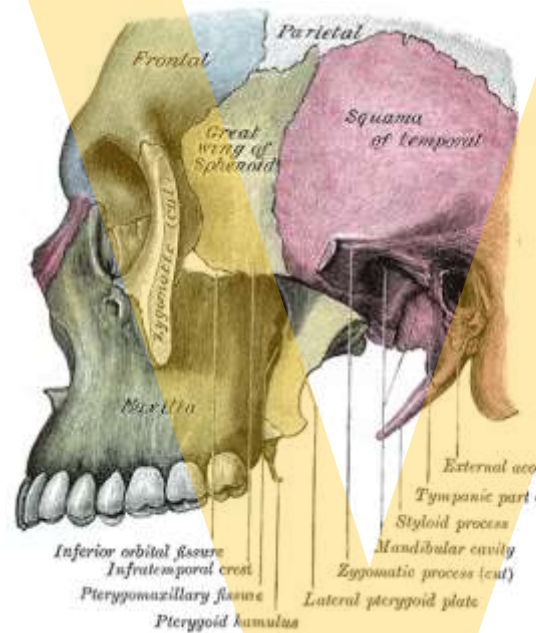
Spreading above insertion of *m. buccinator* – abscessus buccae

- Infection between **superficial** (mimic muscles) and **deep** (*m. buccinator*) layer of muscles in bucal region - *spatium intermusculare*; with *corpus adiposum buccae*



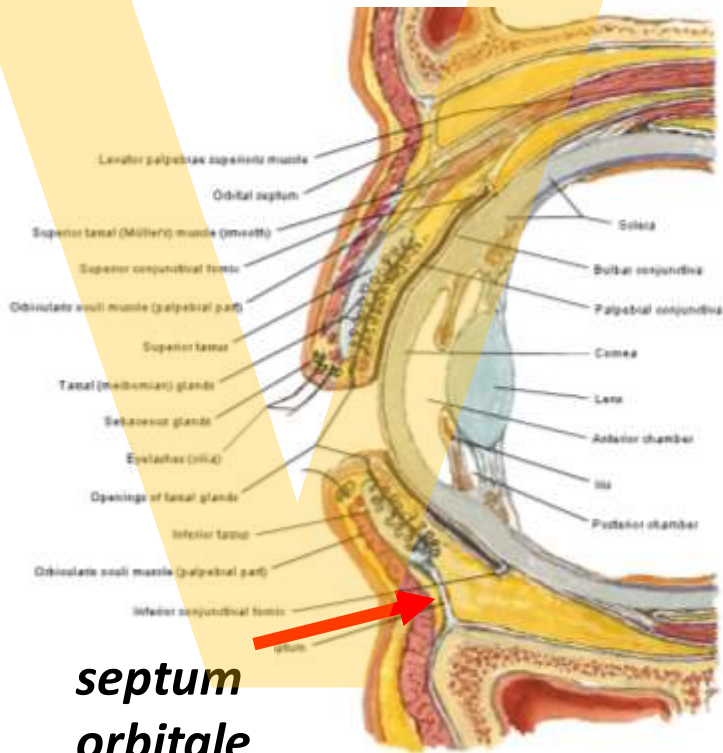
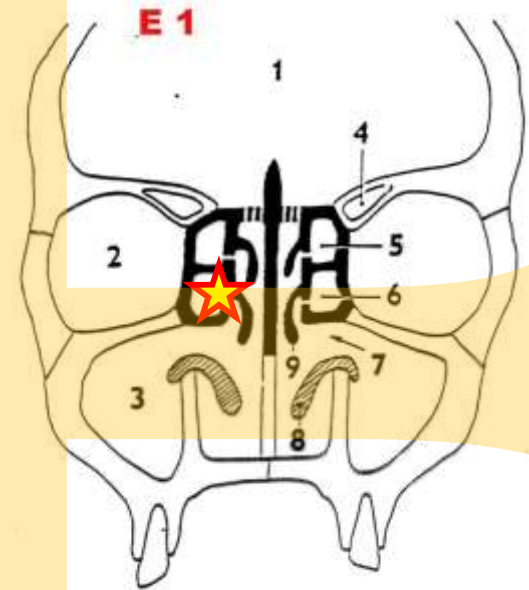
Upper molars (esp. M3) – spreading to *tuber maxillae* – abscessus retromaxillaris

- Part of *fossa infratemporalis* – risk of spreading to surrounding regions (in the illustration to *fossa temporalis*)

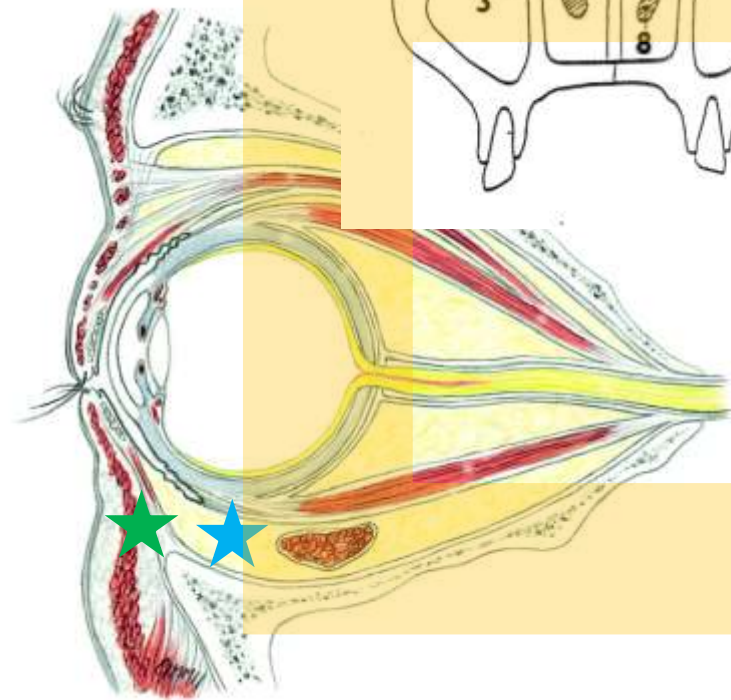


Spreading to orbit pre/retroseptal orbitocelulitis

- Via
 - *fossa canina*/ perimaxillar abscess
 - *tromboflebitis v. angularis*
 - *sinus maxillaris* / *cellulae ethmoidales* ★



