

Odontogenic infection pathway



Odontogenic infections

are caused by **oral pathogens** that inhabit the surface of the teeth and oral mucous membranes and are also found in the gingival sulcus and saliva



Infection	Predominant bacteria
Cavities	<i>Streptococcus mutans</i> <i>Actinomyces spp</i> <i>Lactobacillus spp</i>
Gingivitis	<i>Campylobacter rectus</i> <i>Actinomyces spp</i> <i>Prevotella intermedia</i> <i>Streptococcus anginosus</i>
Periodontitis	<i>Porphyromonas gingivalis</i> <i>Bacteroides forsythus</i> <i>Actinobacillus actinomycentemcomitans</i> <i>Prevotella intermedia</i> <i>Fusobacterium nucleatum</i>
Periapical abscess	<i>Peptostreptococcus micros</i> <i>Prevotella oralis</i> <i>Prevotella melaninogenica</i> <i>Streptococcus anginosus</i> <i>Porphyromonas gingivalis</i>
Pericoronitis	<i>Peptostreptococcus micros</i> <i>Porphyromonas gingivalis</i> <i>Fusobacterium spp</i>
Periimplantitis	<i>Peptostreptococcus micros</i> <i>Fusobacterium nucleatum</i> <i>Prevotella intermedia</i> <i>Pseudomonas aeruginosa</i> <i>Staphylococcus spp</i>
Endodontitis (pulpitis)	<i>Peptostreptococcus micros</i> <i>Porphyromonas endodontalis</i> <i>Prevotella intermedia</i> <i>Prevotella melaninogenica</i> <i>Fusobacterium nucleatum</i>

Microorganisms involved in mixed bacterial infections of the oral cavity

Infection in oral cavity can be:

Dental origin (primary infection)

- progressive dental caries
- extensive periodontal disease
- trauma caused by dental procedures

Nonodontogenic source (secondary infect.)

- an infection surrounding the oral cavity as the skin, tonsils, ears or sinusitis

Dental infection normally produce the classic signs of infection:

Rubor - due to vasodilatation effect of inflammation

Tumor - caused by pus accumulation and oedema

Calor - caused by accelerated local metabolism

Dolor - results from pressure on sensory nerve caused by edema or infection

Functio laesa - problems with mastication, trismus, dysphagia, and respiratory impairment

Spread of dental infection

The various pathways of spread with odontogenic infections:

1. **per continuitatem**

The path of least resistance - by spaces in the head and neck

2. **by vascular system**

3. **by lymphatic system**

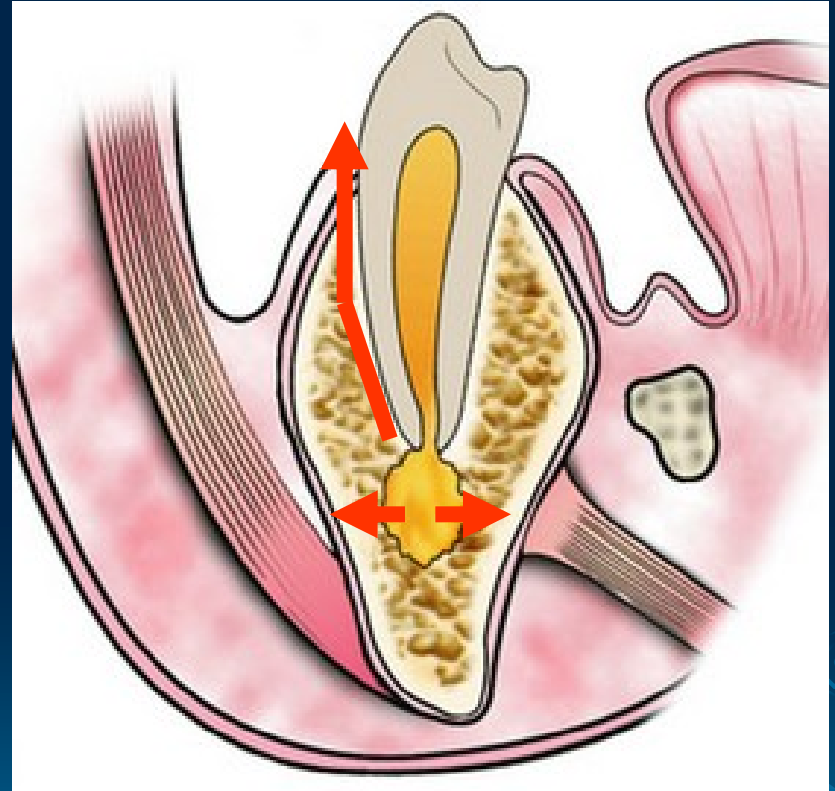


1. Spread of dental infection per continuitatem



Spread of apical infection

- periodontal gap
- alveolar process



- The **type** and **virulence** of the microorganisms involved and the **immunological condition** influence the degree of spread of infection
- Infection may be:
 - **localized** (**abscess**)
 - **diffused** (infection tends to spread rapidly through the tissues along the line of least resistance into the anatomically demarcated **tissue spaces**)

Abscess

A closed tissue space with supuration from a dental infection

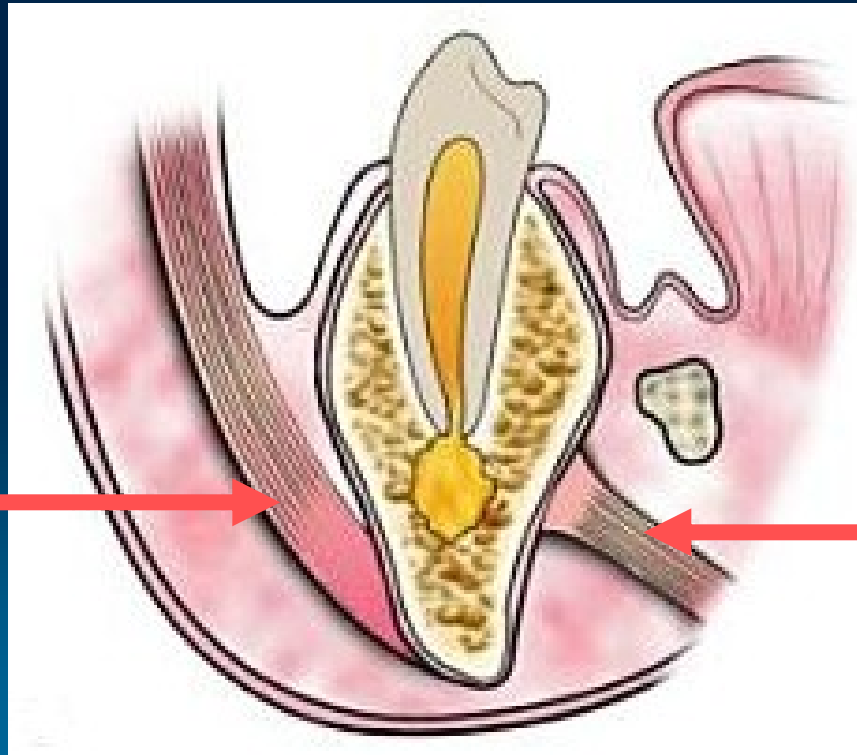
Periapical - progressive carries, pathogens invade the pulp and spread apically

Periodontal - caused by spread from an infected gum (usually in adults)

