

# 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



<b>Infection</b>	<b>Predominant bacteria</b>
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**

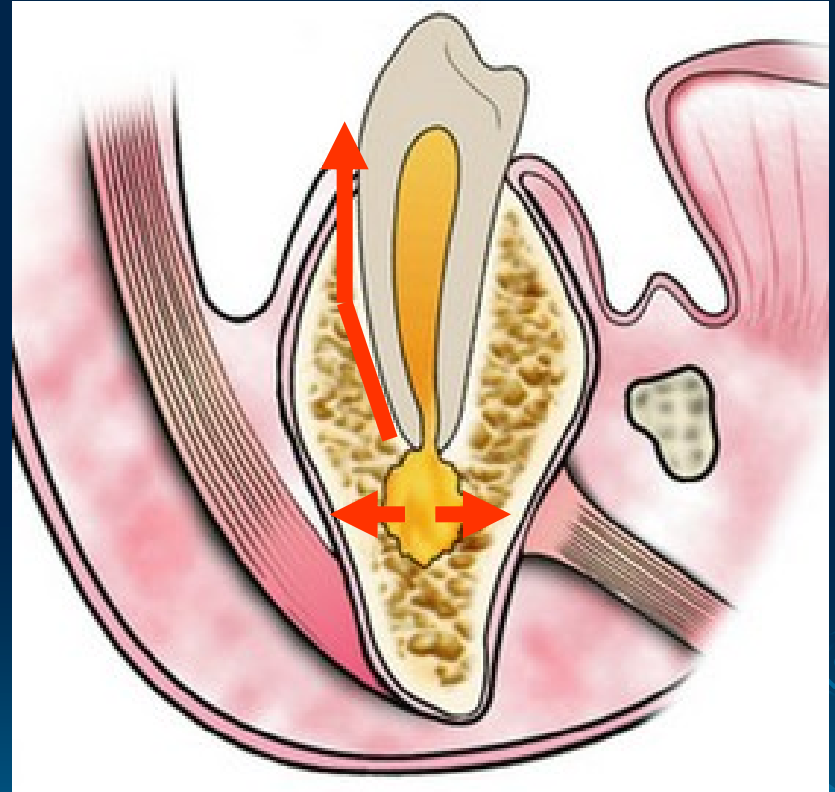


# 1. Spread of dental infection per continuitatem



# 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**

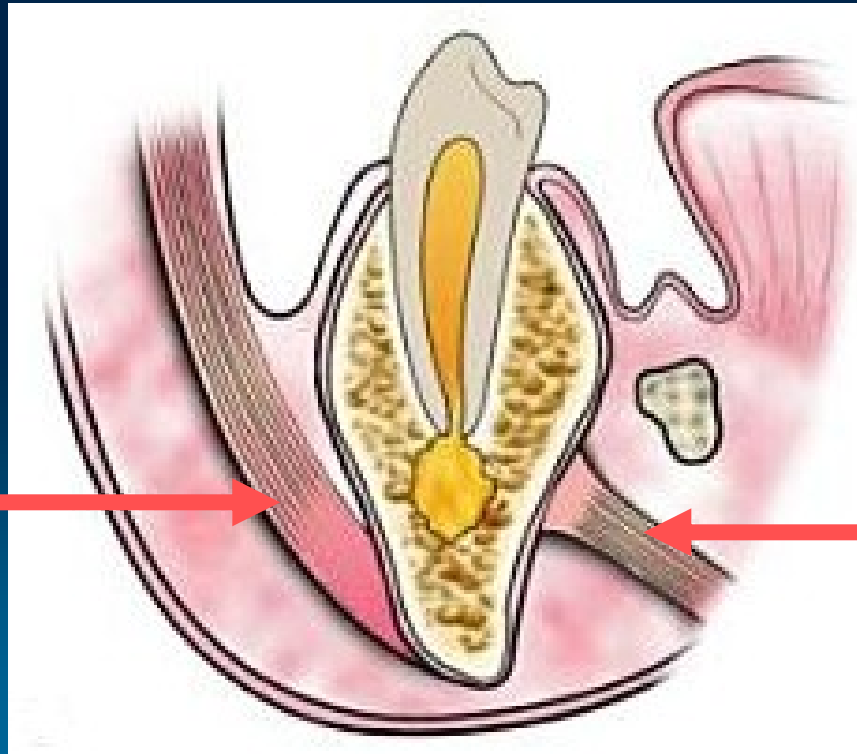
**Periapical** - progressive carries, pathogens invade the pulp and spread apically

**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

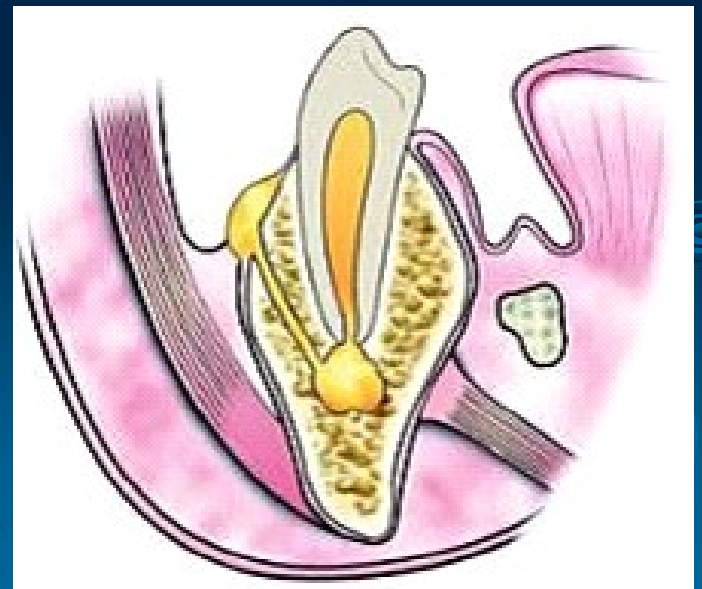
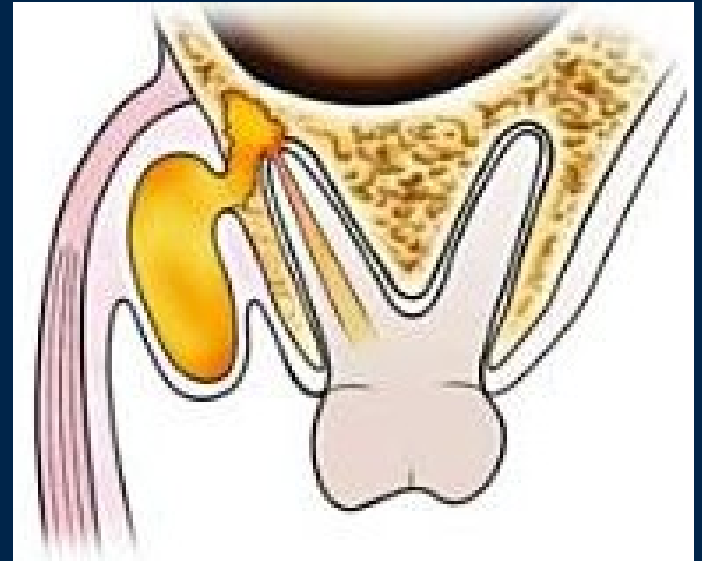