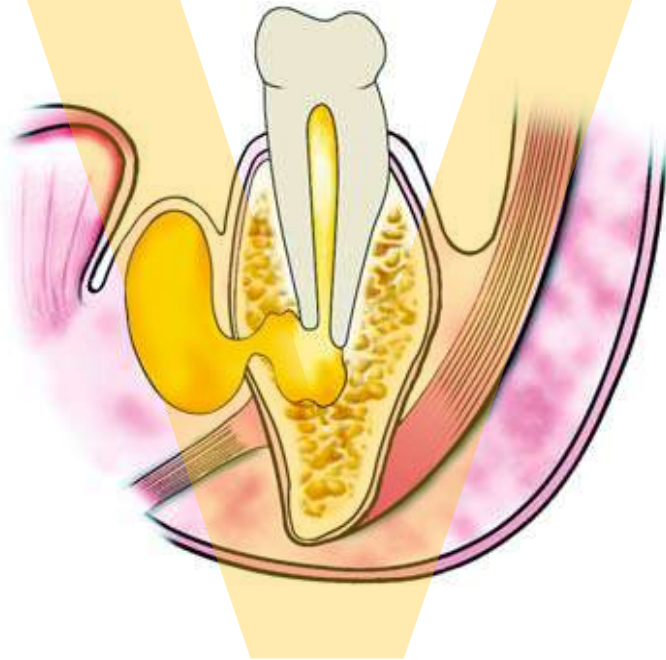
septum orbitale



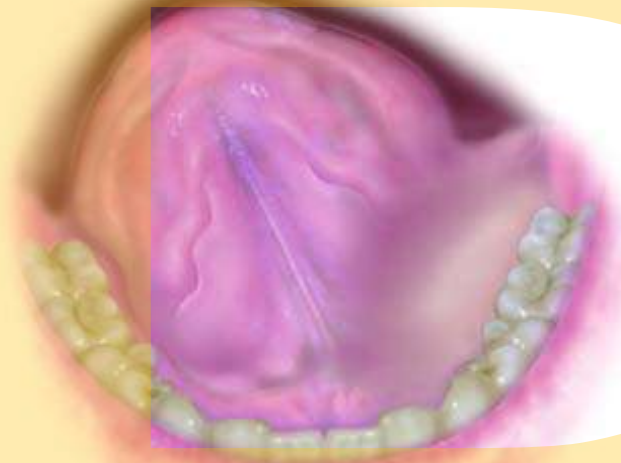
F. Netter M.D.

Mandible

- Vestibular spreading – abscessus vestibularis
- Oral spreading – above insertion of *m. mylohyoideus*
 - abscessus sublingualis; (event. into the tongue)

