

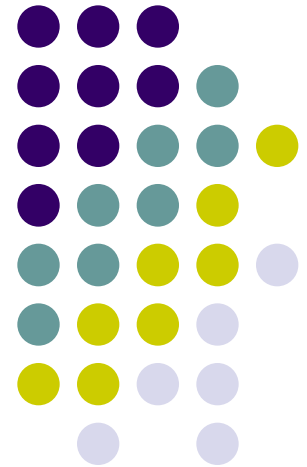
Infection of Oral & Maxillofacial Regions

- I. Spread of Dental Infection
- II. Non-Specific Infection
- III. Specific Infection



Spread of Dental Infection

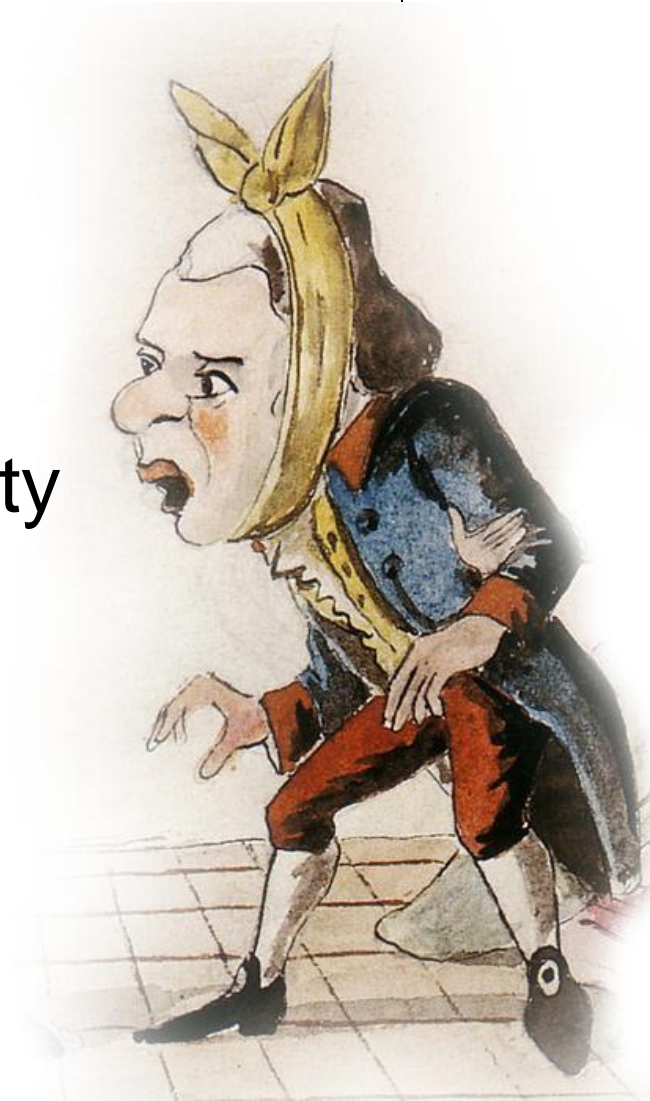
1. Routes of Spread of Infection
2. Factors which govern the Spread of Infection
 - a) Microbial Factors
 - b) Host Physiological Factors
 - c) Host Anatomical Factors



Routes of Spread of Infection

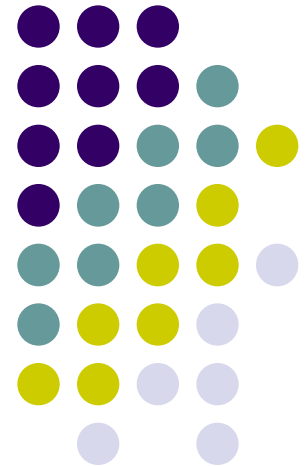


- Local Spread
- Spread by Lymphatics
- Spread by blood stream
- Spread through tissue continuity



Factors Governing Spread of Infection

- I. Microbial Factors
- II. Host Physiological Factors
- III. Host Anatomical Factors