buccinator  
muscle

mylohyoid  
muscle

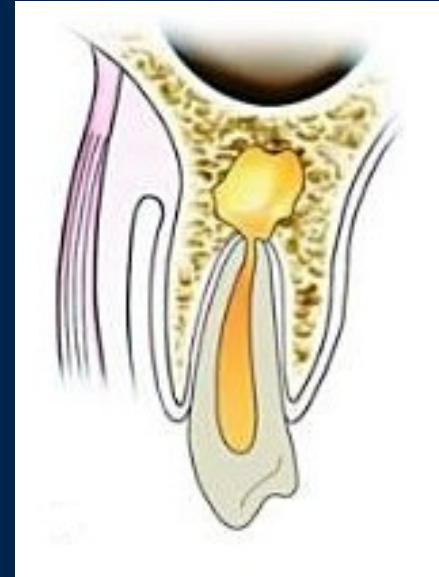
# Vestibular Abscess

- 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

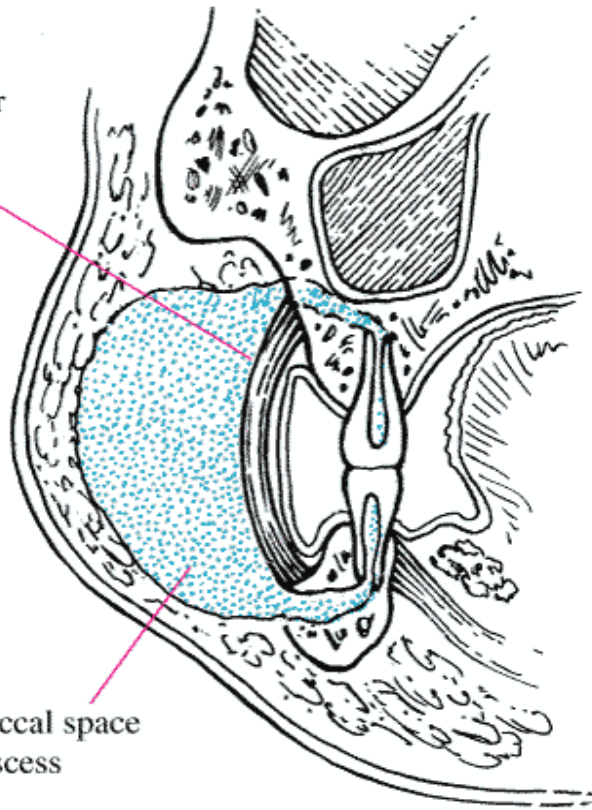
- **premolars** and **molars** both jaws



- 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!**)