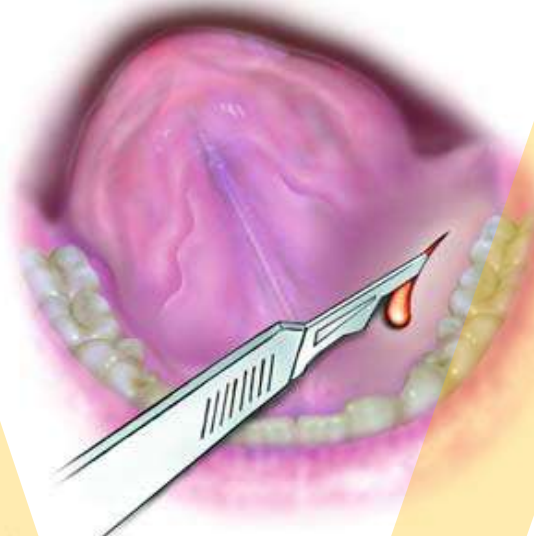


OPG: periapical radiolucency 37

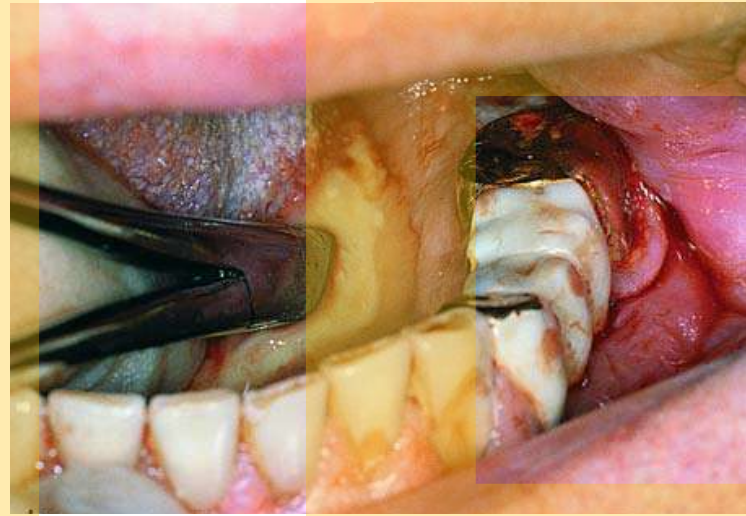


Sublingual swelling

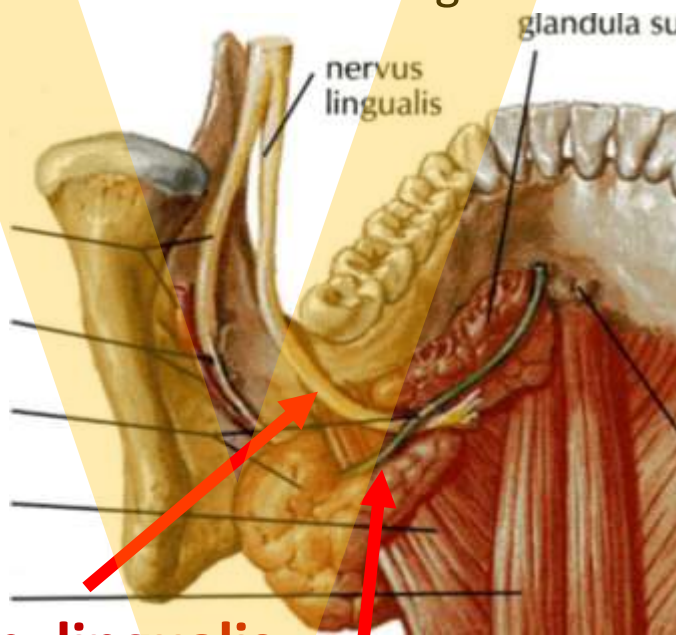
Abscessus sublingualis



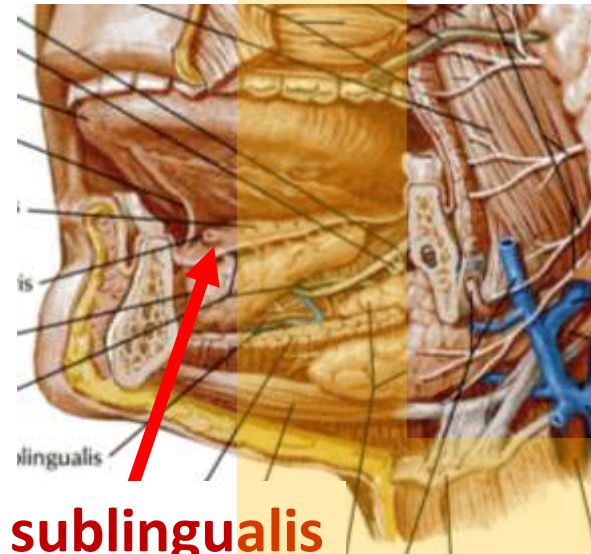
a Incision through mucosa



Drainage

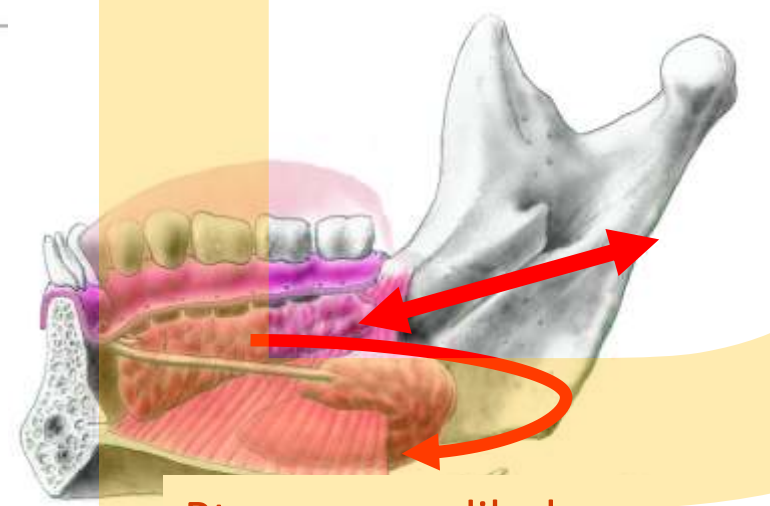
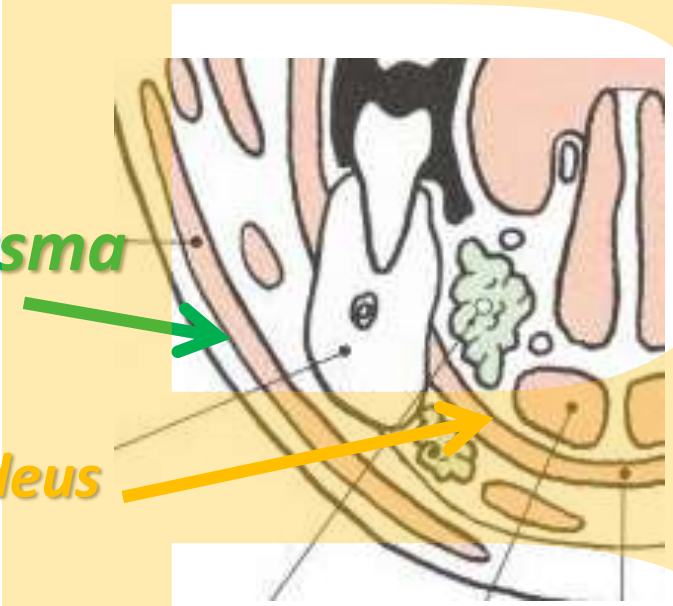
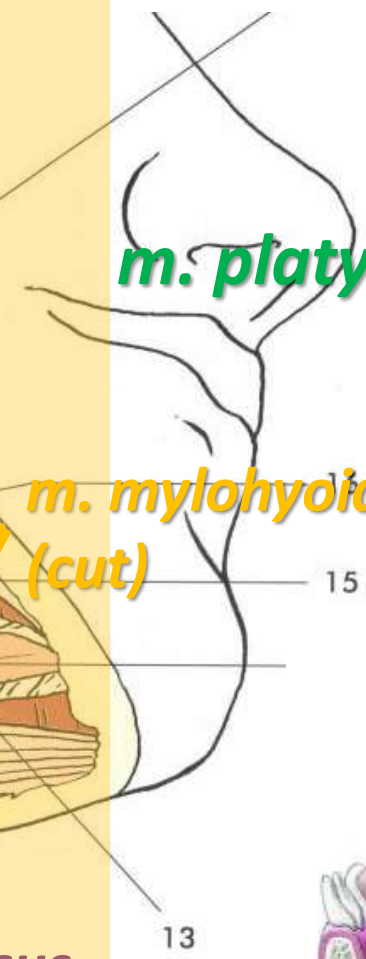
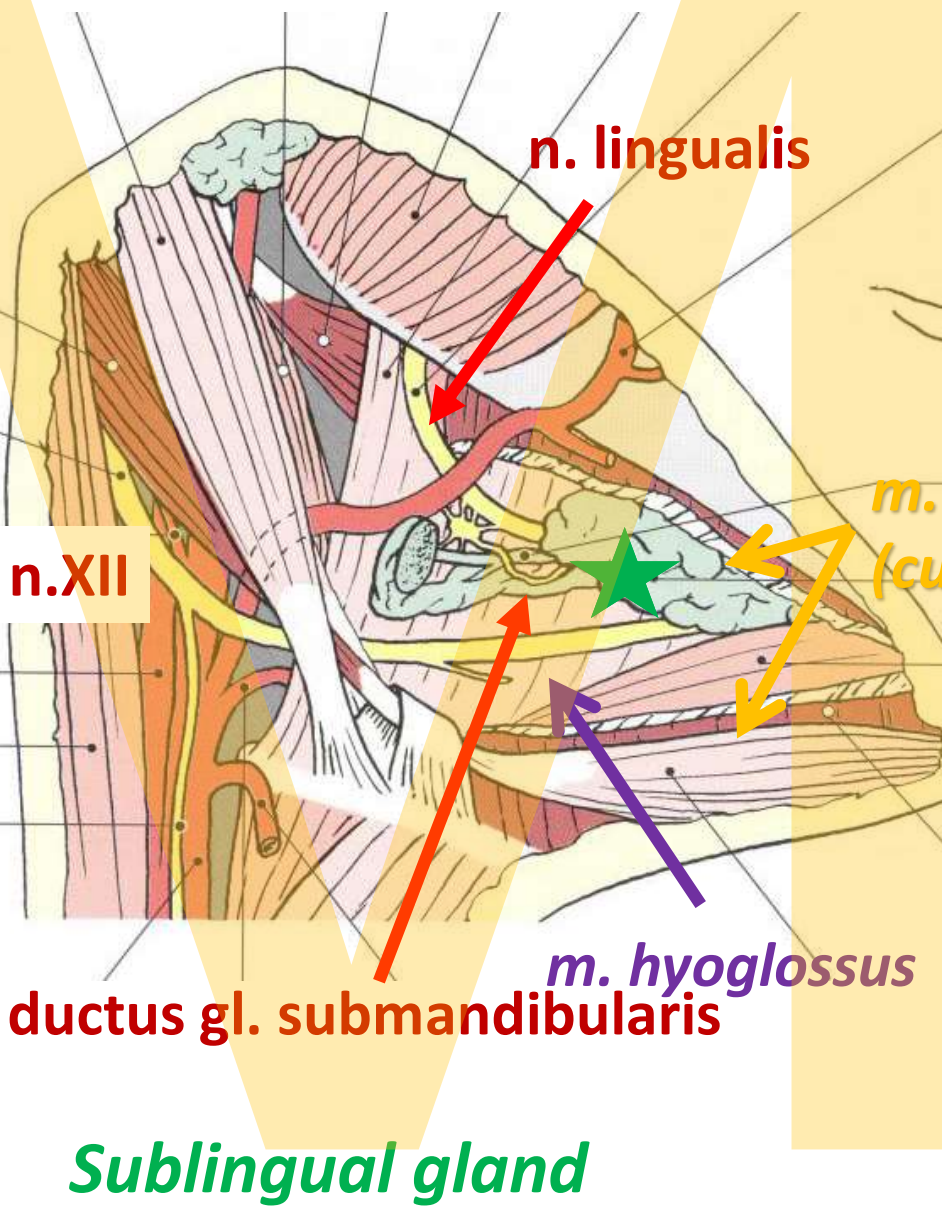