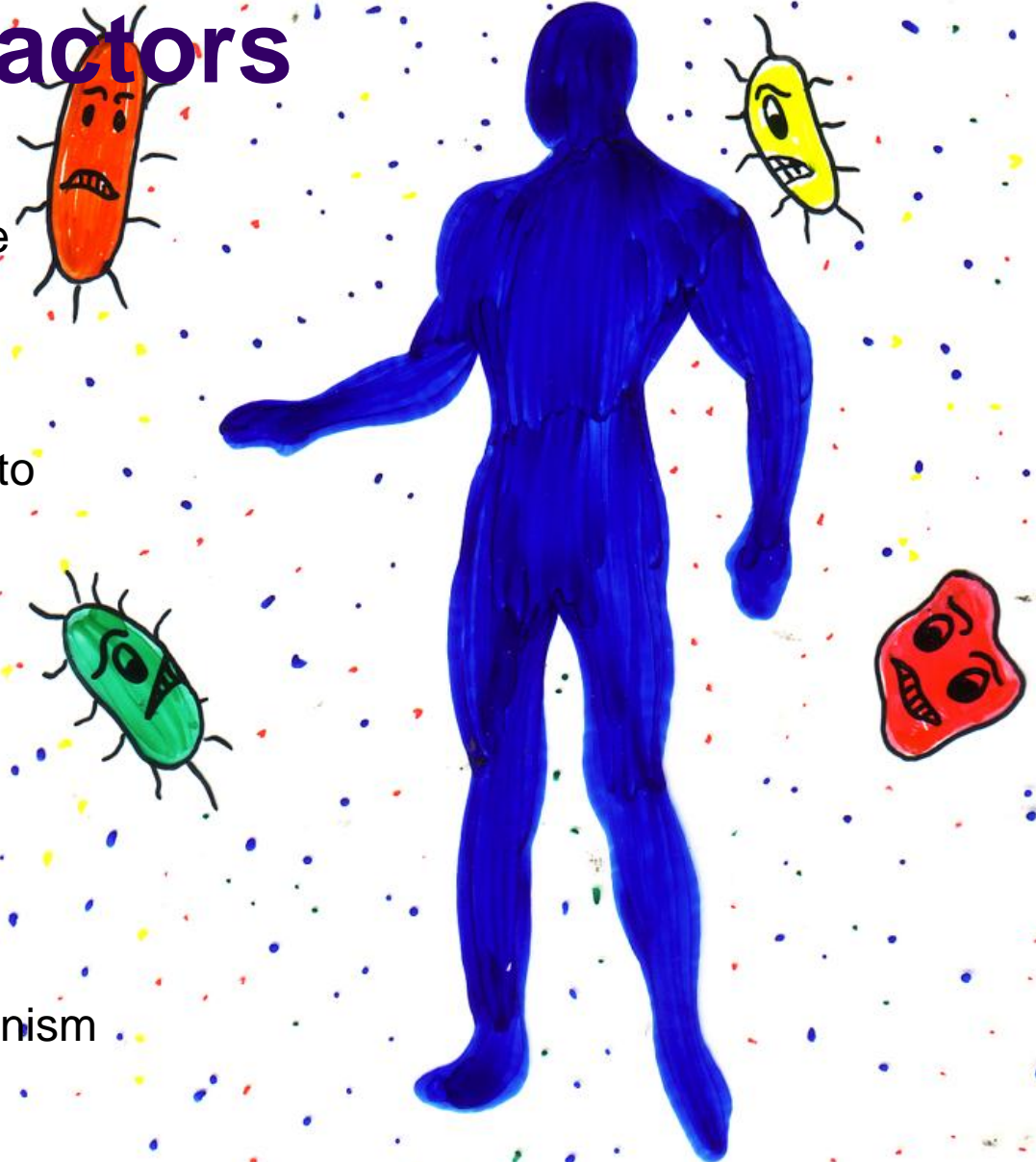
I. Microbial Factors

We live in a world full of MICROORGANISMS some are **PATHOGENIC**

Pathogenic microorganism are those who are capable to produce **DISEASE** in the *susceptible host*

Factors are:

- Enzymes produced
- Chemotaxis effect
- Mode of growth
- Number of invading organism





Definitions

Pathogenicity

Is the ability of a microorganism to produce a pathogenic condition, i.e. Disease

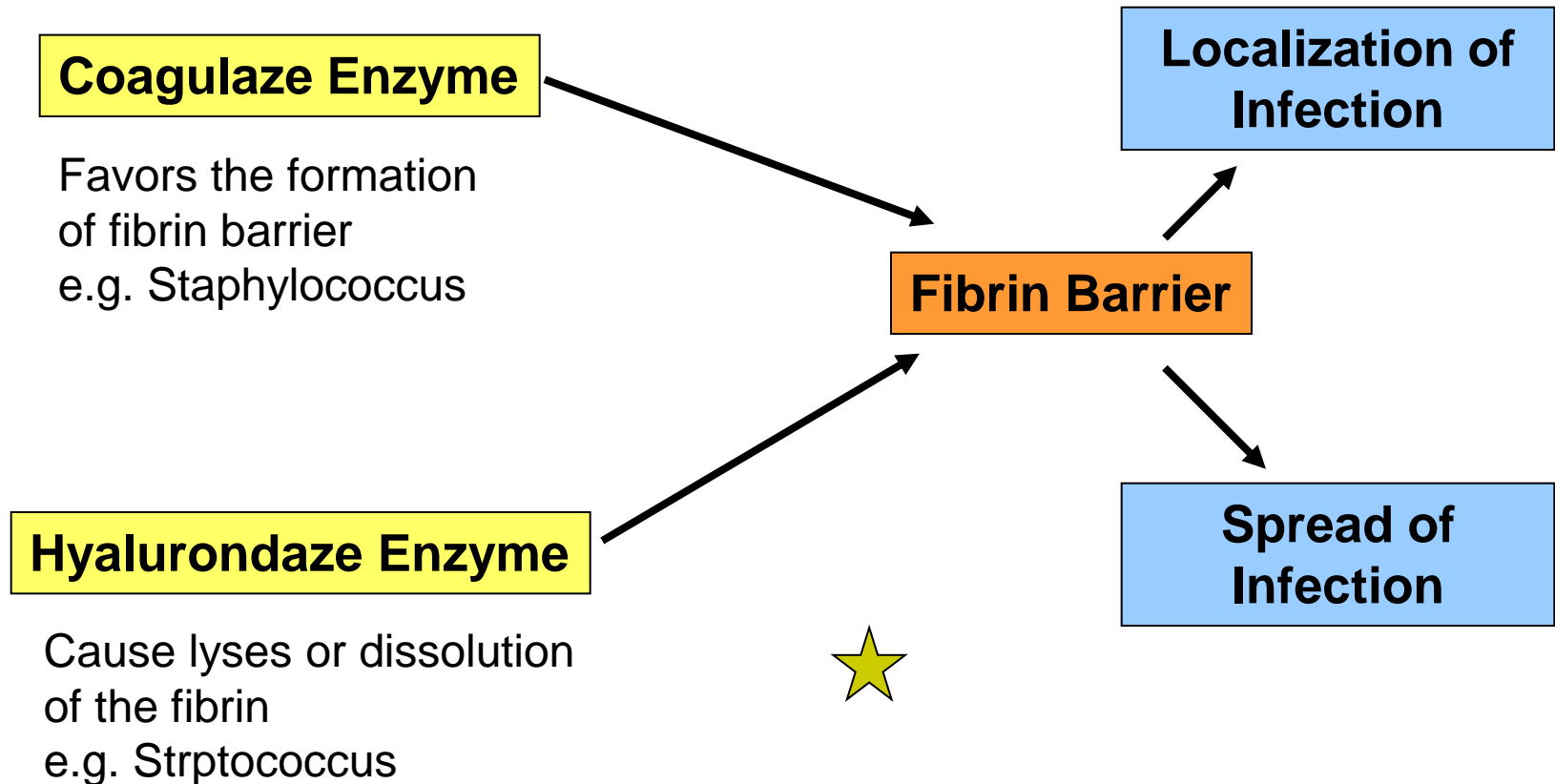
Depends on **VIRULENCE & NUMBER** of microorganism