Pericoronaral - around an erupting third molar

Local abscess can spread along the anatomically demarcated tissue spaces

An **barrier** is the fascia and the **muscle attachments** to the bones

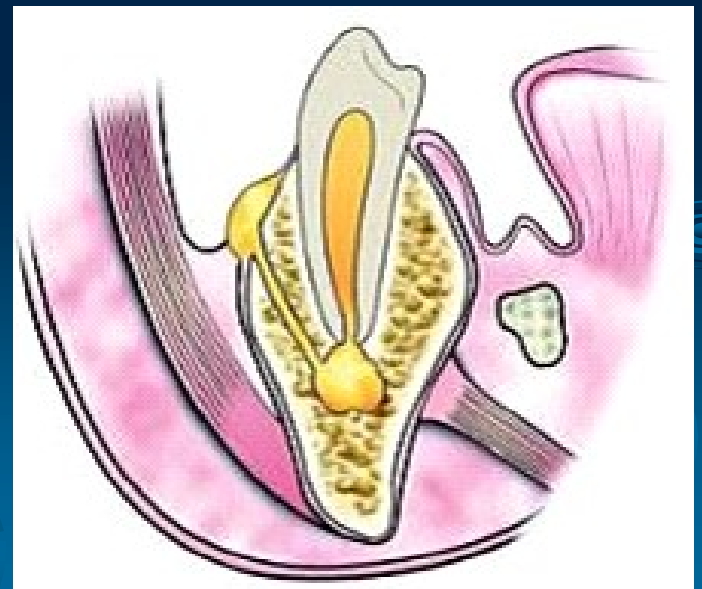
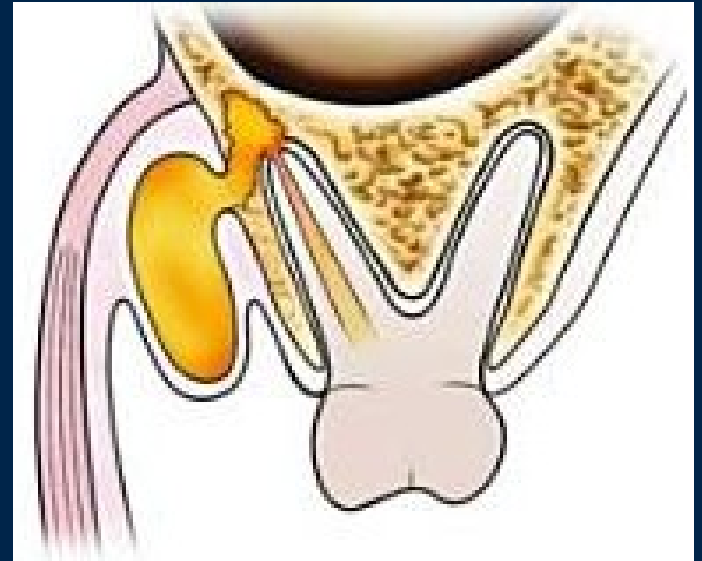


buccinator
muscle

mylohyoid
muscle

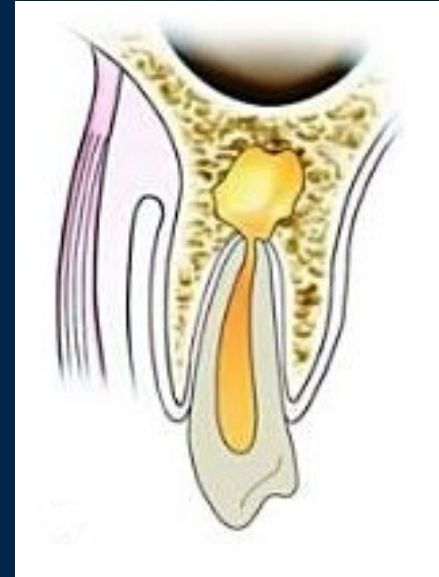
Vestibular Abscess

- abscess perforate bone **on the vestibular plate of the alveolar process**
- the roots **of all teeth of upper and lower jaw**
- if the roots are localized upon the muscle insertion (lower jaw) or below muscle insertion (upper jaw)



Palatal Abscess

- the roots of the **upper lateral incisors** or the **first premolars** and **molars** (roots often incline palatally)



- usually **no spread over palatine raphe**



The submucosal portion of the hard palate contains neurovascular bundle, minor salivary glands and lymphoid tissue

- the rich innervation of the periosteum - **painful !**
- the course of the palatine artery - **bleeding !**

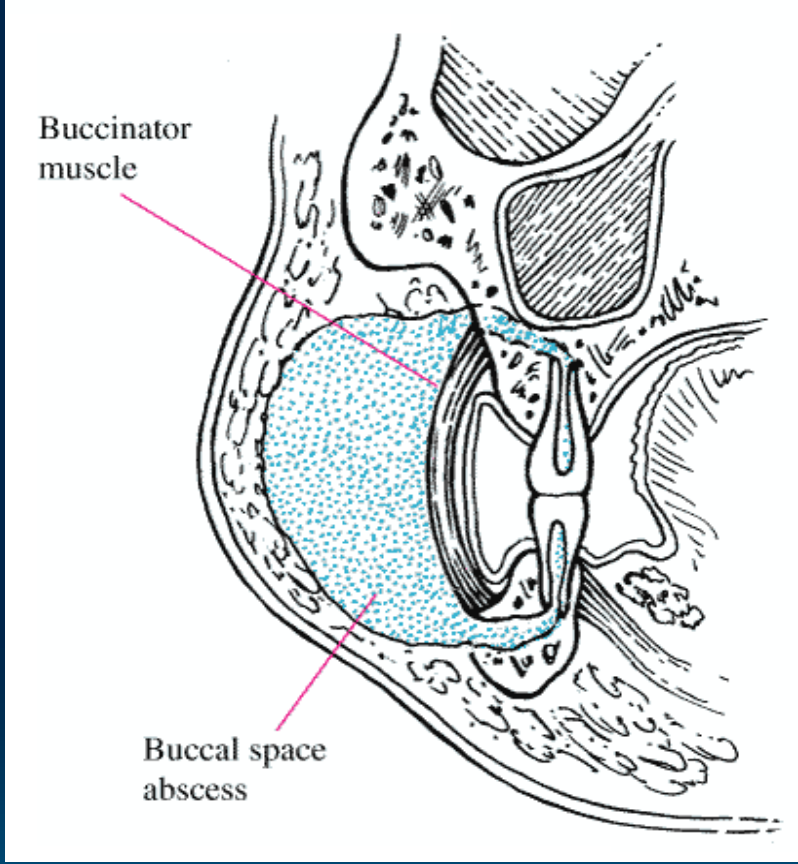


Buccal Space

- **premolars** and **molars** both jaws

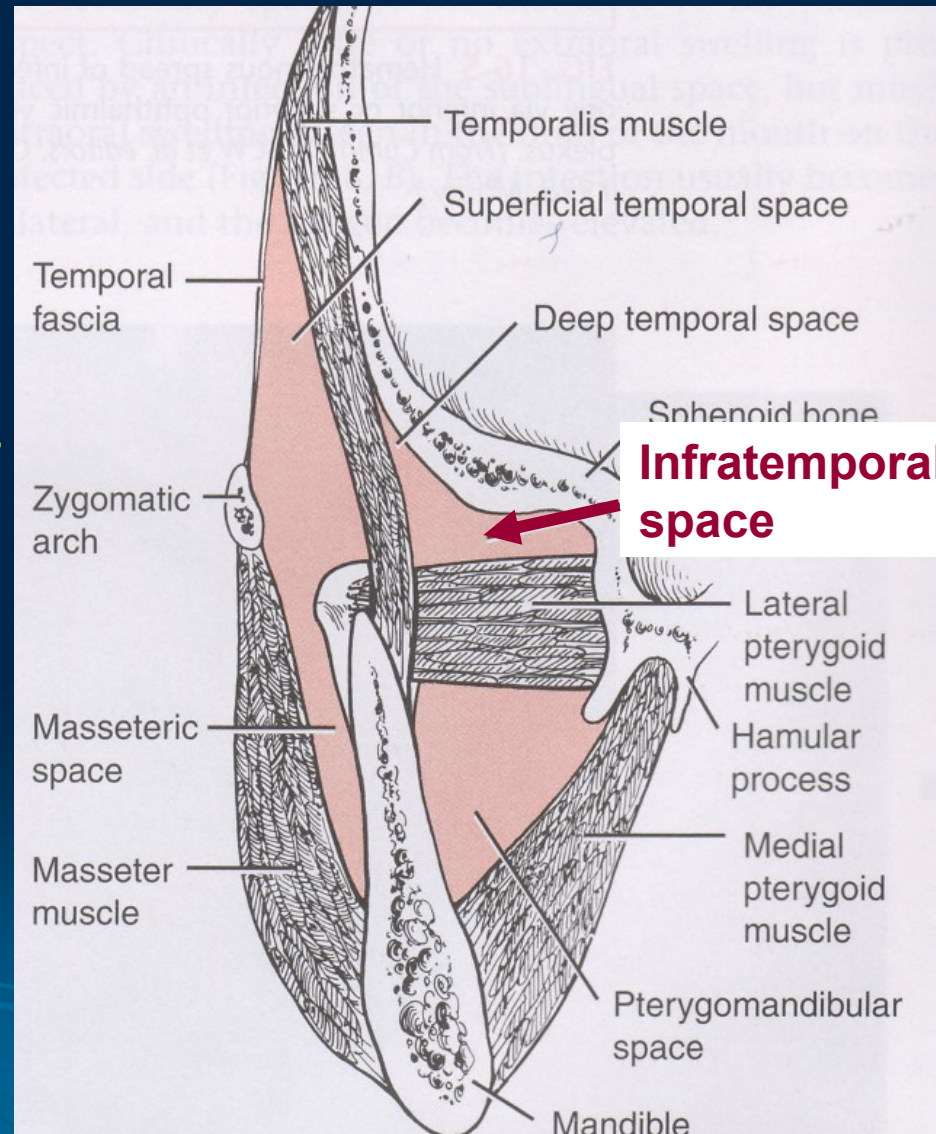


- if the roots are localized above the buccinator muscle insertion (upper jaw) or below insertion (lower jaw)
- infection spread into the soft tissues of the cheek → along anatomical planes toward the infratemporal or pterygopalatine fossa (**pterygomandibular raphe!**)