n. lingualis
ductus gl. submandibularis



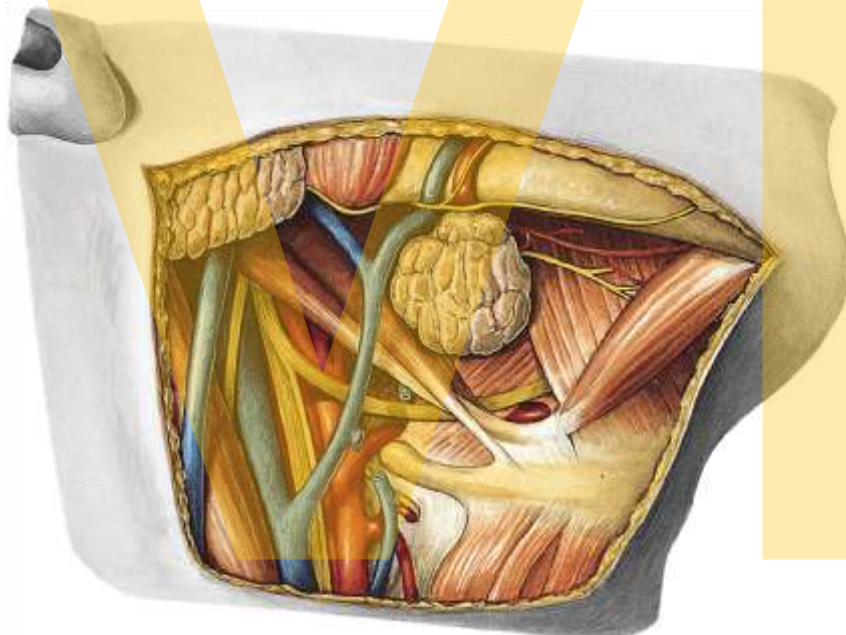
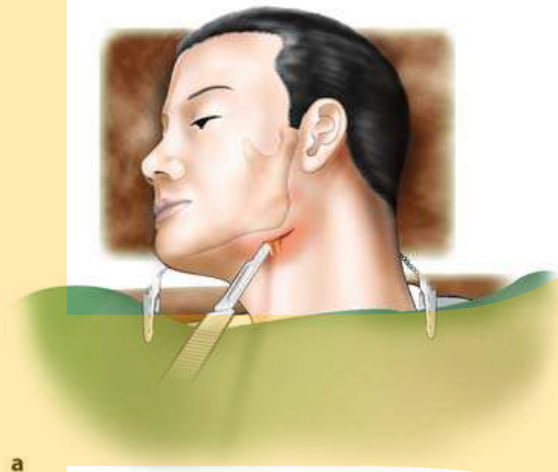
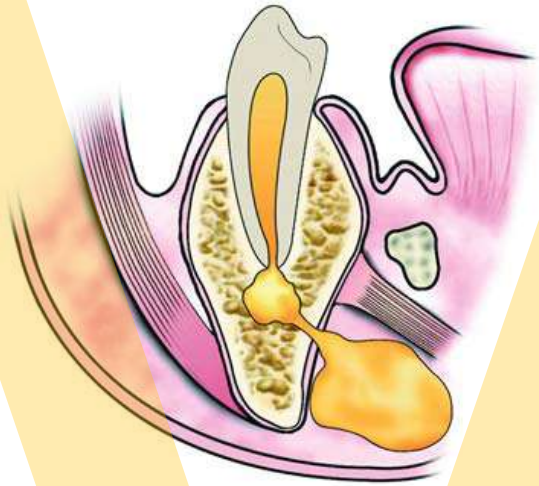
a. sublingualis

Sublingual region – inferior aspect



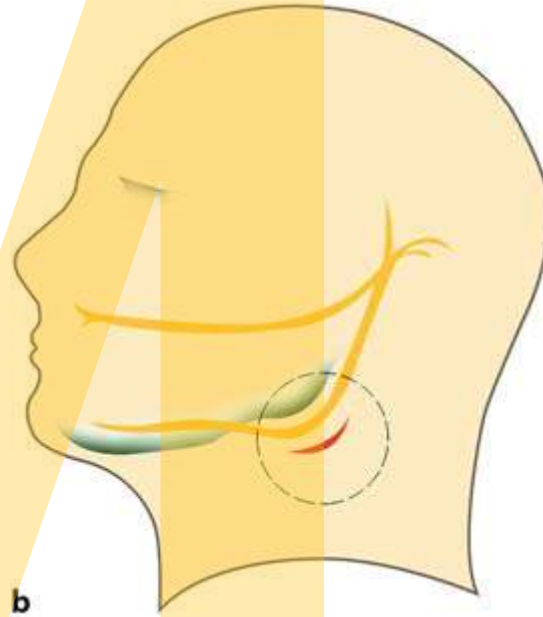
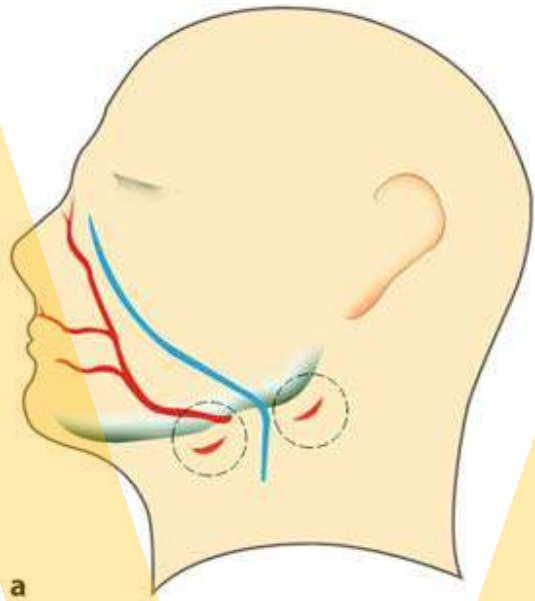
Pterygomandibulare space
Submandibulare space

Spreading bellow insertion of *m. mylohyoideus* – abscessus submandibularis



Submandibular triangle - borders

- lower margin of the mandible
- ant. and post. belly of m. digasticus
- floor – m. mylohyoides
- superficial – cervical fascia – lam. spf.