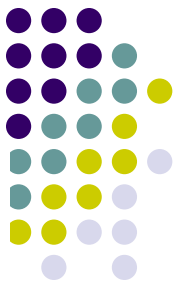
Virulence

Is sum of all characteristics of the microorganism that is harmful to the host

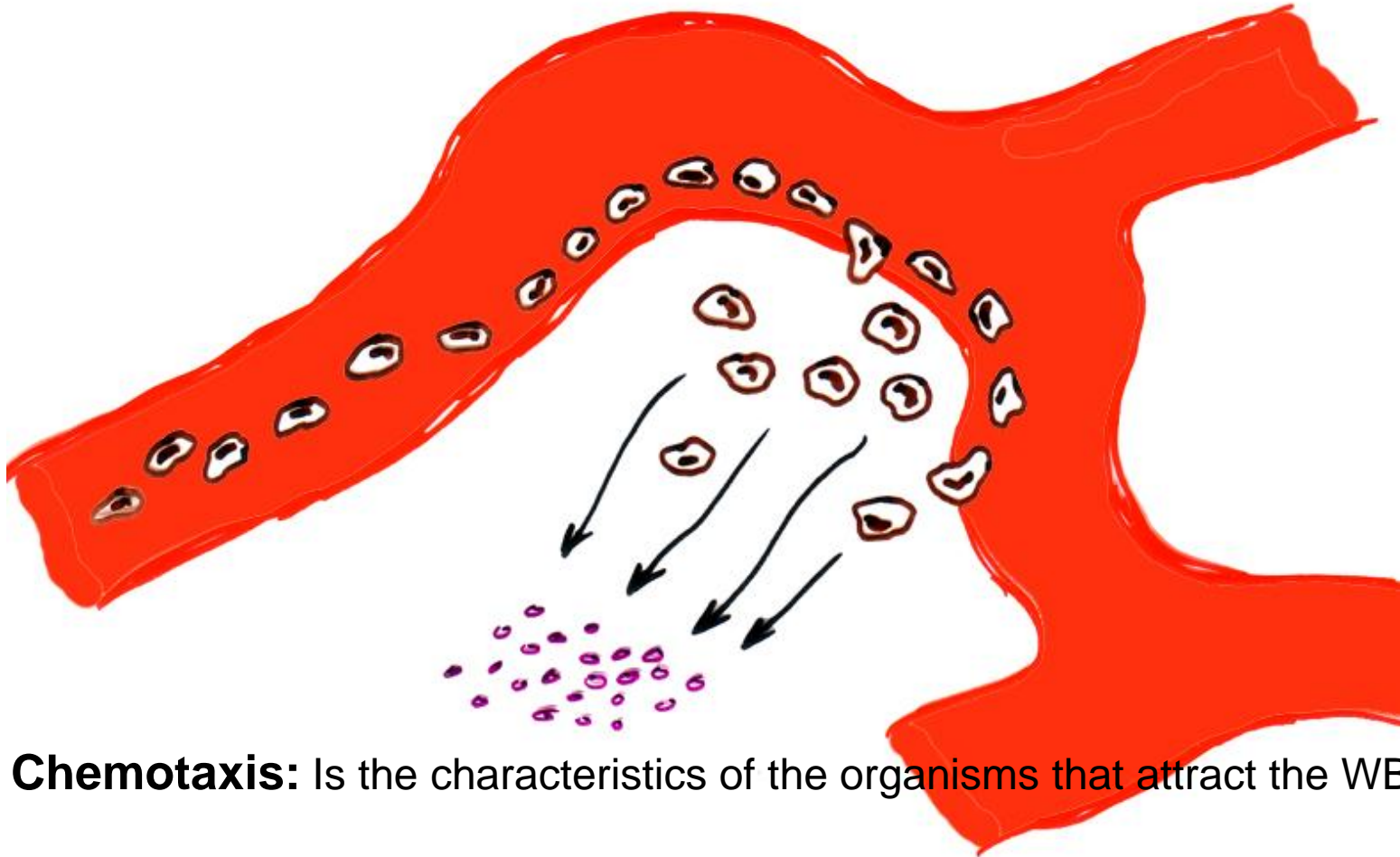


A. Enzymes Produced by Organism





B. Chemotaxis Effect

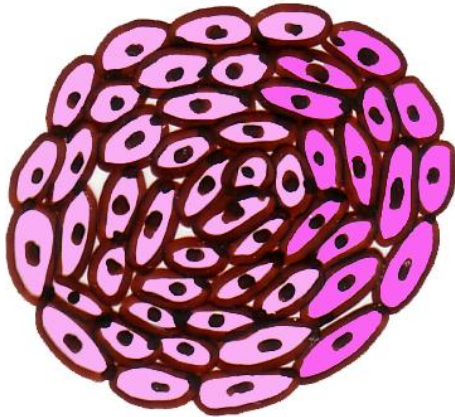


Chemotaxis: Is the characteristics of the organisms that attract the WBCs

Bavementation of Leucocytes: Is the migration of the leucocytes to the area of infection