Buccinator  
muscle



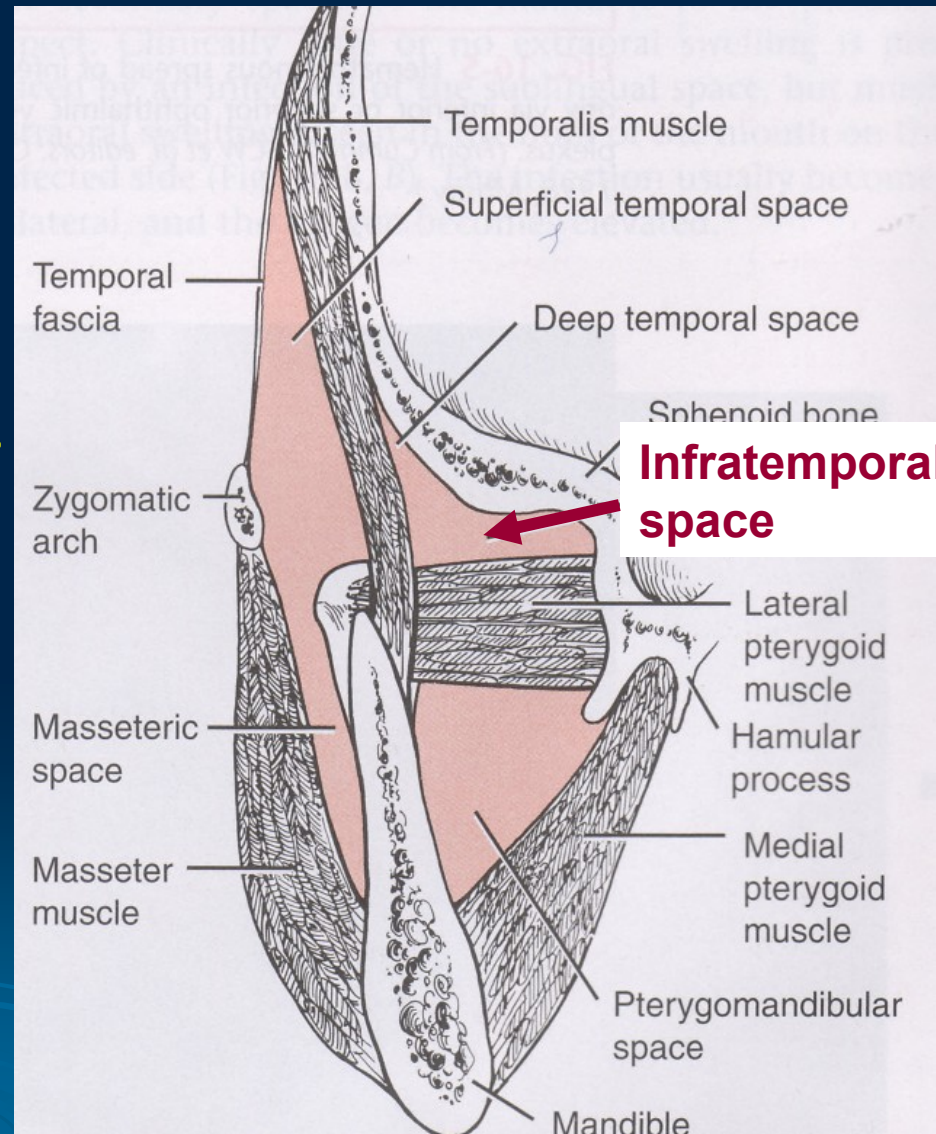
Buccal space  
abscess





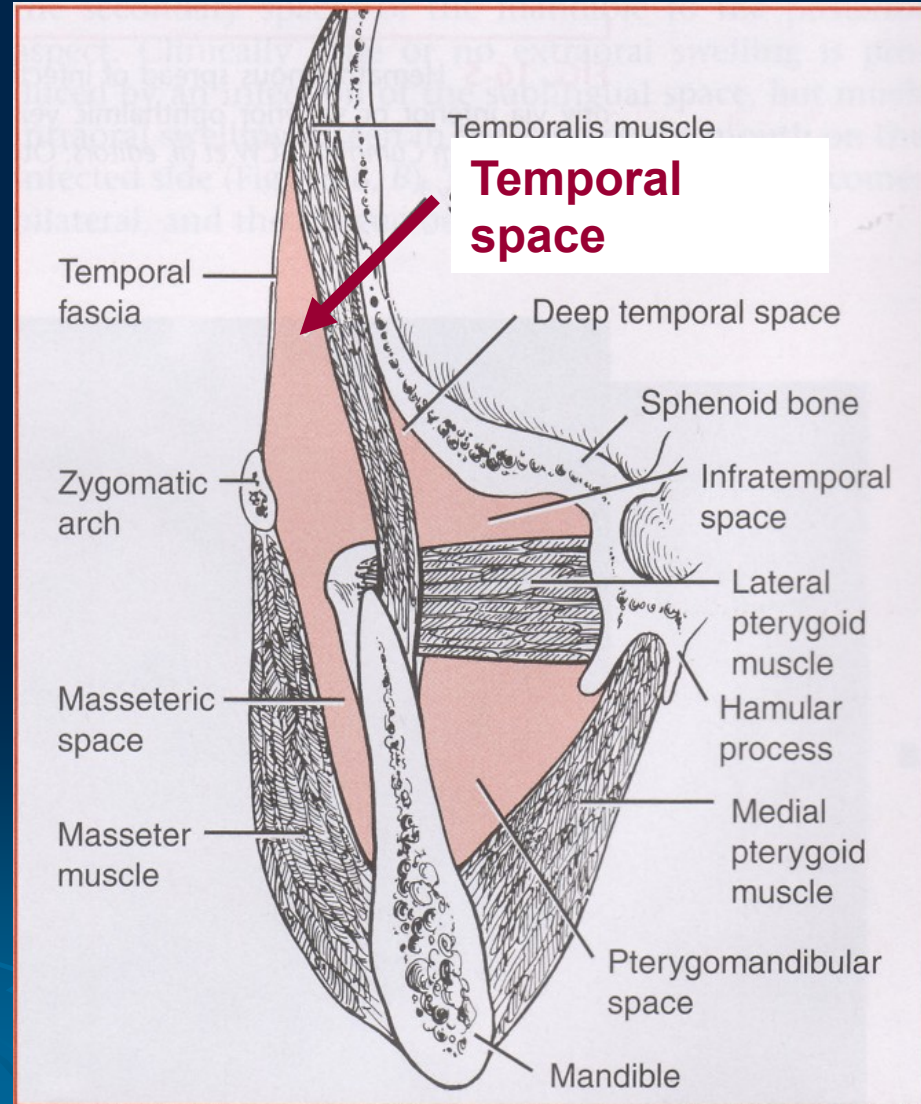
# Infratemporal Space

- **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



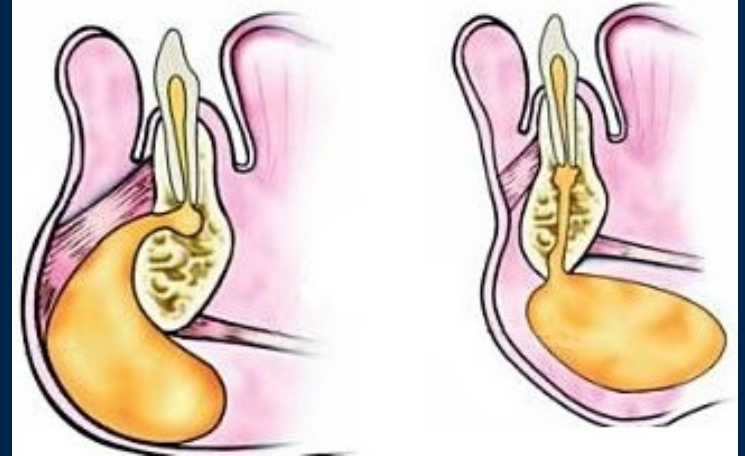
# Maxillary Sinus

- 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



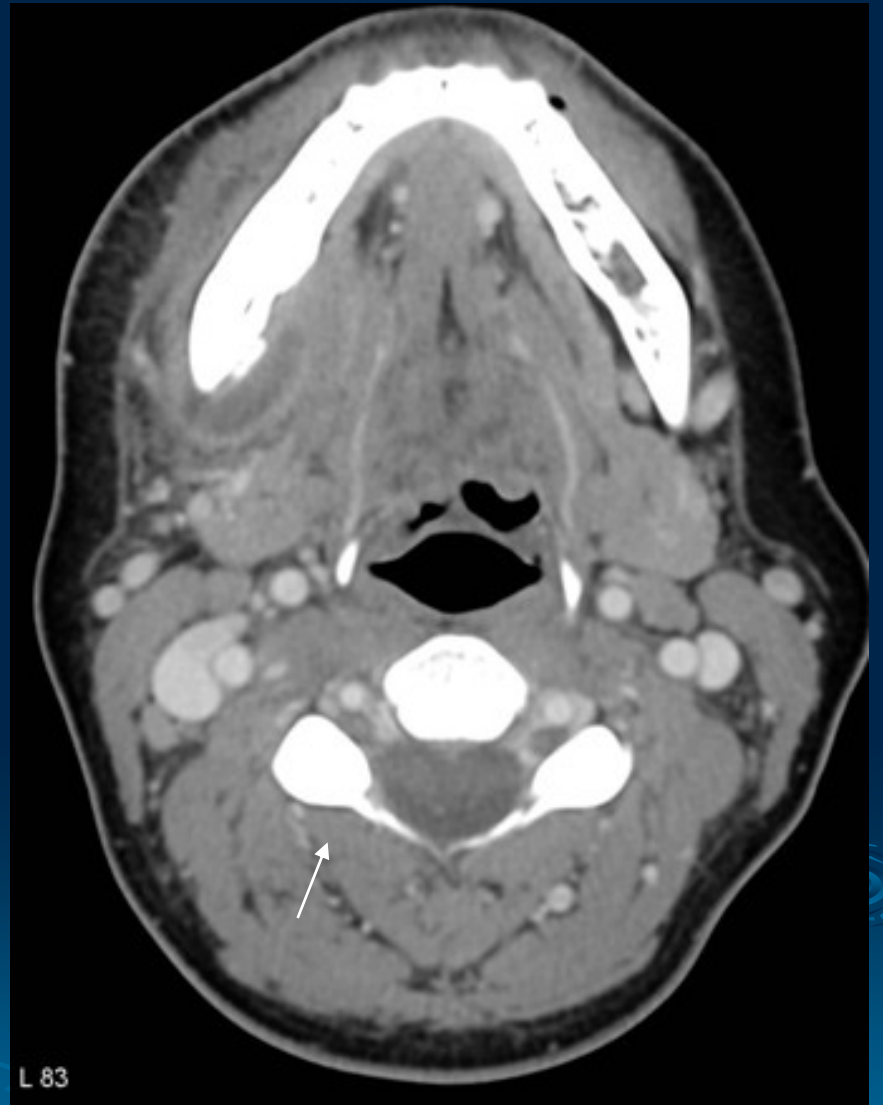
# Submandibular Space

- mandibular **posterior teeth**



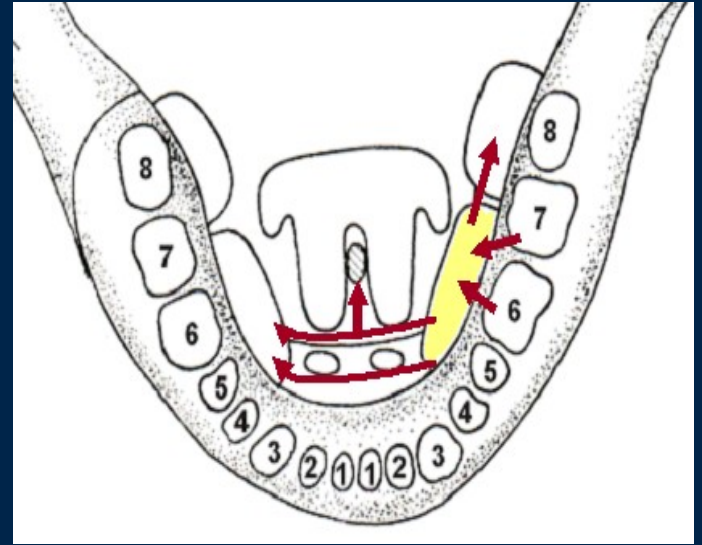
- the root of teeth lay root apices lay **below** the **buccinator** muscle insertion
- spread beneath the **mylohyoid muscle** into the submandibular area