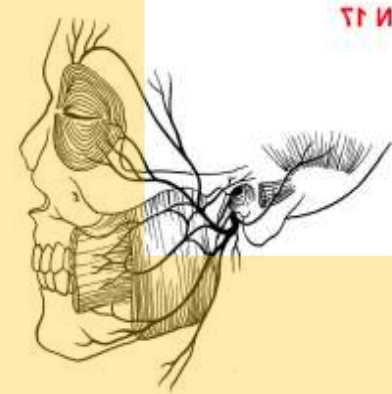


Extraoral incision

CAVE

a. + v. facialis

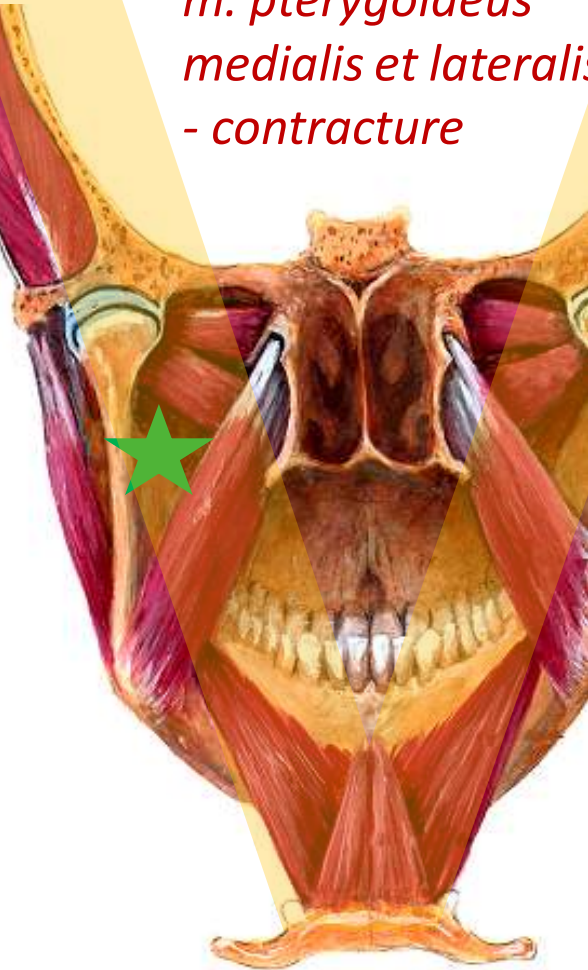
r. marginalis mandibulae n. VII



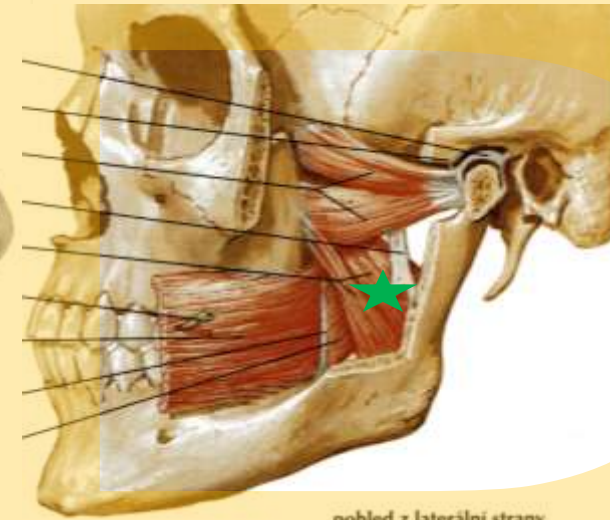
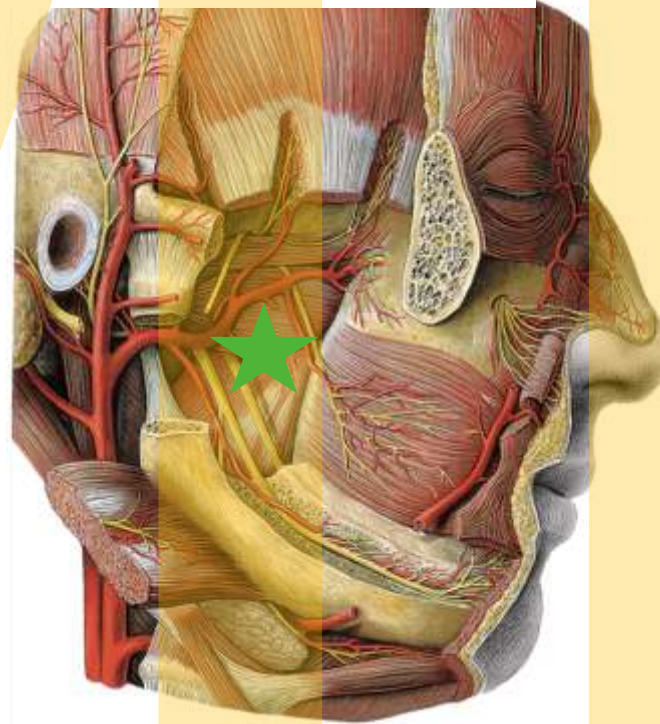
Extraoral incision and drainage

Spreading to pterygomandibulare space – abscessus pterygomandibularis

*m. pterygoideus
medialis et lateralis
- contracture*

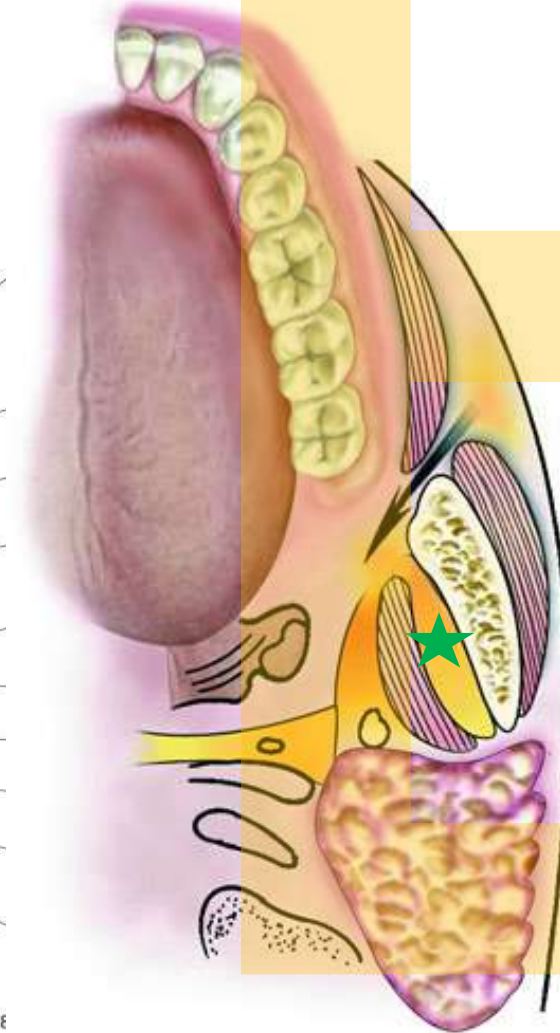
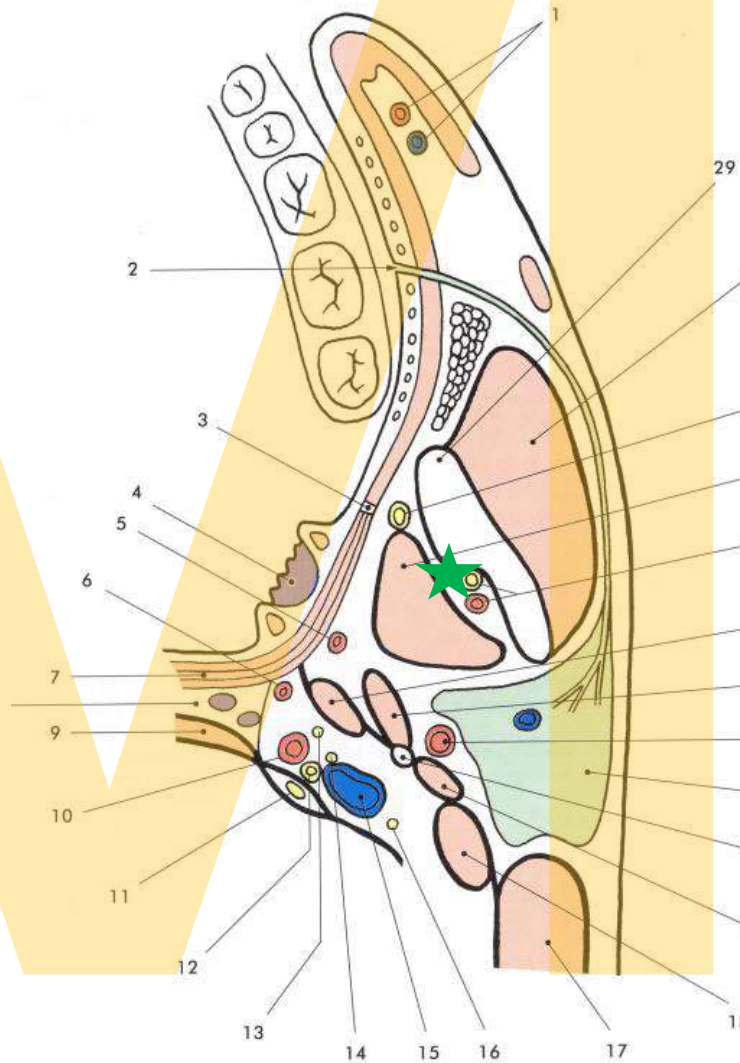