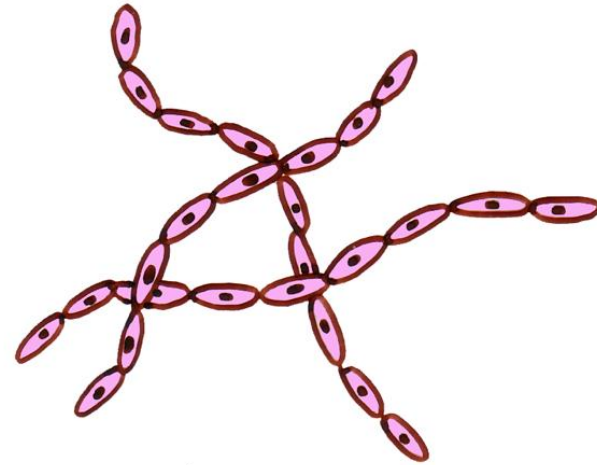
C. Mode of Growth



Colonies

Localization

Staphylococcus



Chains

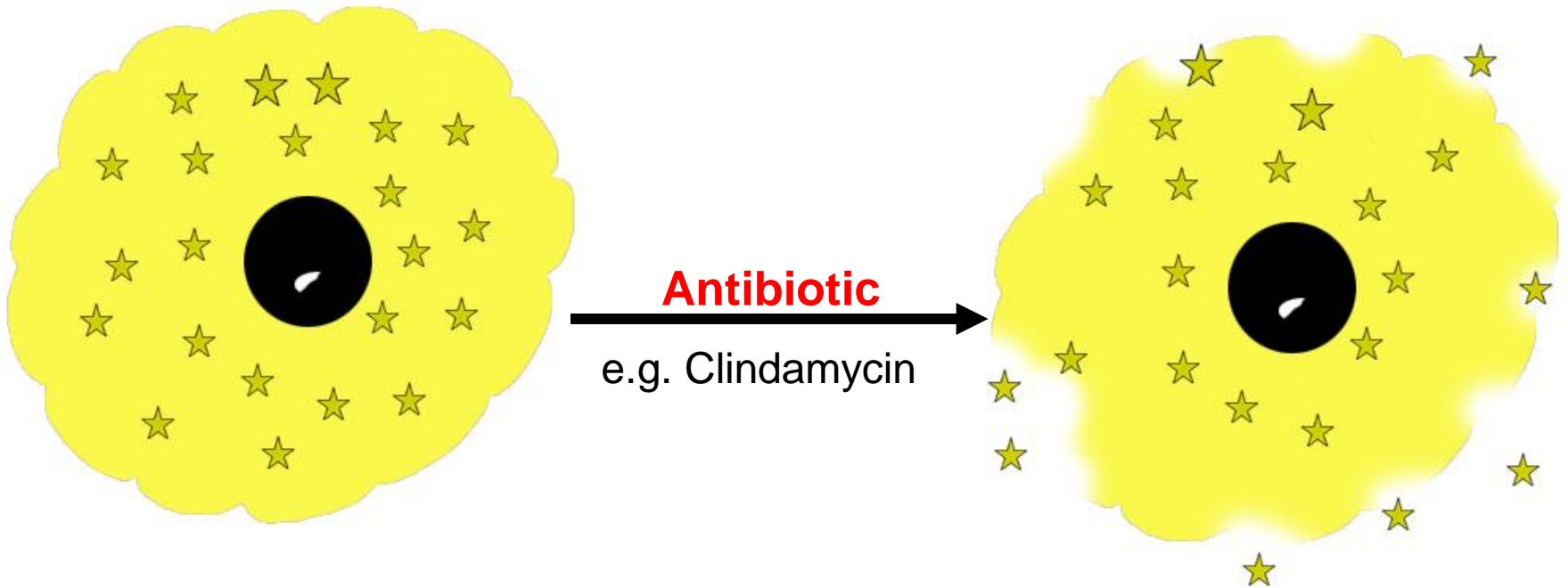
Spread

Streptococcus



Bacteroids – g-ve Anaerobic Bacteria

Produce Endotoxins



Rapid release of large amounts of endotoxins into the tissues which result in initial **flare-up of infection** following the administration of antibiotics



Produce Enzymes

Proteolytic Enzyme

Hydrolysis Collagen & Fibrin

Spread of Infection

Heparinase Enzyme

Inactivate Heparin

Thrombophlebitis

Thrombotic Emboli

Metastatic Lesions

Bacteroides Anaerobic Infection is to be suspected if

1. Pus have a **foul odor** or gas is present
2. When there is local **tissues necrosis** in the inflammatory lesion



D. Number of Invading Organisms

$$\frac{\text{Organism} \times \text{Virulence} \times \text{Number}}{\text{Resistance} \times \text{Host}}$$

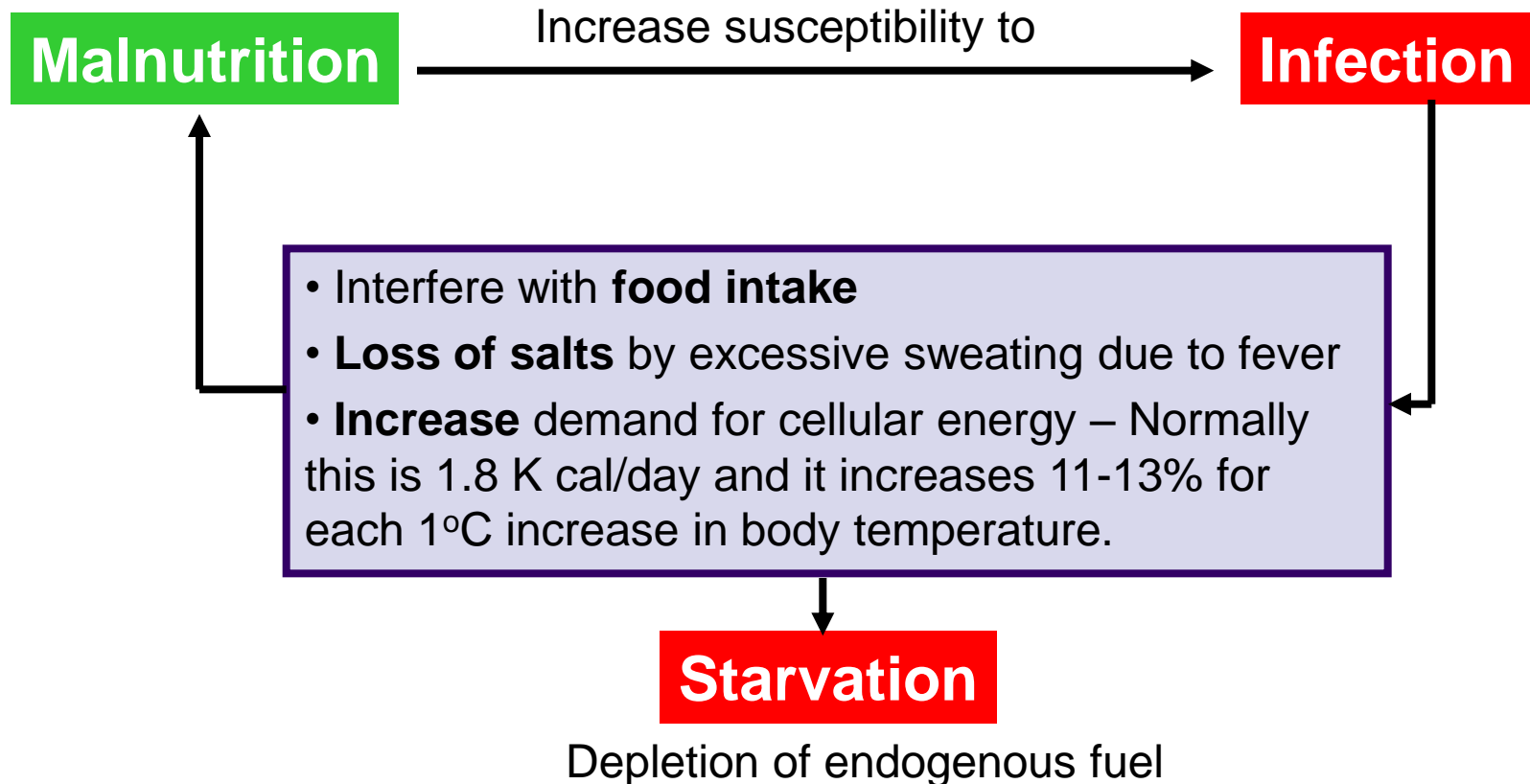
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Organism / MI of Body Fluids