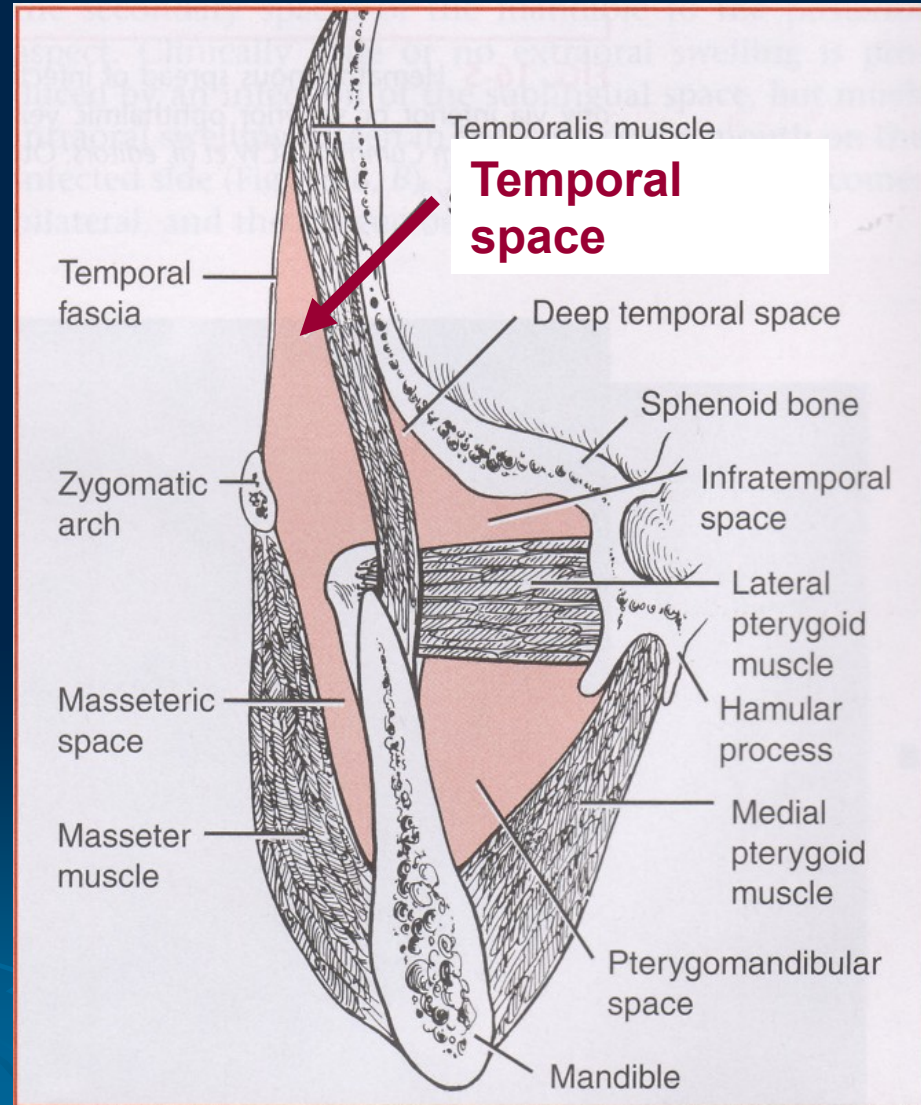
Infratemporal Space

- **molars** of upper jaws
- infection may ascend into the **cavernous sinus** (through venous plexus in the ovale and spinosum foramen), **orbita, temporal fossa, pterygopalatine fossa**



Temporal Space

- between the temporal fascia and the temporal bone
- inferiorly communicate with infratemporal space



Infraorbital Space

- usually **anterior superior teeth**, less often the premolars



- between the **levator anguli oris** and the **levator labii superioris** muscles

- possible infection via the **angular vein** → ophthalmic vein → spread into the cavernous sinus

- collateral oedema often includes the upper lip and lower eyelid



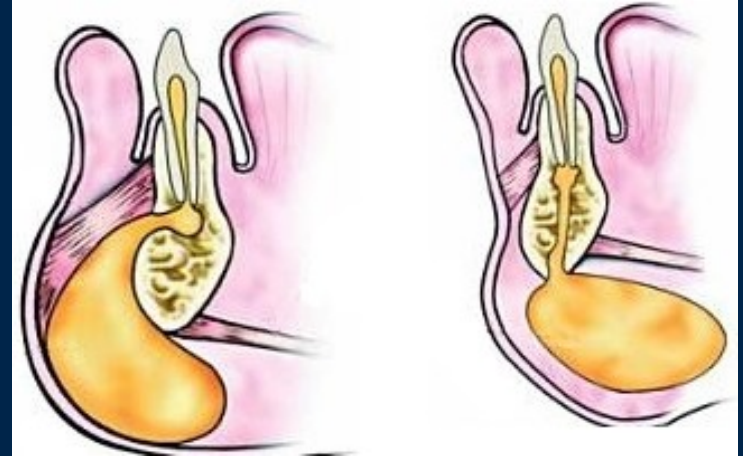
Maxillary Sinus

- occasionally of dental origin, more often by respiratory infection
- buccal and sometimes palatine root of **first** or **second molar**, **second premolar** that perforate the sinus floor
- the floor of **nasal cavity** is infected from the **anterior teeth**



Submental Space

- mandibular **anterior teeth**
- the root of teeth lay **below** the muscles insertion (**mental + depressor labii inf. muscles**)
- spread **beneath the mylohyoid muscle** into the submandibular area