ramus mandibulae



pohled z laterální strany

Spreading to pterygomandibulare space – abscessus pterygomandibularis

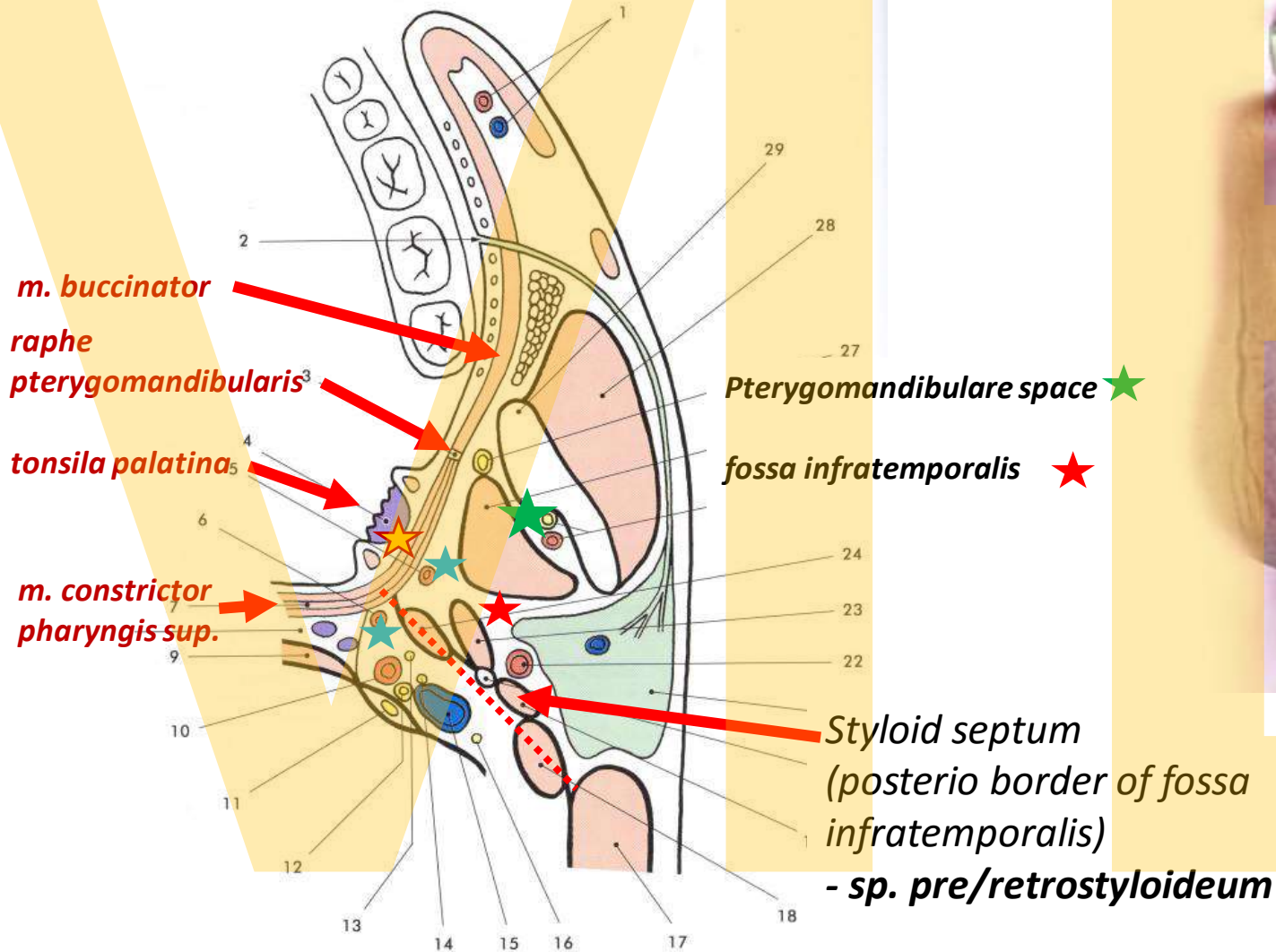


Spreading to para/retrofaryngeal space ★

direct spreading from lower molars

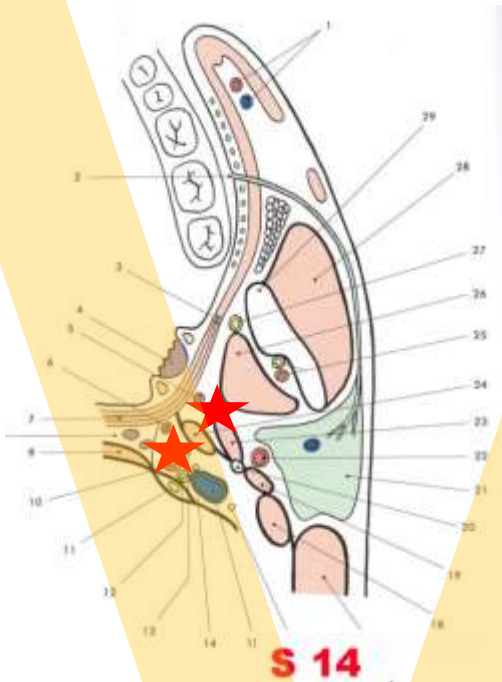
secondary spreading from submandibular, pterygomandibular and parotic space