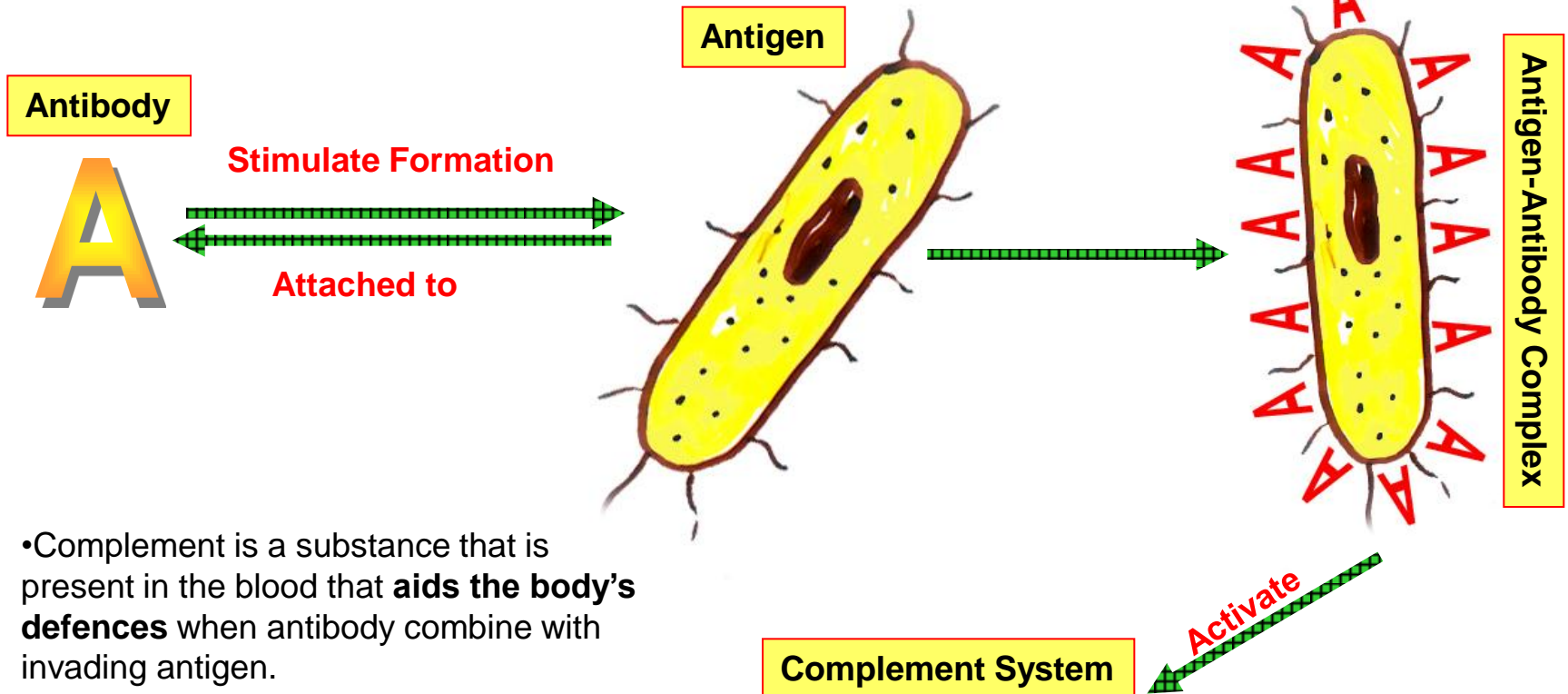
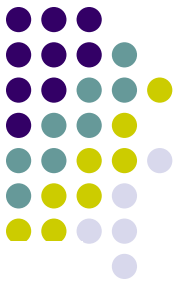
II. Host Physiological Factors



A. Nutritional Status



B & C. Immunohumeral Mechanism & Phagocytosis



- Complement is a substance that is present in the blood that **aids the body's defences** when antibody combine with invading antigen.
- Complement is **involved with** breaking up (lysis), agglutination and opsonization of foreign cells.
- Following Antib-Antigen reaction it **attracts** scavenging cells (phagocytes) to the area of conflict.