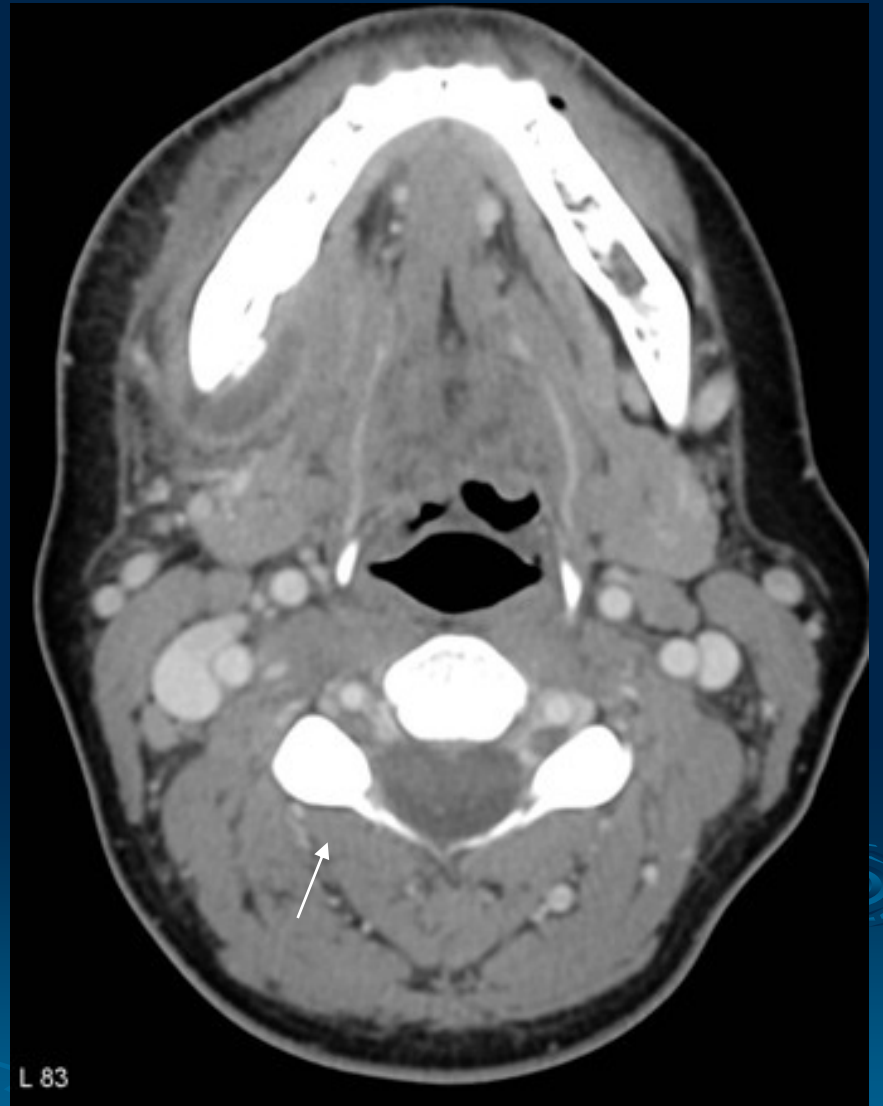


Submandibular Space

- mandibular **posterior teeth**

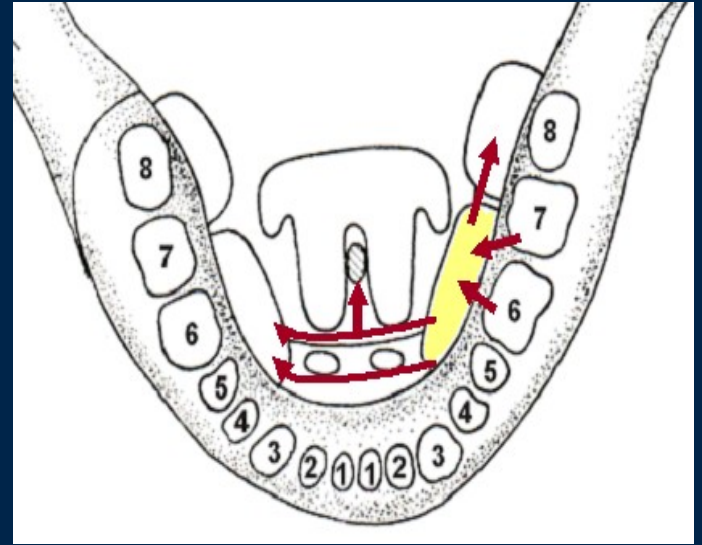


- the root of teeth lay root apices lay **below** the **buccinator** muscle insertion
- spread beneath the **mylohyoid muscle** into the submandibular area



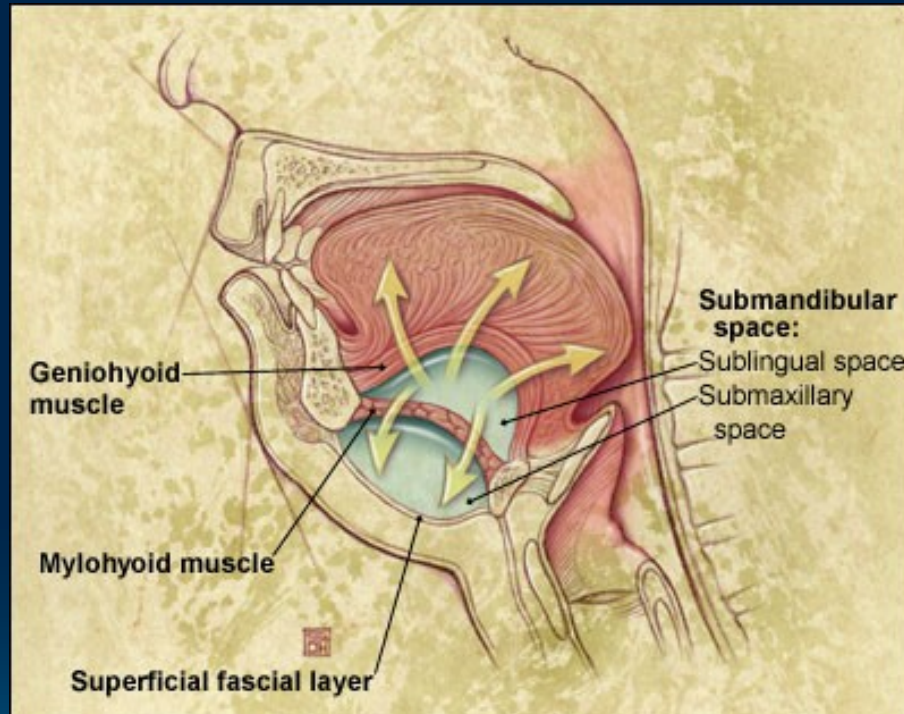
Sublingual Space

- mandibular **posterior teeth**

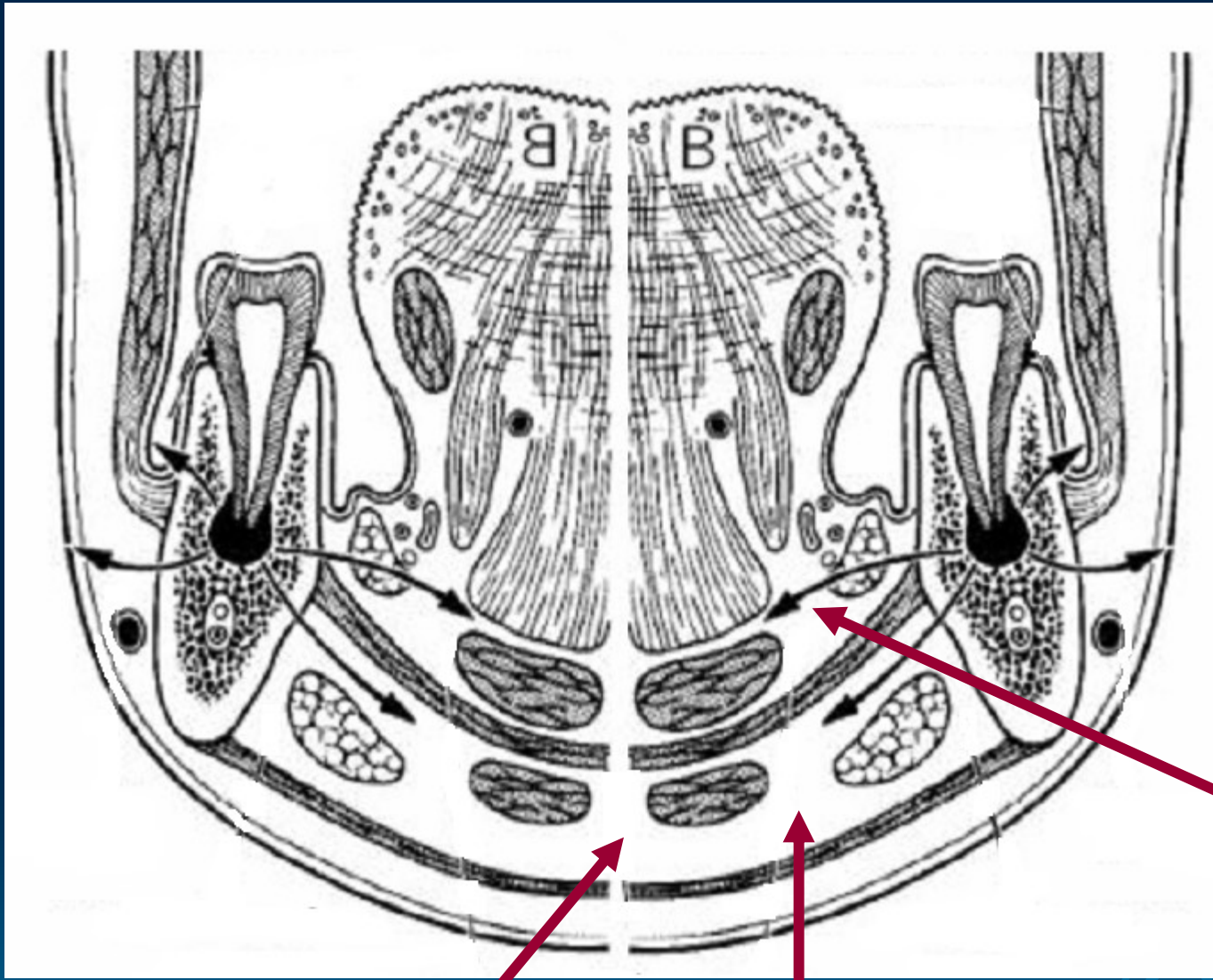


- spread to the sublingual space - between the mouth floor and mylohyoid muscle
- **CAVE! Ludwig's angina**
- spread along submandibular duct into submandibular space

Ludwig's angina = the right and left submandibular, sublingual and submental spaces are infected



A fulminant infection can spread rapidly to **pharyngeal and retropharyngeal space**