# Sublingual Space

- mandibular **posterior teeth**

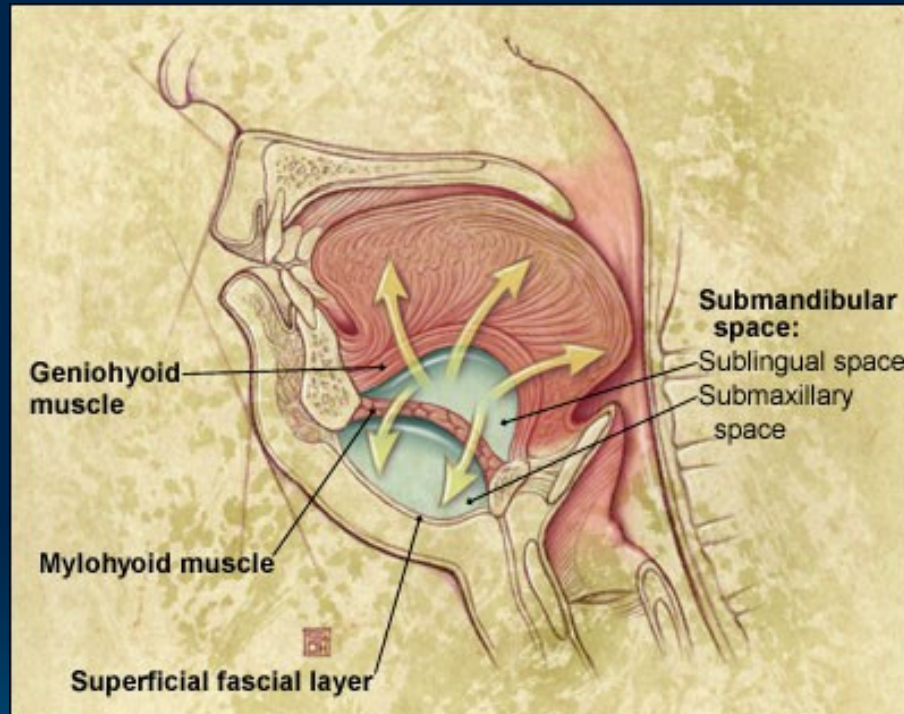


- spread to the sublingual space - between the mouth floor and mylohyoid muscle

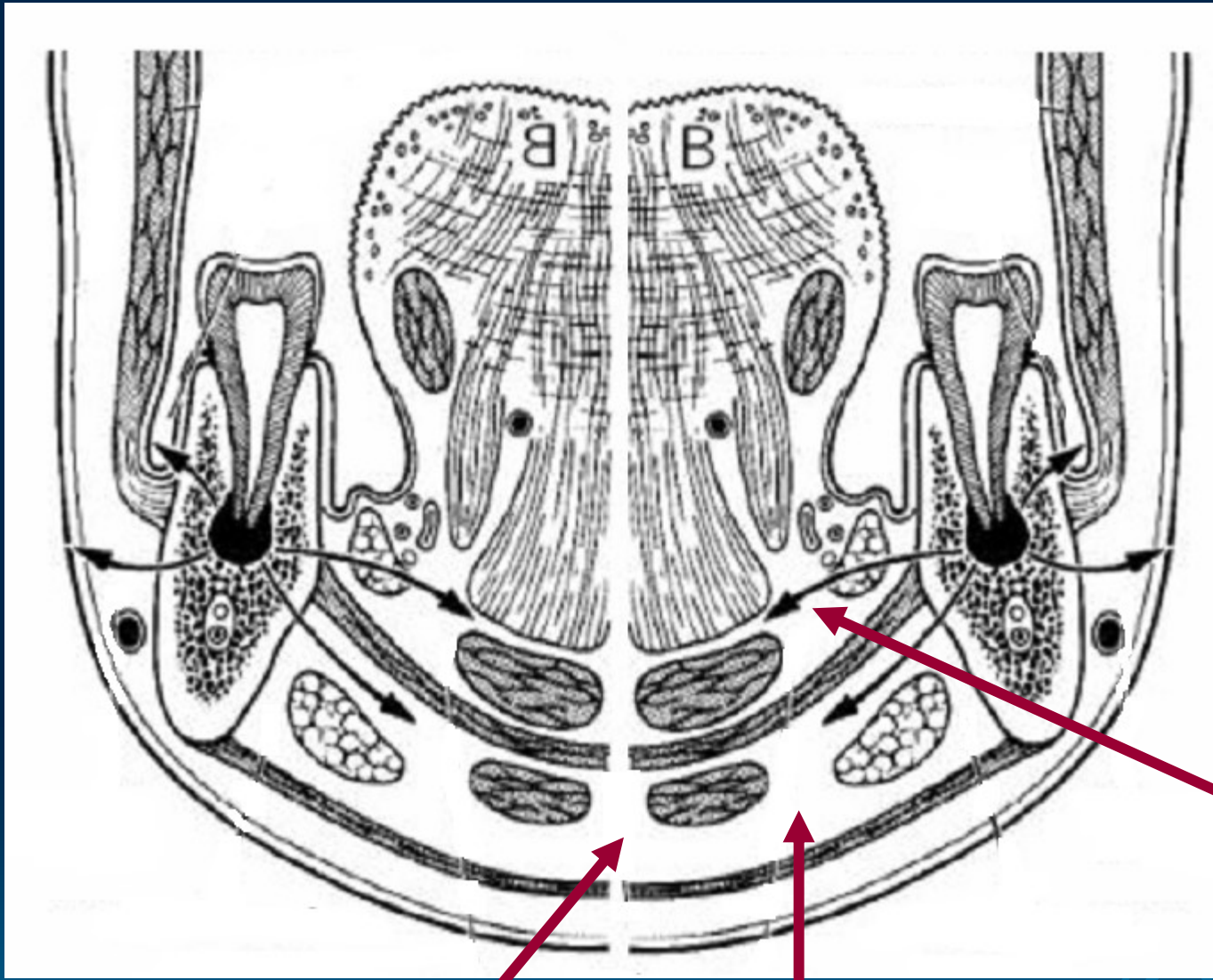
- **CAVE! Ludwig's angina**

- 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

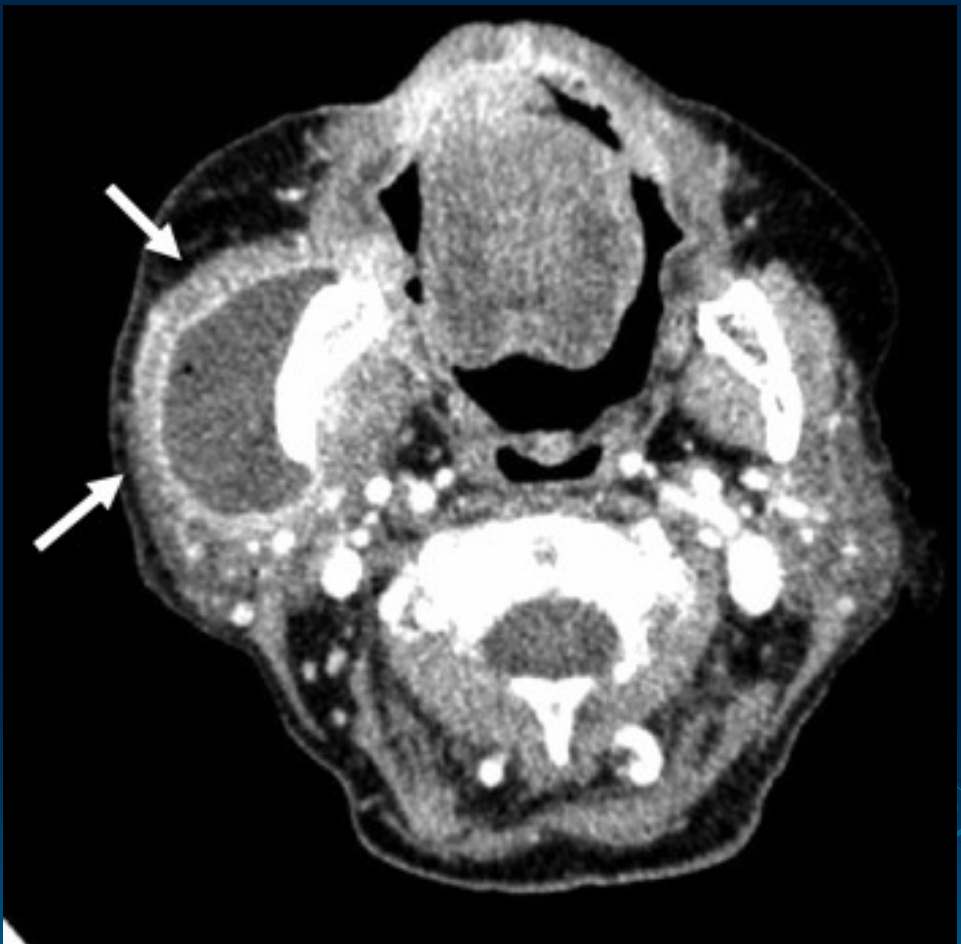
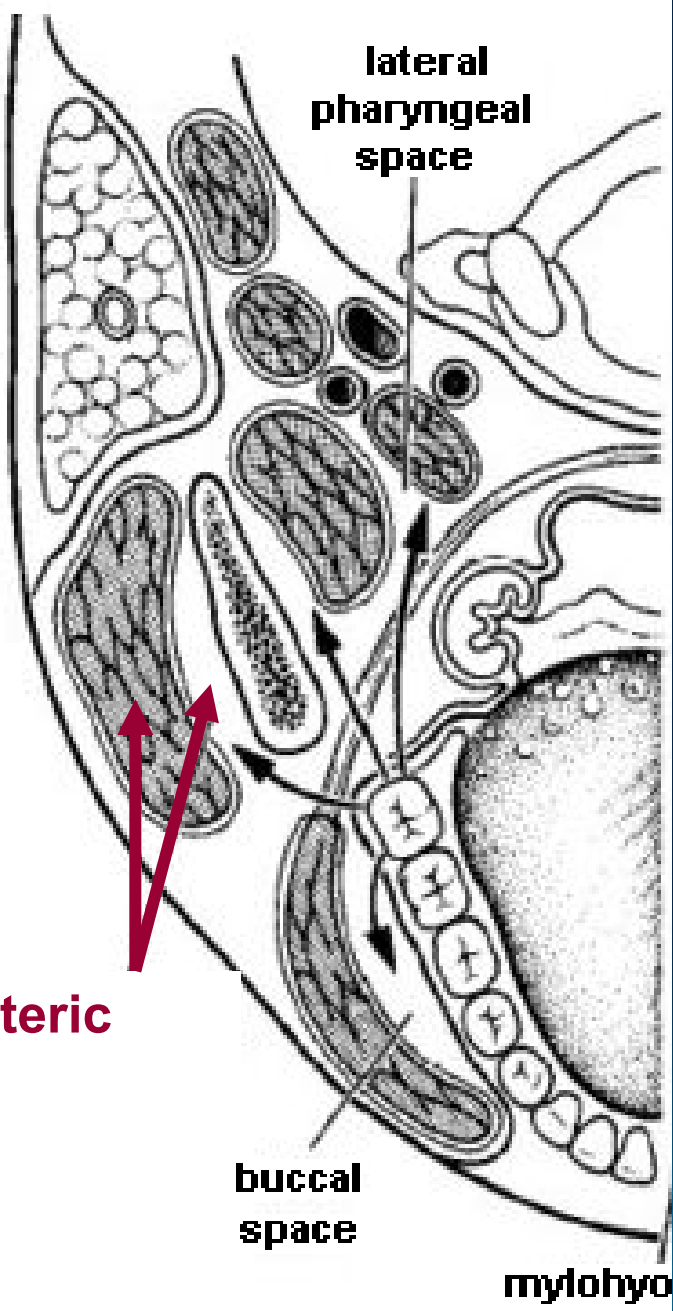
**l**: parotideomasseteric fascia