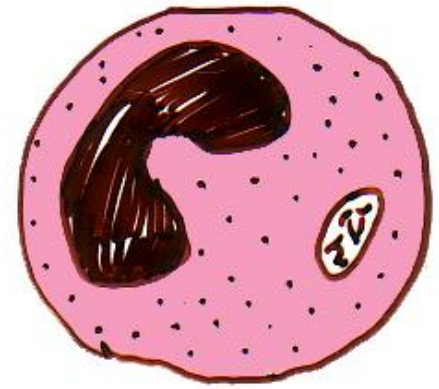
Phagocytosis



Engulfment



Killing



Digestion

Phagocyte is a cell that is able to engulf and digest bacteria, protozoa, cells and cell debris. Phagocytes include many white blood cells.

Phagocytosis is the engulfment and digestion of bacteria and other foreign particles by phagocytes.



Factors Reducing Host Resistance

Phagocytes must be accumulated in a sufficient numbers around the invading organisms to start phagocytosis.

Any **factor that may interfere** with their accumulation or with their physical contact with the organism will give chance for the organisms to flourish.

Factors that prevent accumulation of phagocytes in the inflammation site include:

- **Ischemia** with decreased blood supply in the area
- **Dead tissues** in the area
- The presence of **foreign body** in the area
- Accumulation of **seroma or hematoma**

These factors may be induced by

- Administration of vasopressor drugs
- Radiation
- Uremia
- Sever malnutrition
- Drugs as steroids

III. Host Anatomical Factors

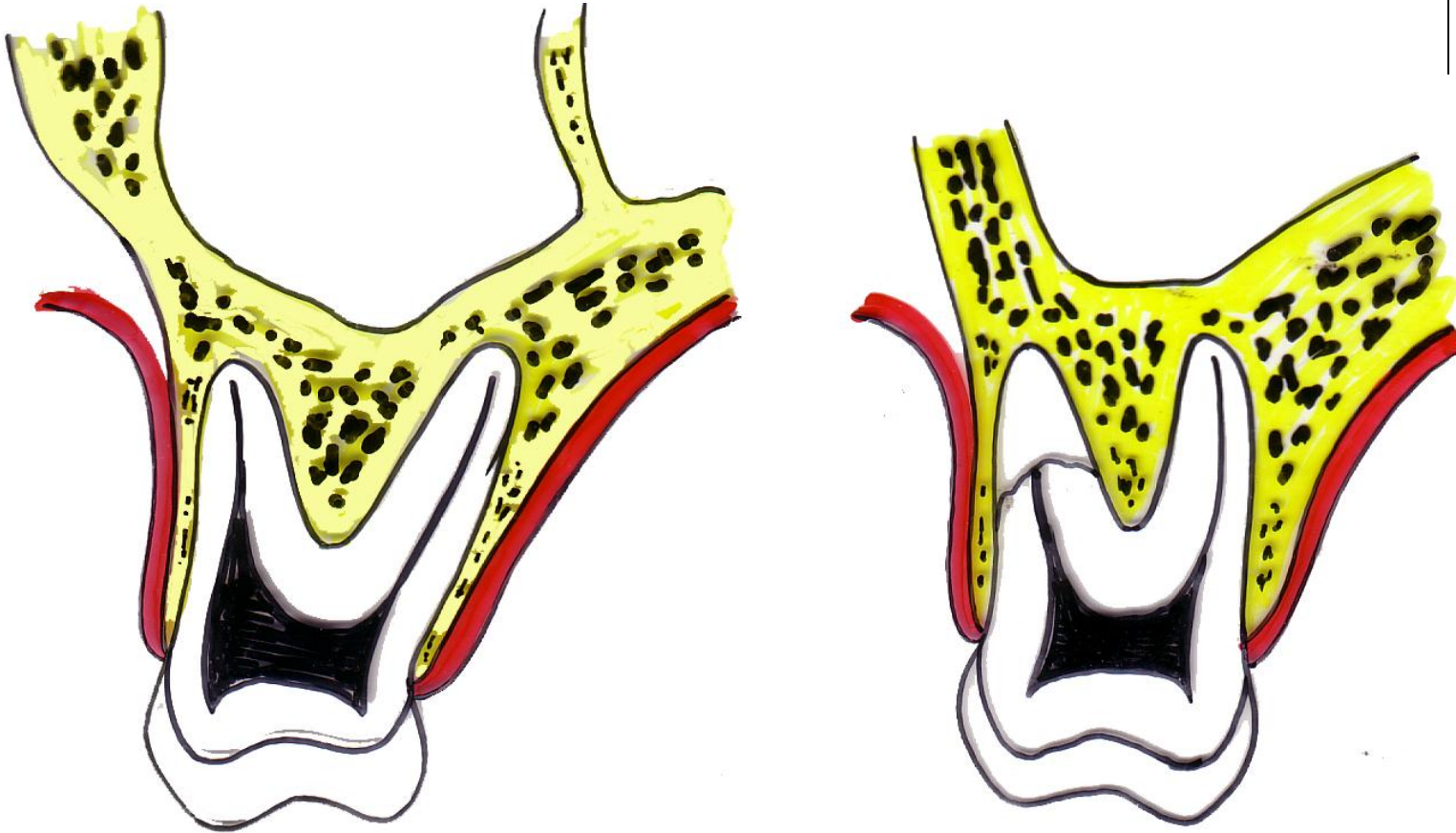
A. Position of the Teeth in the Alveolus

B. Relation of the tooth apex to the muscle attachment

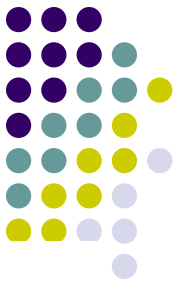




- Buccal cortical plate is very thin
- Palatal bone is thicker
- Related to Max Sinus