**Submental
space**

**Submandibular
space**

**Sublingual
space**

Masseteric Space

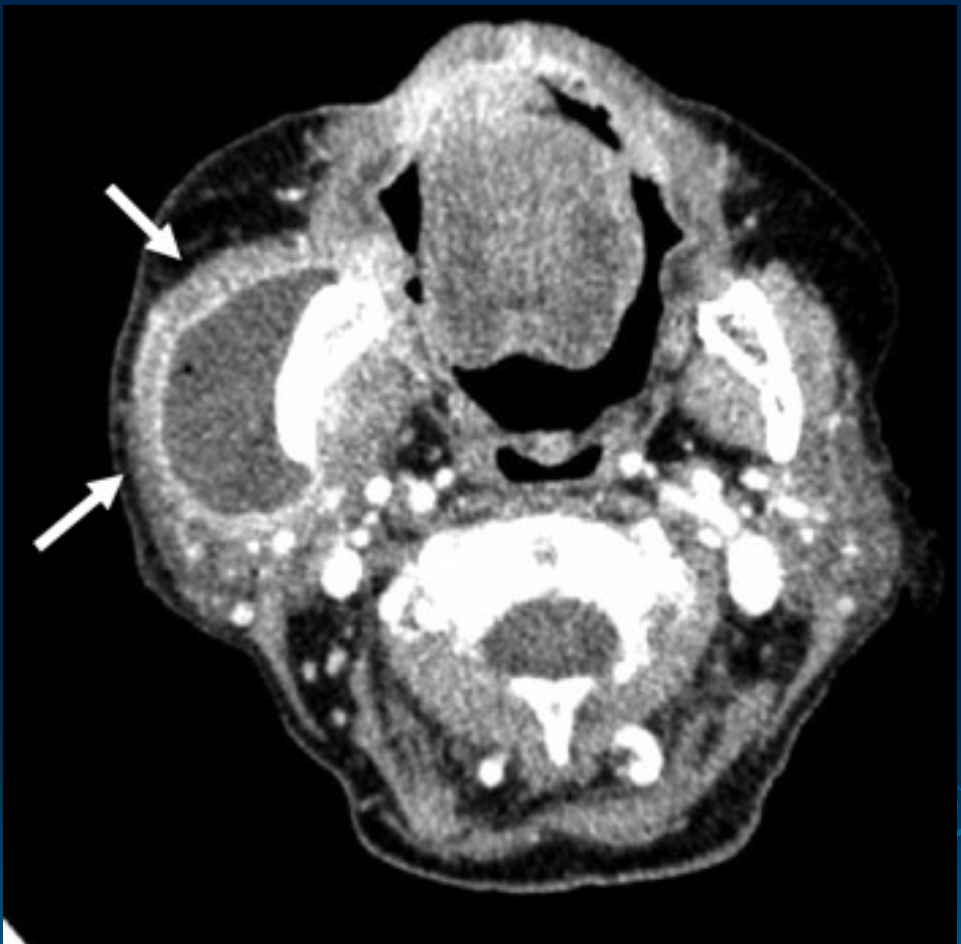
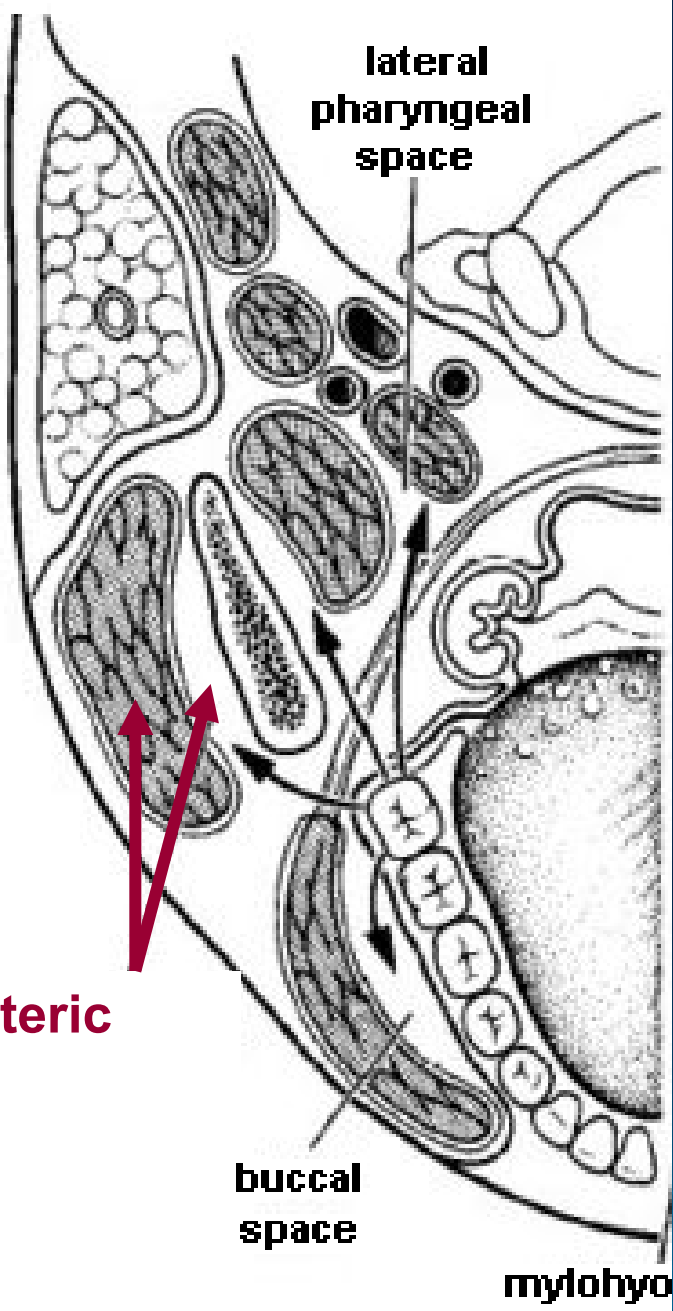
l: parotideomasseteric fascia

m: ramus of the mandible

s: zygomatic arch

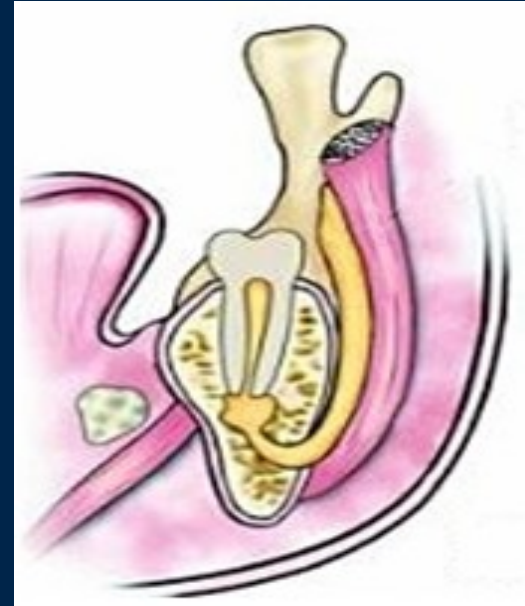
i: insertio of the masseter muscle

- **posterior teeth** of the lower jaw
- expand laterally to the **pterygomandib. space**
- oedema of the overlying masseter muscle