**m**: ramus of the mandible

**s**: zygomatic arch

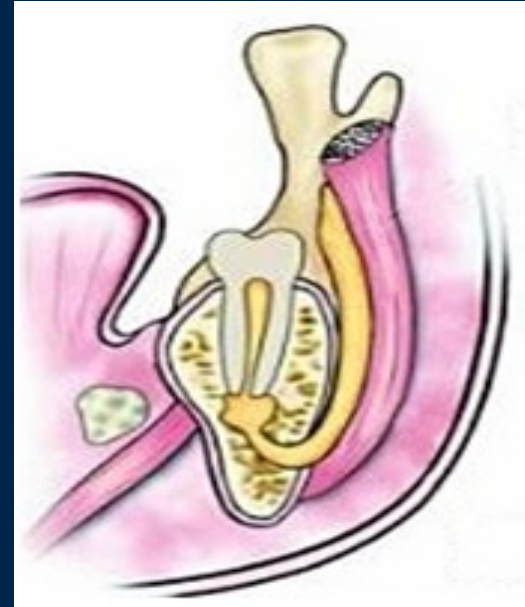
**i**: insertio of the masseter muscle

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



# Pterygomandibular Space

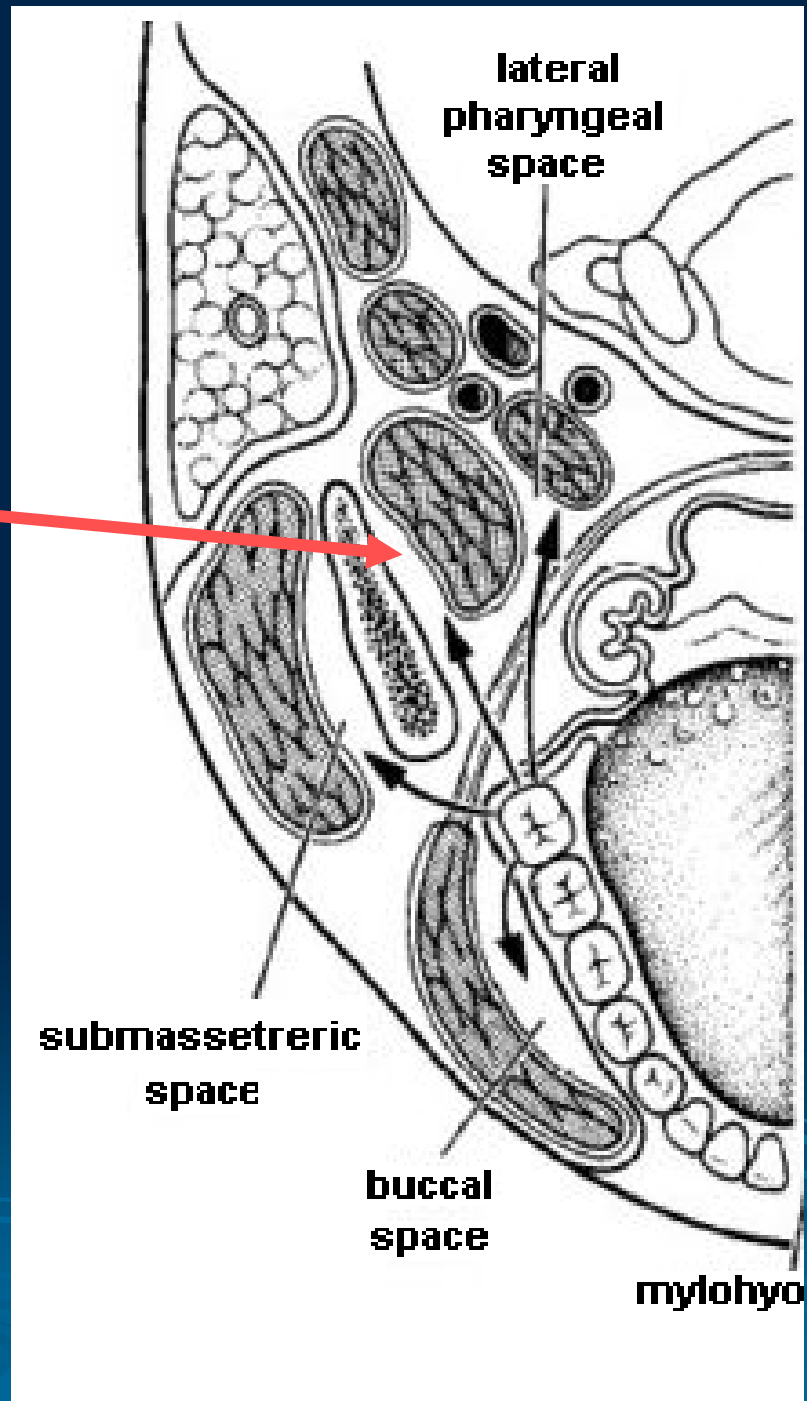
- carious, partially erupted mandibular **third molar** or needle tract **infection of anesthetize** of inferior alveolar nerve



- infection may spread into **infratemporal space**

## Pterygomandibular space

Alveolar inferior artery,  
vein and nerve !