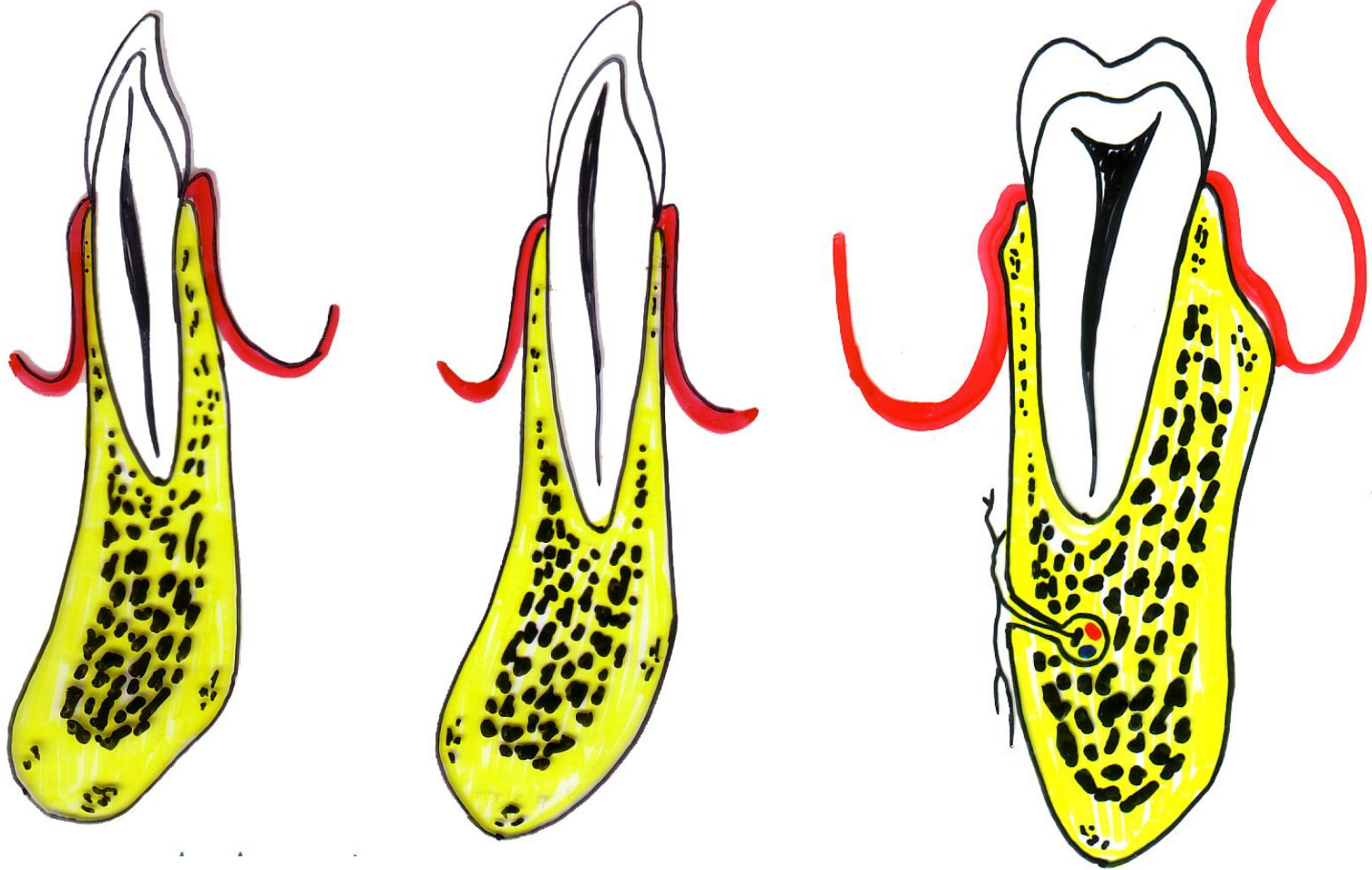


- Related to Max Sinus



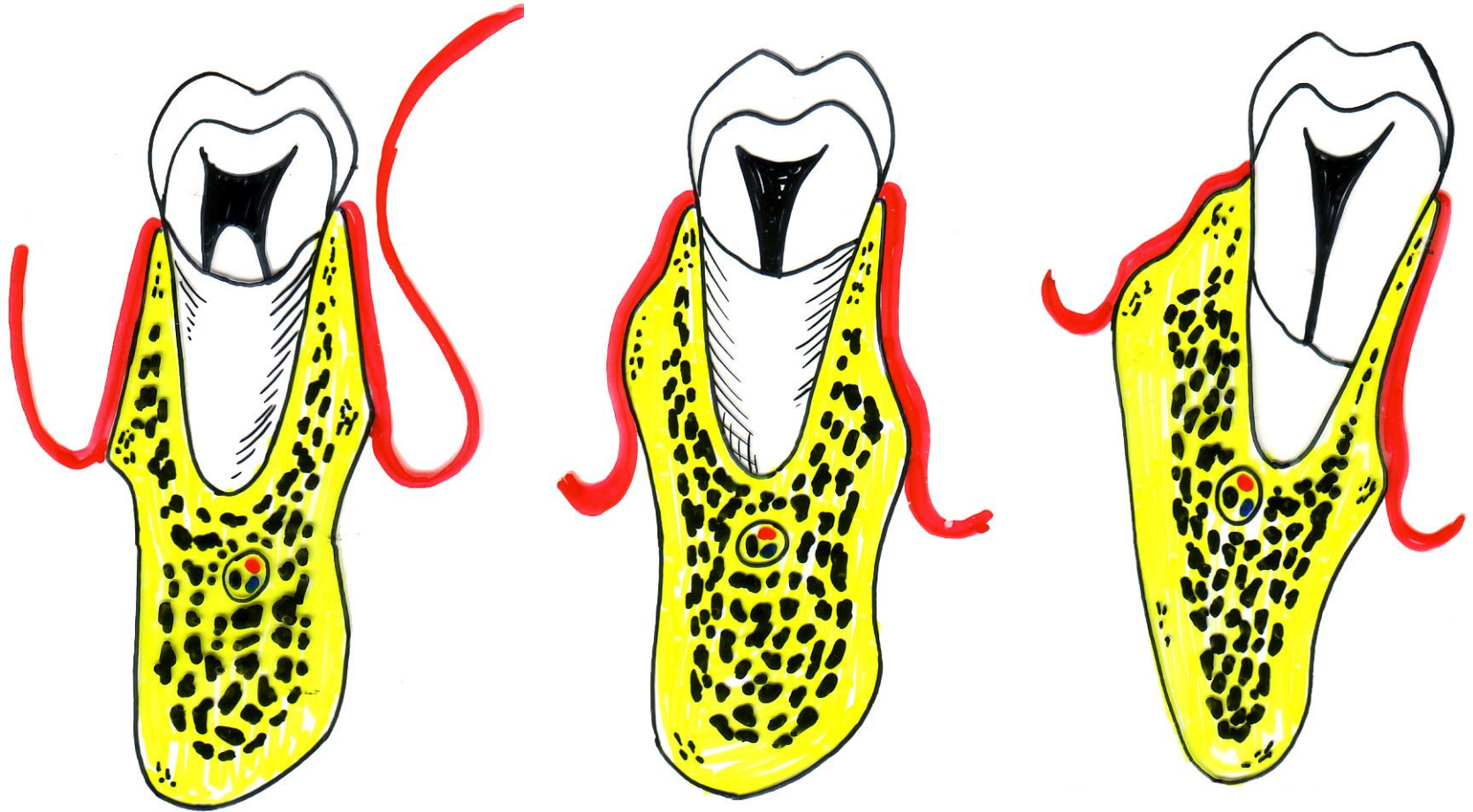
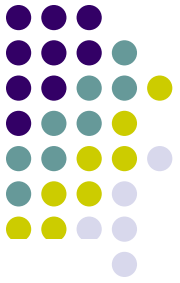