Pterygomandibular Space

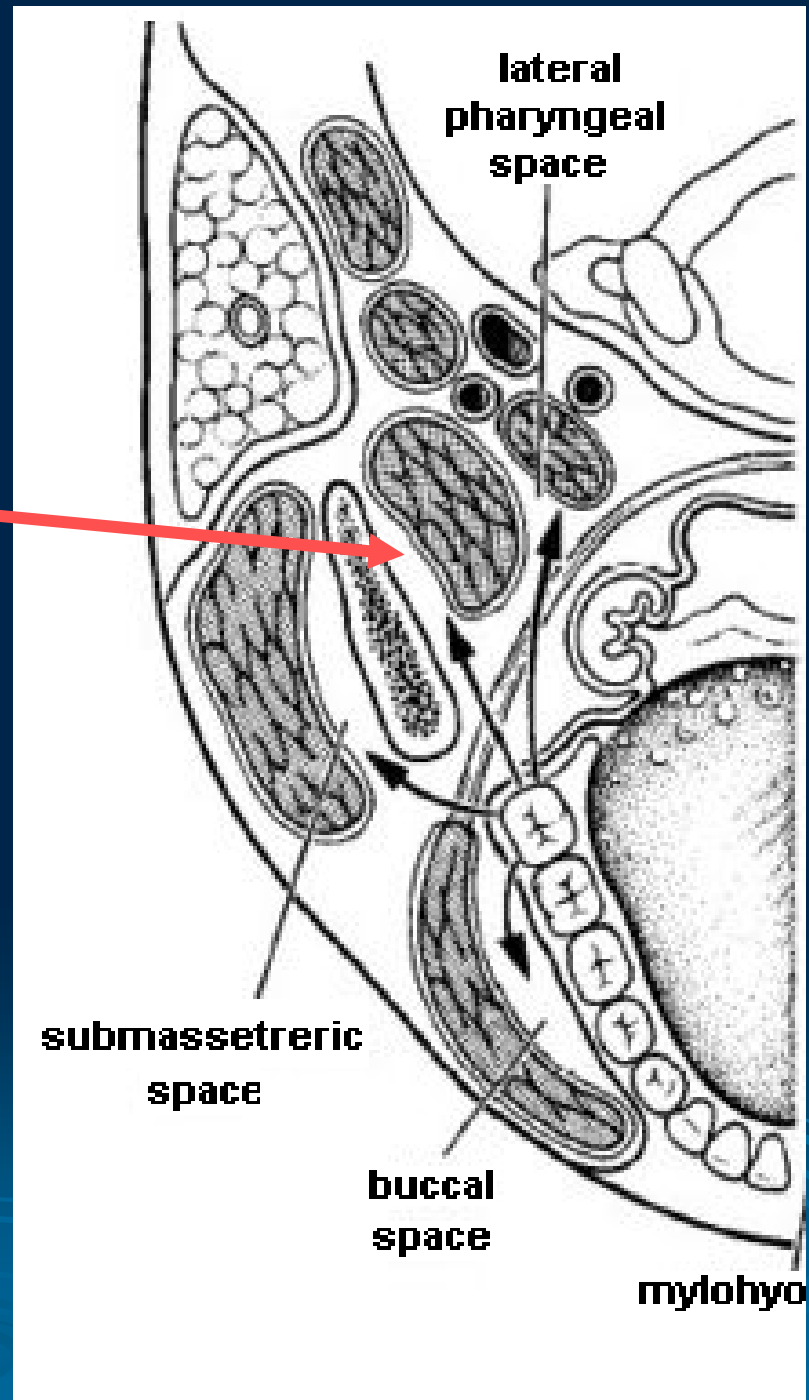
- carious, partially erupted mandibular **third molar** or needle tract **infection of anesthetize** of inferior alveolar nerve



- infection may spread into **infratemporal space**

Pterygomandibular space

Alveolar inferior artery,
vein and nerve !



Lateral Pharyngeal Space

- **peritonsillar infection** penetrate the pharyngeal constrictor muscles → **lateral pharyngeal space**
- shaped like an inverted pyramid, base at the base of the skull and its apex at the hyoid bone
- space is divided into **prestyloid** and **poststyloid compartments** (by aponeurosis of Zuckerkandl and Testut, joining the styloid process to the tensor veli palatini)

Lateral pharyngeal space

submasseteric space

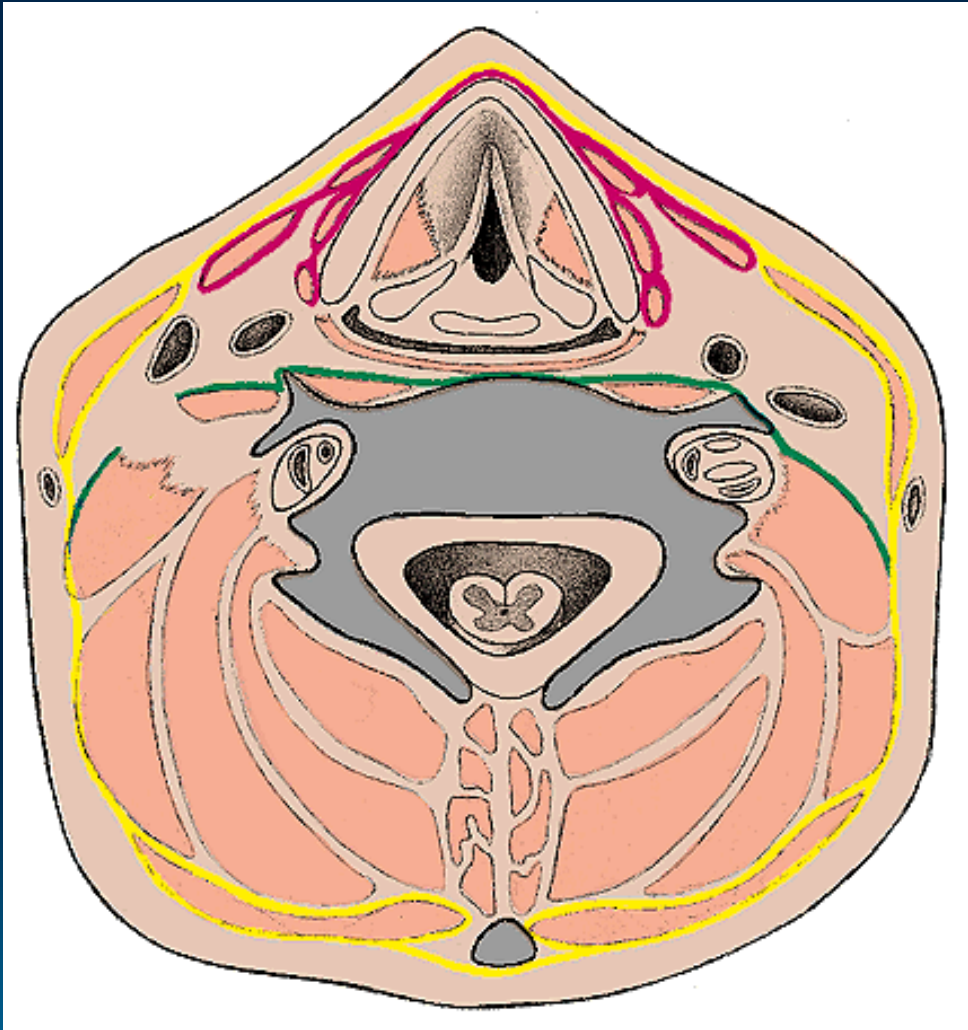
buccal space

mylohyo



Copyright (c)
Indiana University
All Rights Reserved

The Neck Spaces



Visceral space

Visceral

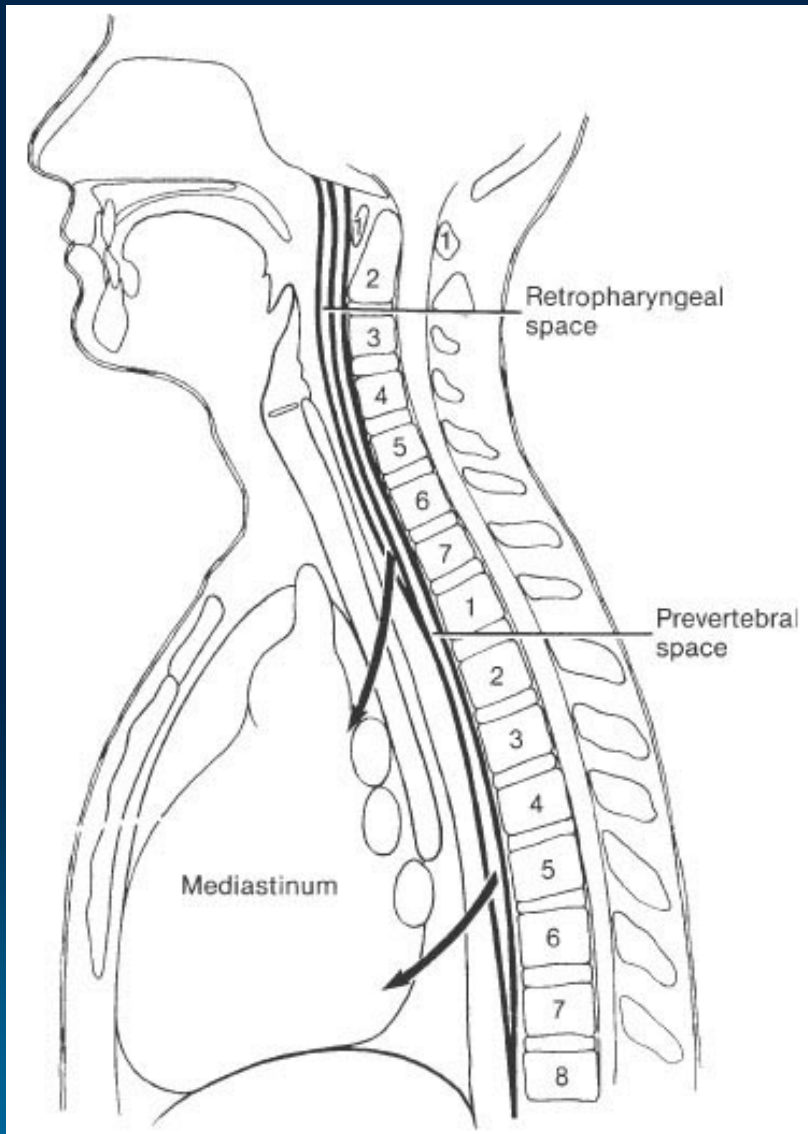
Paravisceral

Retrovisceral

Pretracheal space

Prevertebral space

Abscess



- **Subcutaneous** - between the superficial cervical fascia and platysma
- **Suprasternal** - between the superficial and middle cervical fascia
- **Pretracheal**
- **Parapharyngeal**
- **Retropharyngeal**