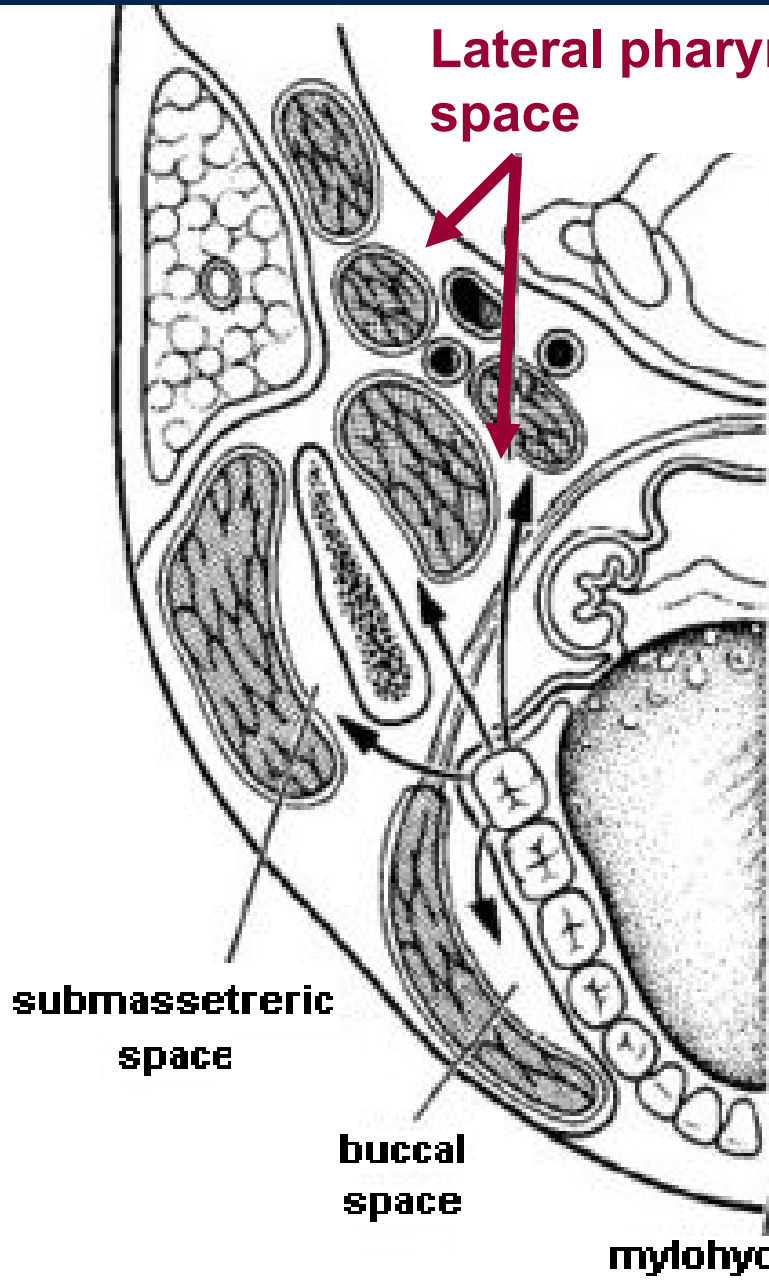




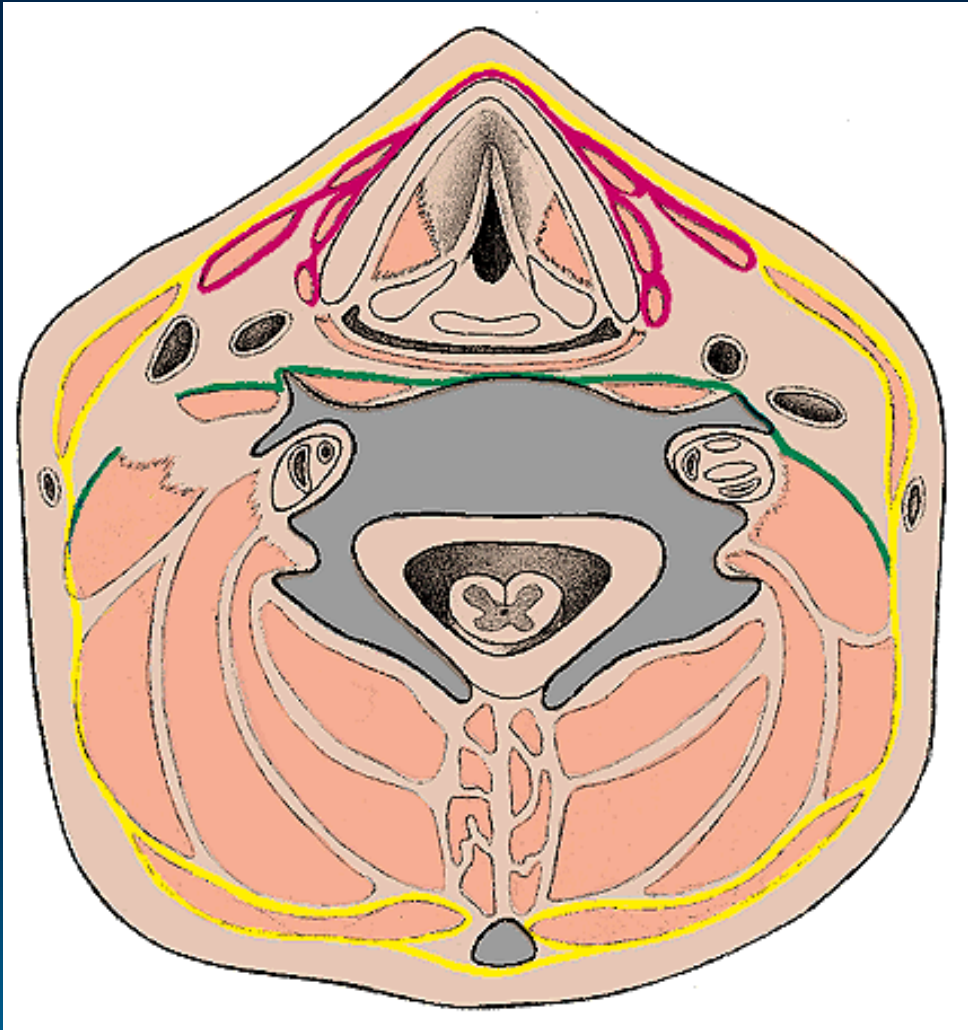
# Lateral Pharyngeal Space

- **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
- by aponeurosis of Zuckerkandl is space divides into **prestyloid** and **poststyloid compartments**