(diff. dg. abscessus peritonsilaris) ★



Spreading caudally to *spatium viscerale colli*

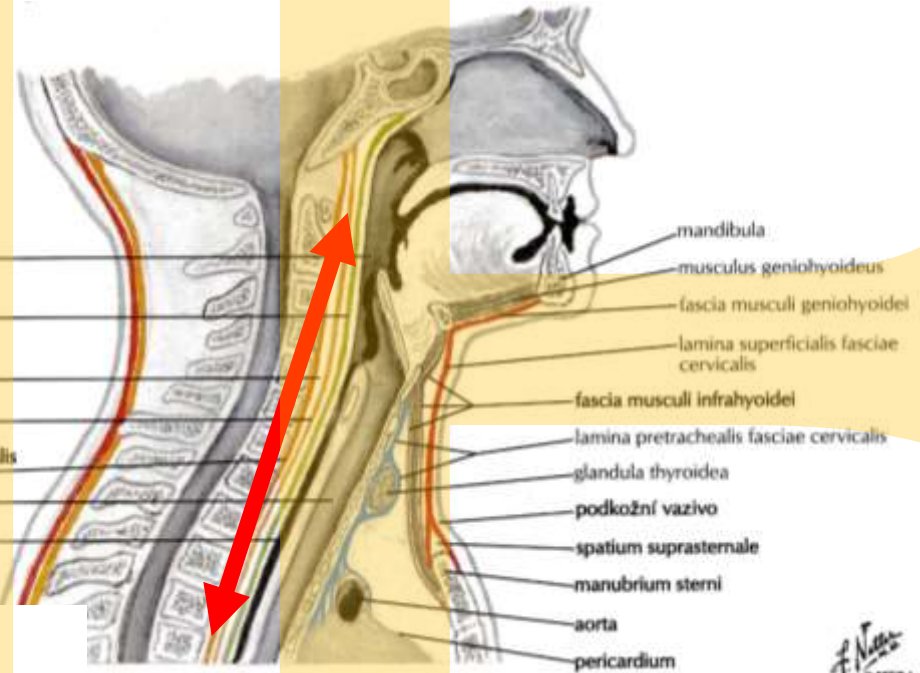
connected with mediastinum
without anatomical barriers



S 14

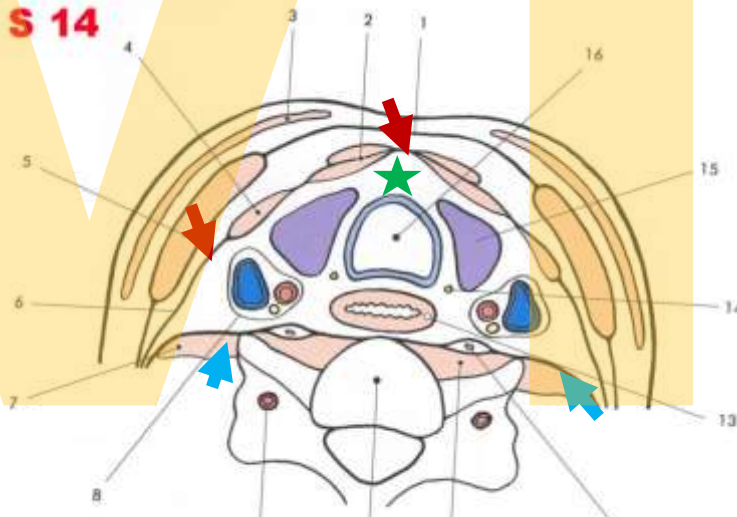
sagitální řez

pharynx
fascia buccopharyngea
retrofaryngeální prostor
fascia alaris
lamina prevertebralis fasciae cervicalis
trachea
oesophagus



mandibula
musculus geniohyoideus
fascia musculi geniohyoidei
lamina superficialis fasciae cervicalis
fascia musculi infrahyoidei
lamina pretrachealis fasciae cervicalis
glandula thyroidea
podkožní vazivo
spatium suprasternale
manubrium sterni
aorta
pericardium

Transversální řez krkem (C6)

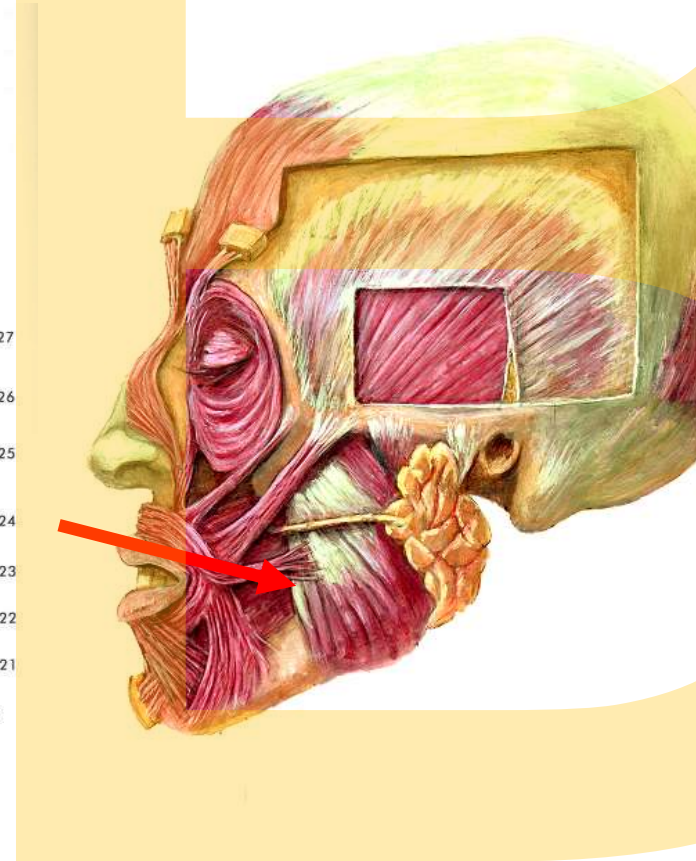
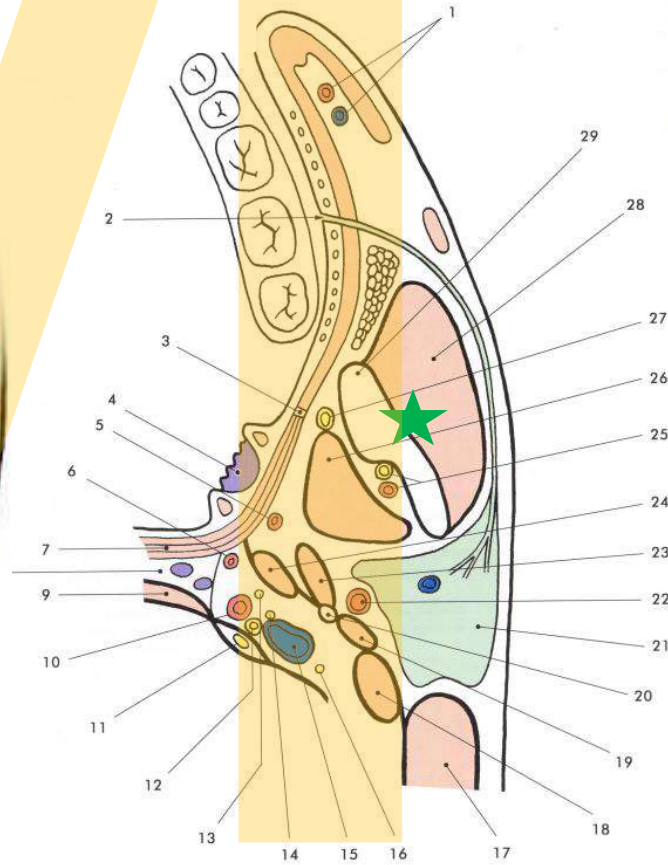
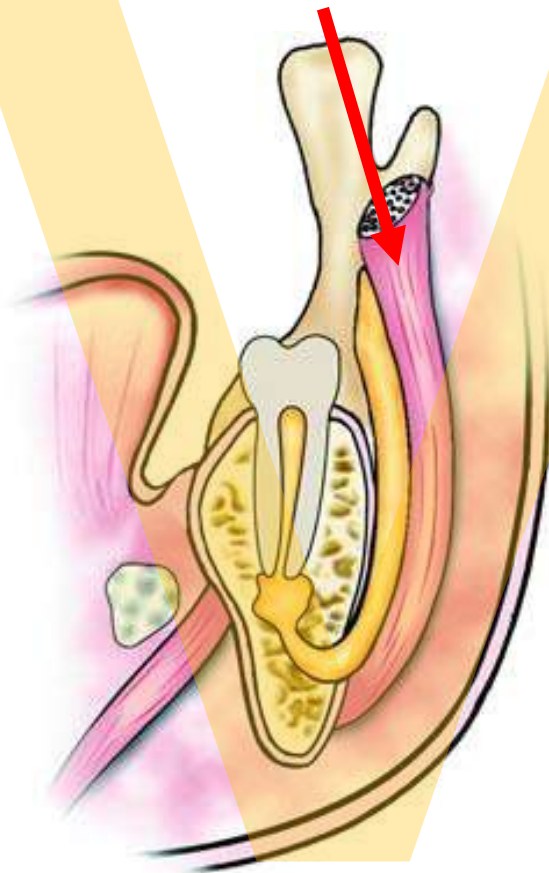