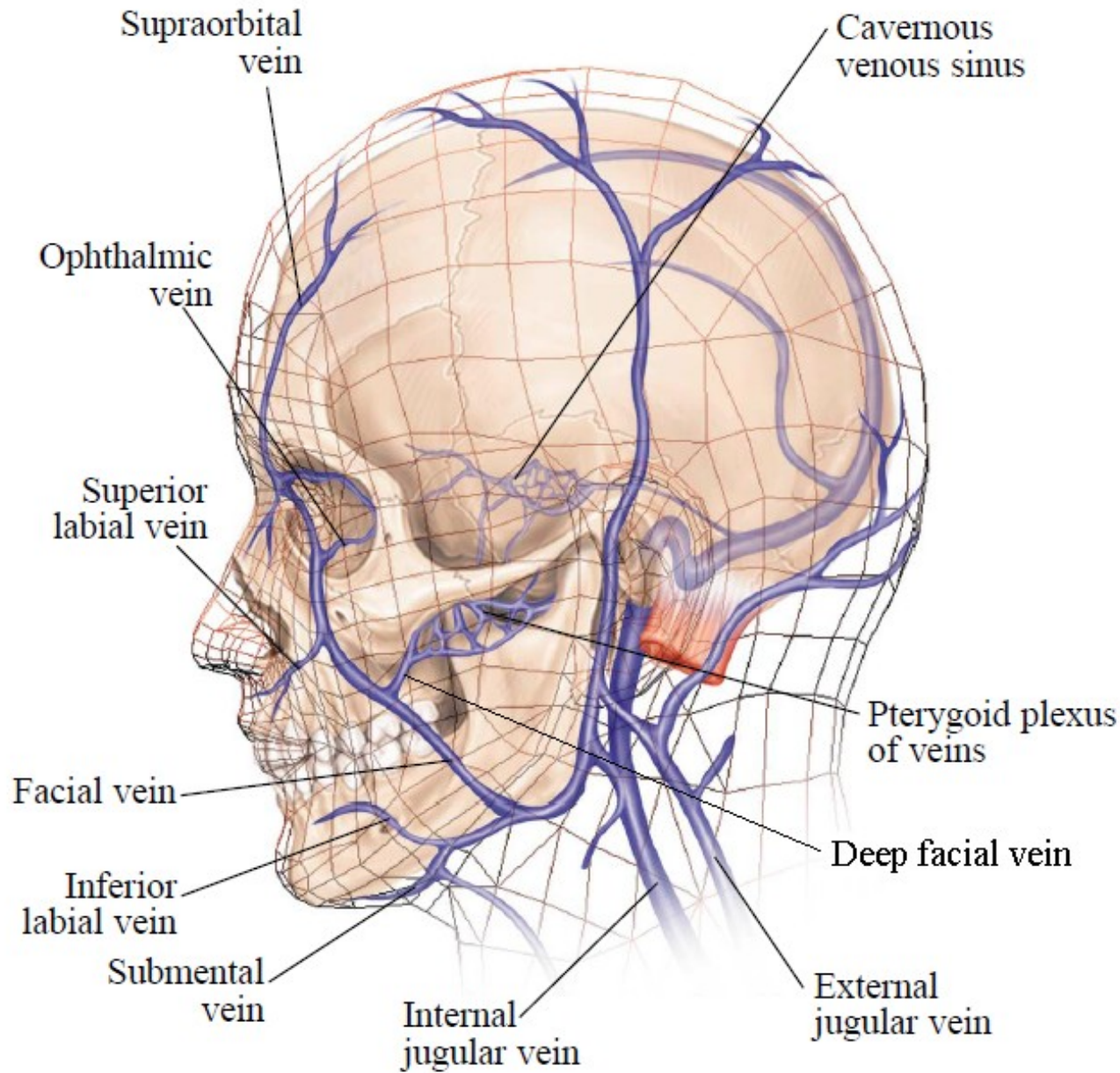
**Retropharyngeal
abscess**

2. Spread of dental infection by blood system



- **Bacteremia** - bacteria traveling in the blood
- **Infected thrombus** - dislodge from the inner blood vessel wall and travel as an embolus → dural venous sinuses → brain or internal jugular vein → thrombophlebitis

In general, **veins of the head and neck lack valves**, so blood can flow into and out of the cranial cavity !



Anterior pathway

ophthalmic v.
 infraorb. v.
 deep facial v.