**Lateral pharyngeal space**



# The Neck Spaces



## **Visceral space**

Visceral

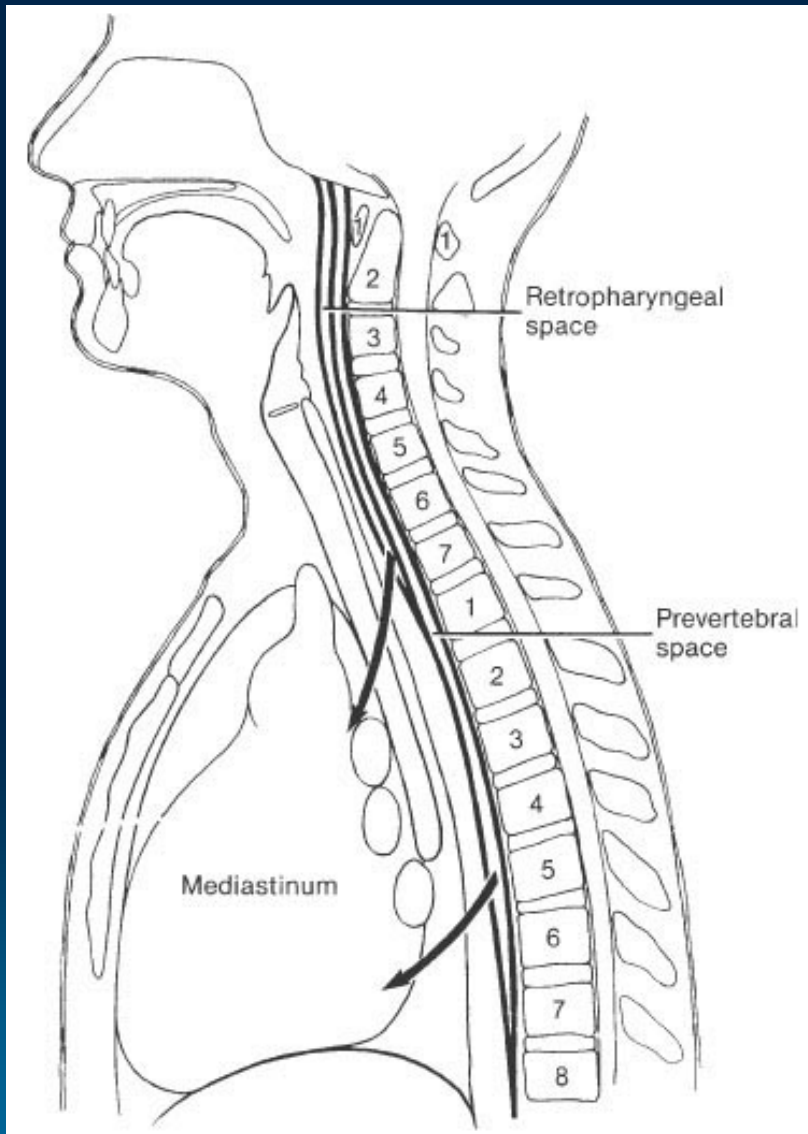
Paravisceral

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**



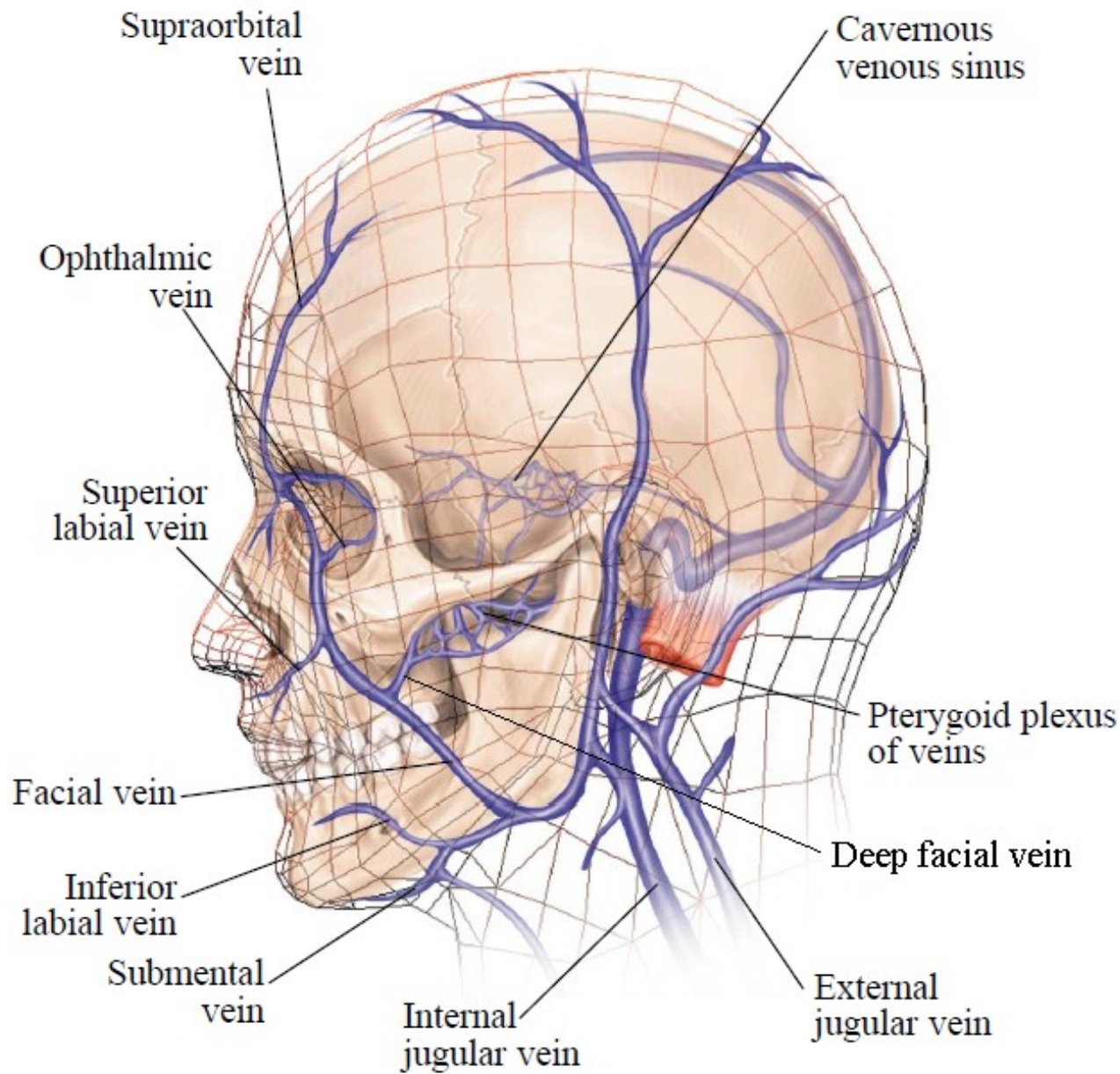
**Retropharyngeal  
abscess**

## **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

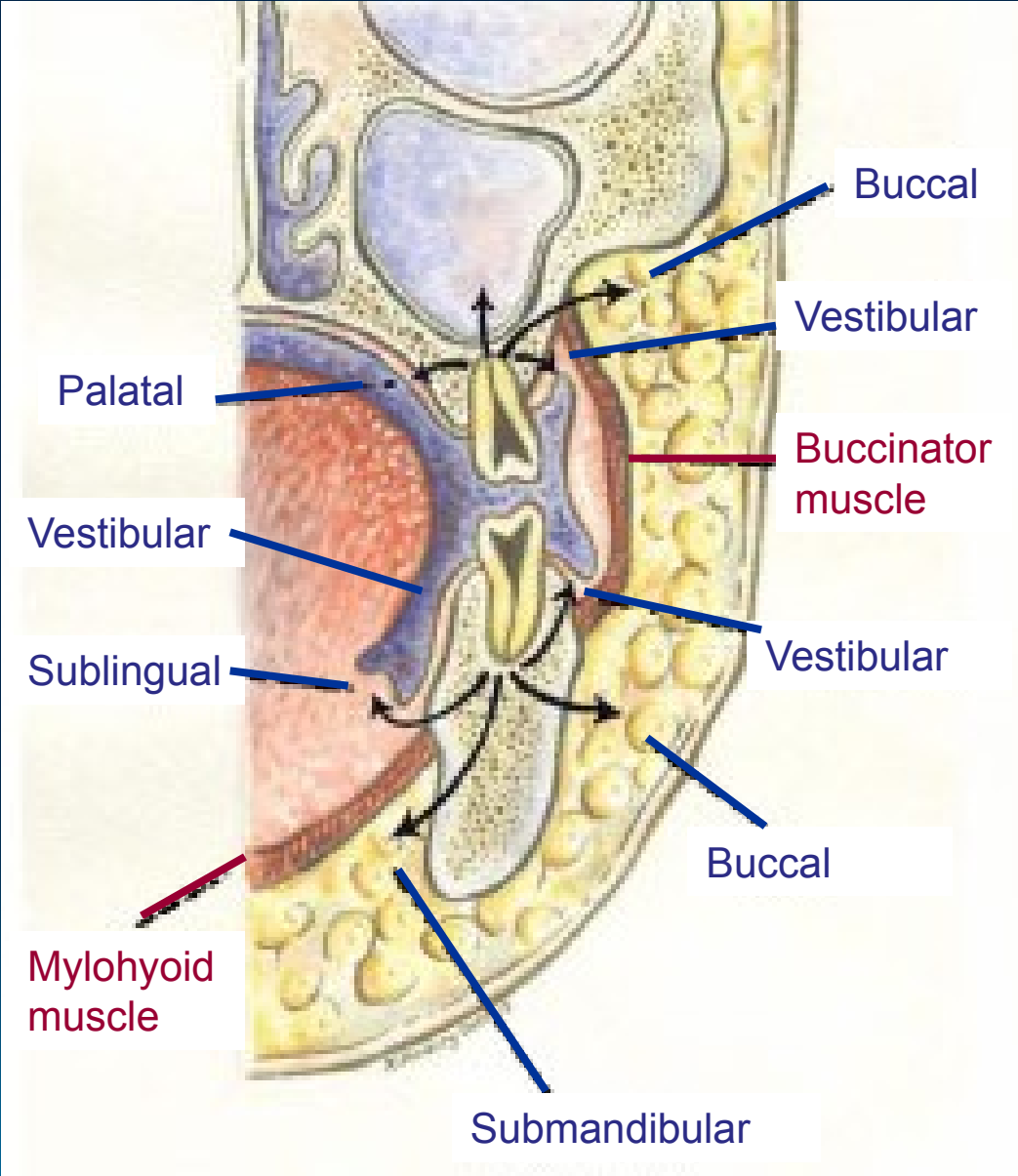
pterygoid plx.  
→ oval for.  
spinosum for.