spatium viscerale colli
mezi lamina pretrachealis
a l. prevertebralis fasciae cervicalis

trachea, oesophagus
nervově-cévní svazek krční
gl. thyroidea
...

Spreading between *ramus mandibulae* and *m. masseter* – abscessus submassetericus

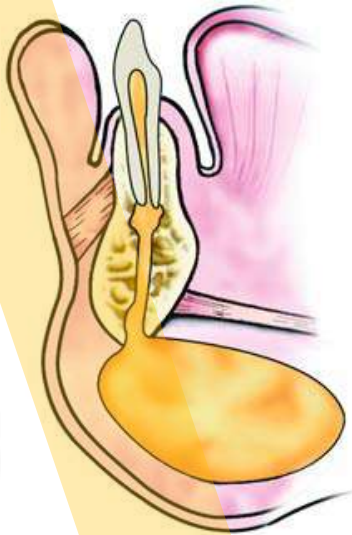
m. masseter
- contracture



Spreading bellow insertion of *m. mentalis* - abscessus mentalis



Spreading submentally – abscessus submentalialis



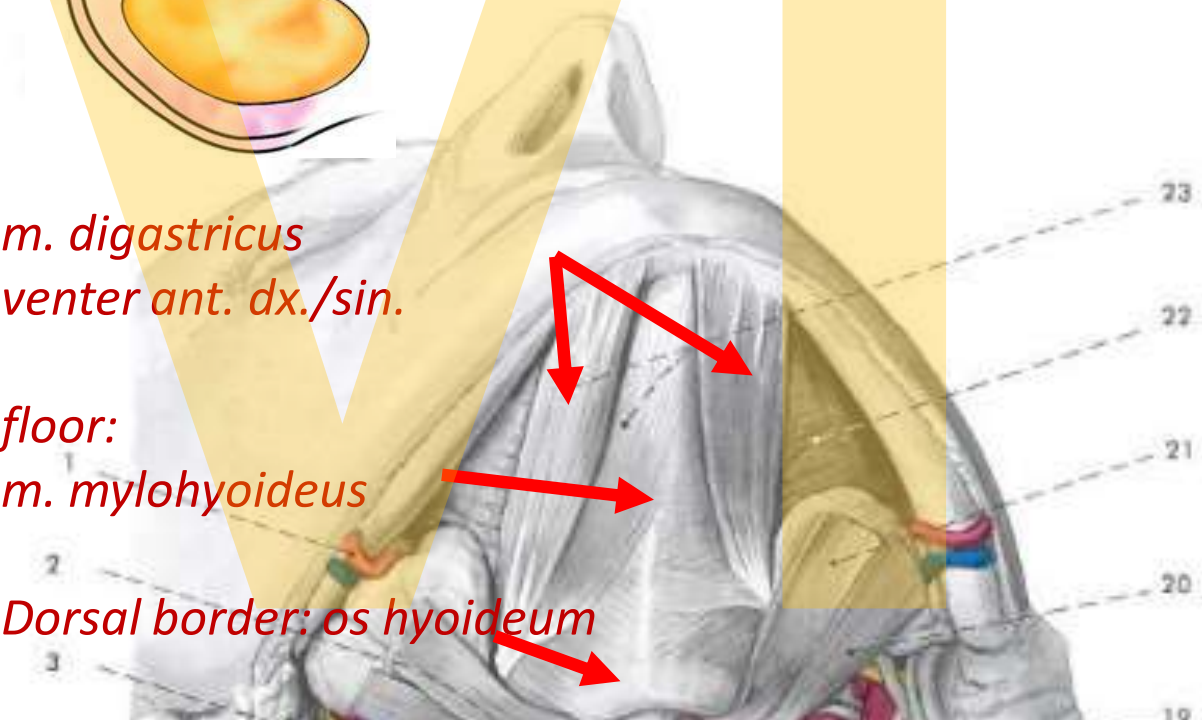
a



m. digastricus
venter ant. dx./sin.

floor:
m. mylohyoideus

Dorsal border: os hyoideum



<http://anat.lf1.cuni.cz/vyuka/zub3/sylabus.php>

<http://anat.lf1.cuni.cz/vyuka/zub3/program.php>

Recommended literature:

- Oral Surgery (Fragiskos D. Fragiskos, PhD)
- Contemporary Oral and Maxillofacial Surgery
(prof. Hupp, prof. Tucker, prof. Ellis)
- Regional anatomy (prof. Grim)
- Atlas of Human Anatomy (Netter, MD)