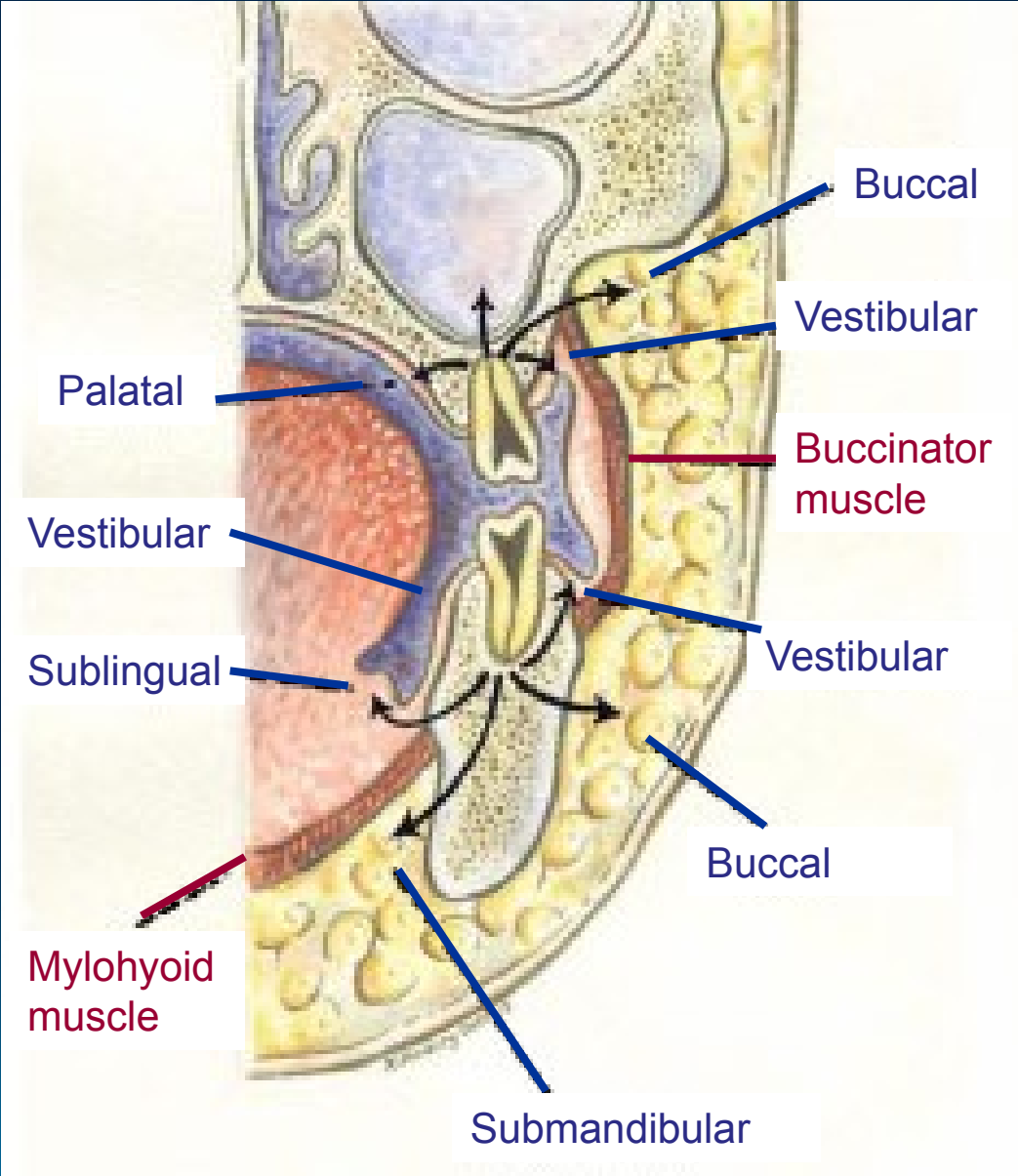
Posterior pathway

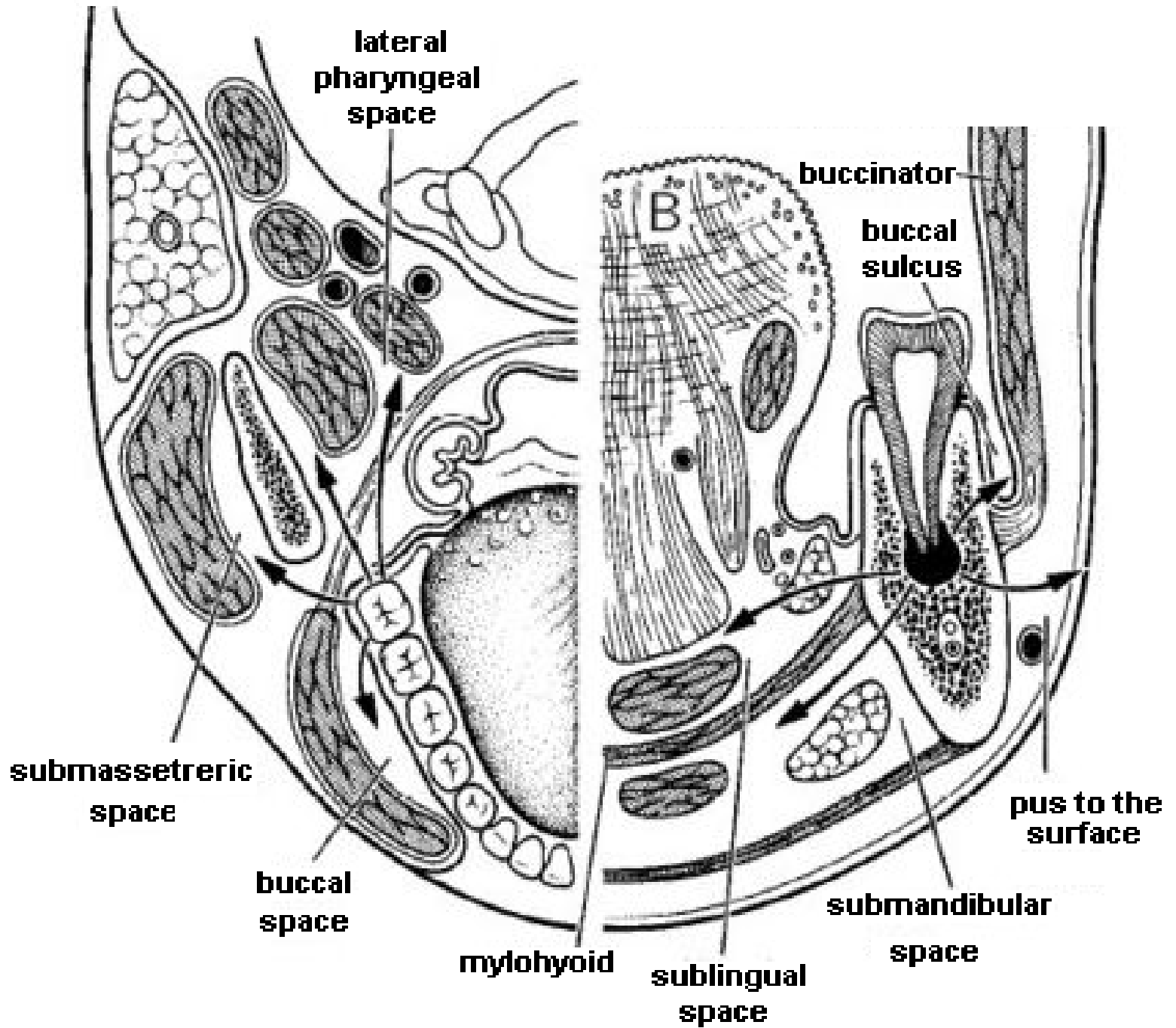
pterygoid plx.
 → oval for.
 spinosum for.

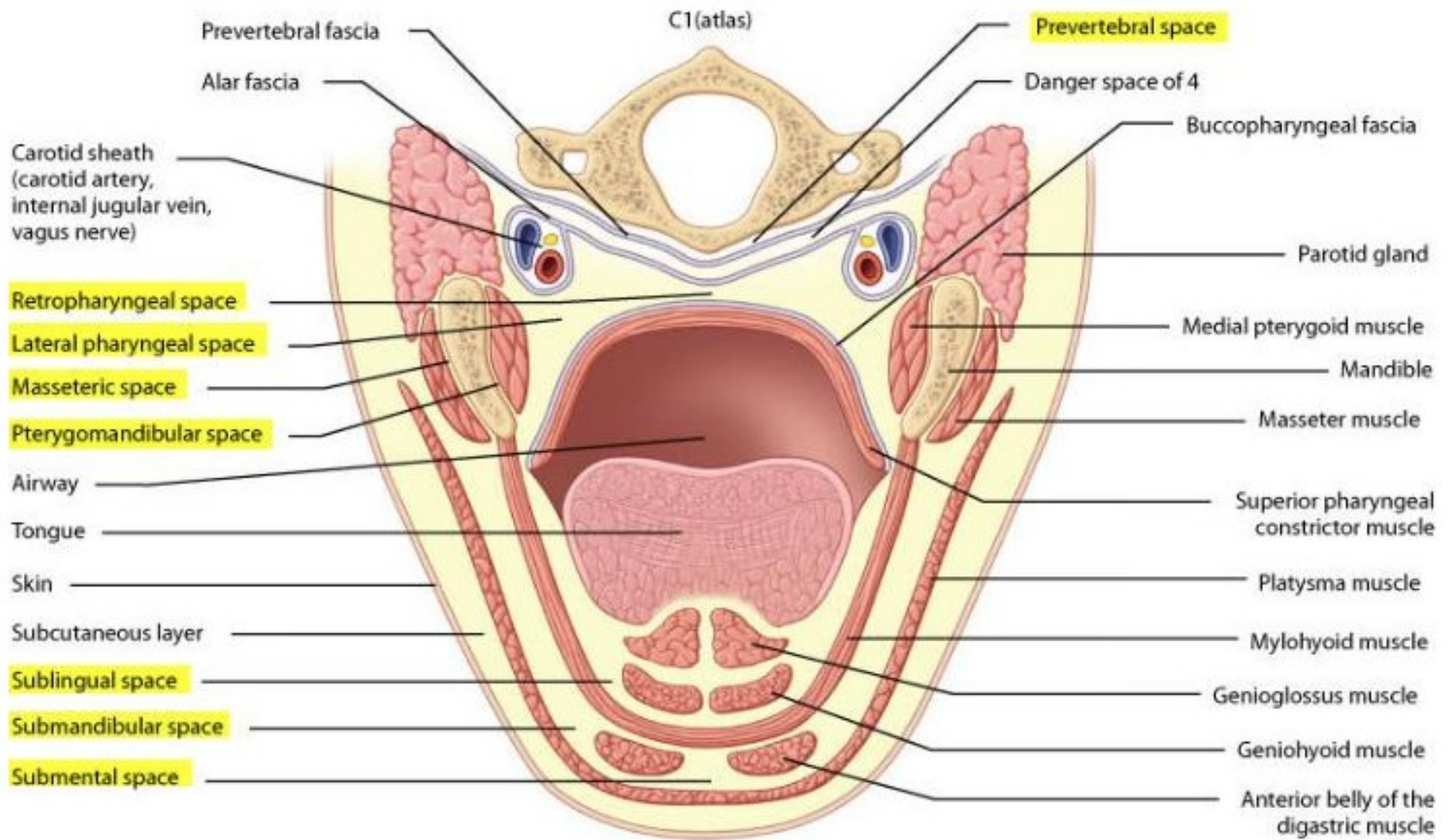
3. Spread of dental infection by lymphatic system

Repetition of the 2nd semester

The background features several decorative elements consisting of concentric circles in a lighter shade of blue, resembling ripples in water. These circles are scattered across the lower half of the slide, with one prominent set in the bottom right corner and others in the bottom left and center.







Spatium basale intermusculare linguae