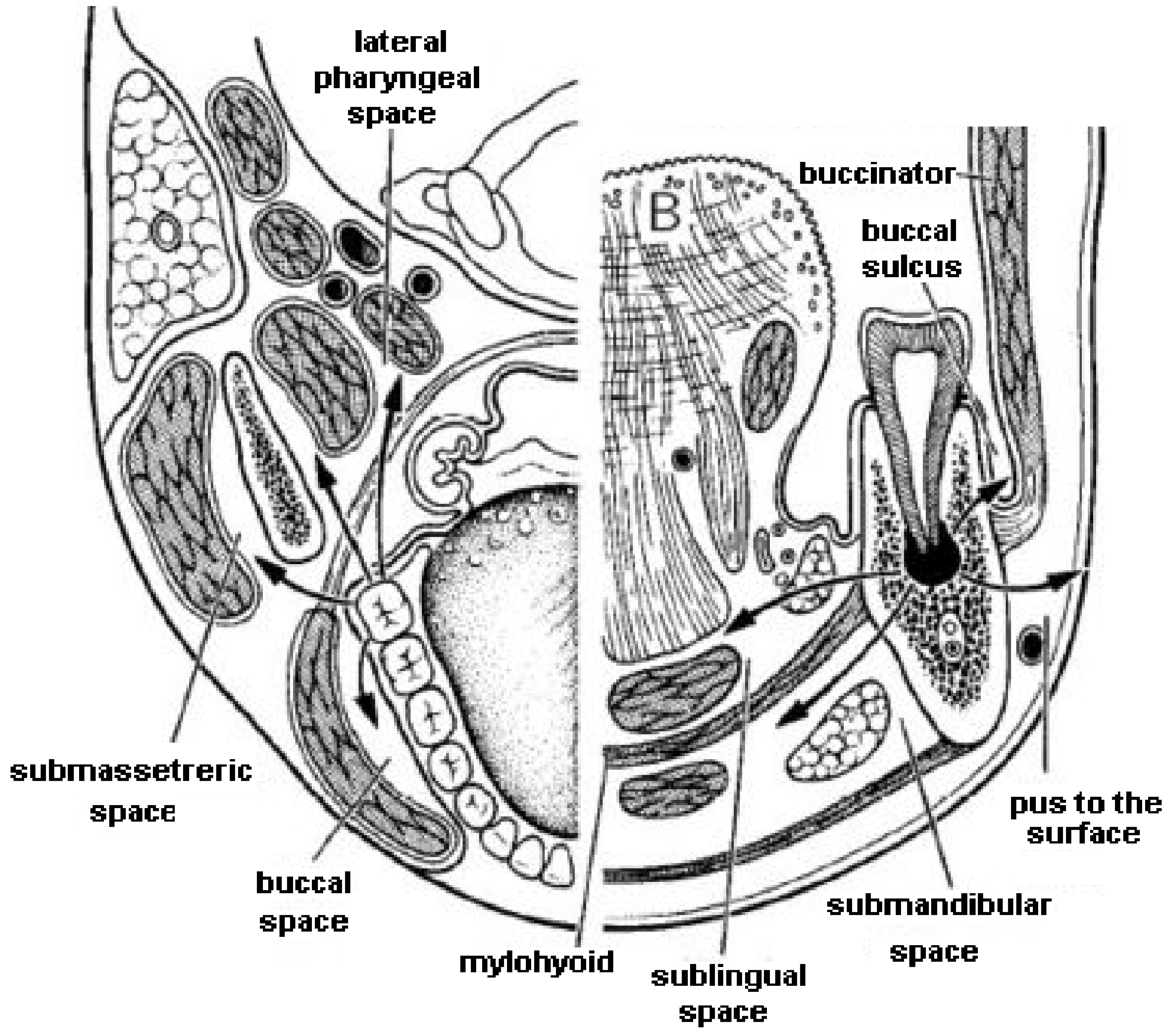


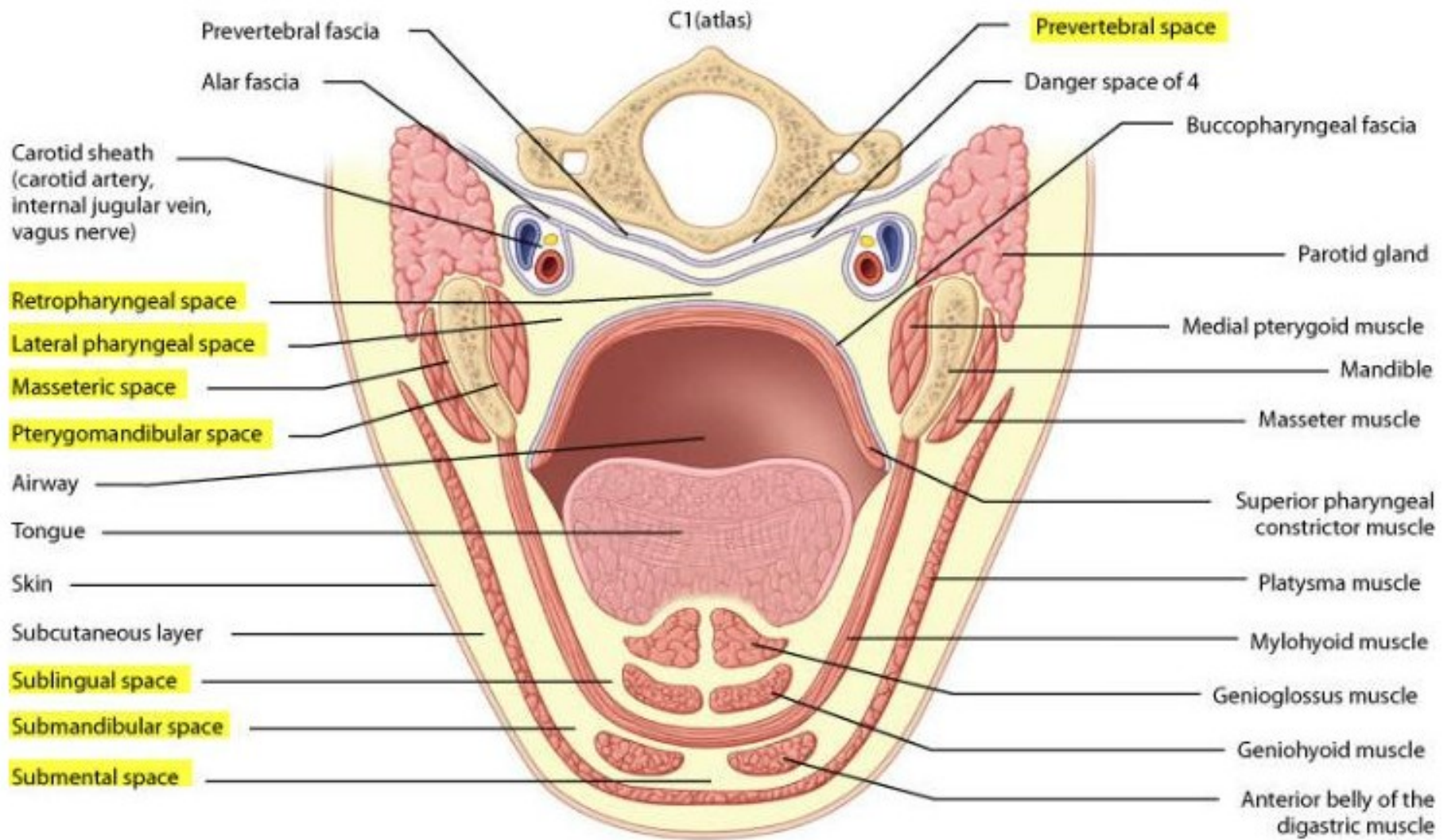
# **3. Spread of dental infection by lymphatic system**

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 positioned in the lower half of the slide, with one set on the left, one in the center, and a larger, more prominent set on the right.







# Spatium basale intermusculare linguae