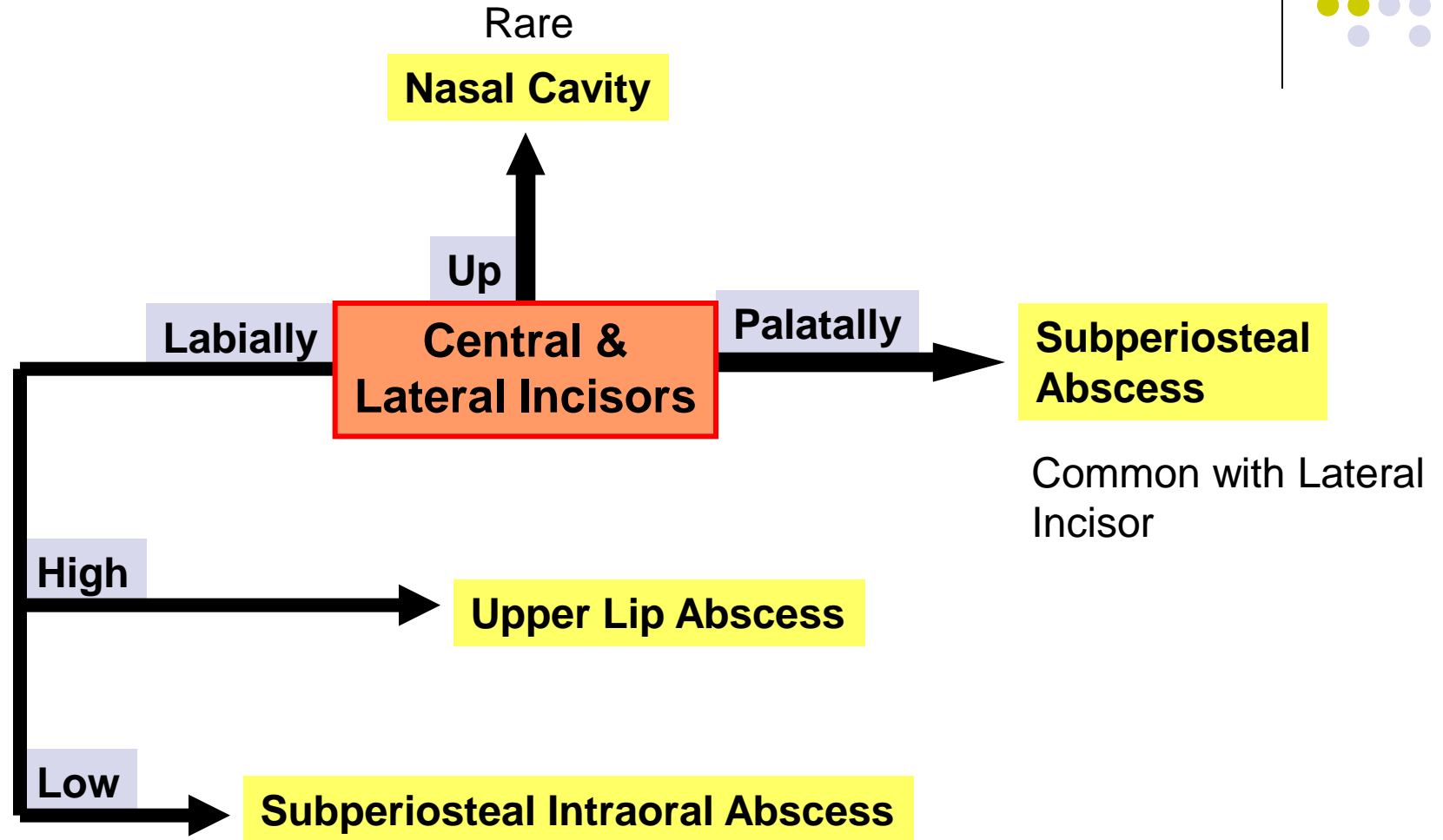








Maxillary Teeth





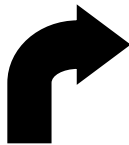
Infraorbital Abscess



To space between Caninus & Qudratus Labii Muscles



Above Caninus Muscle Attachment



Upward

As Central & Lateral

Labially

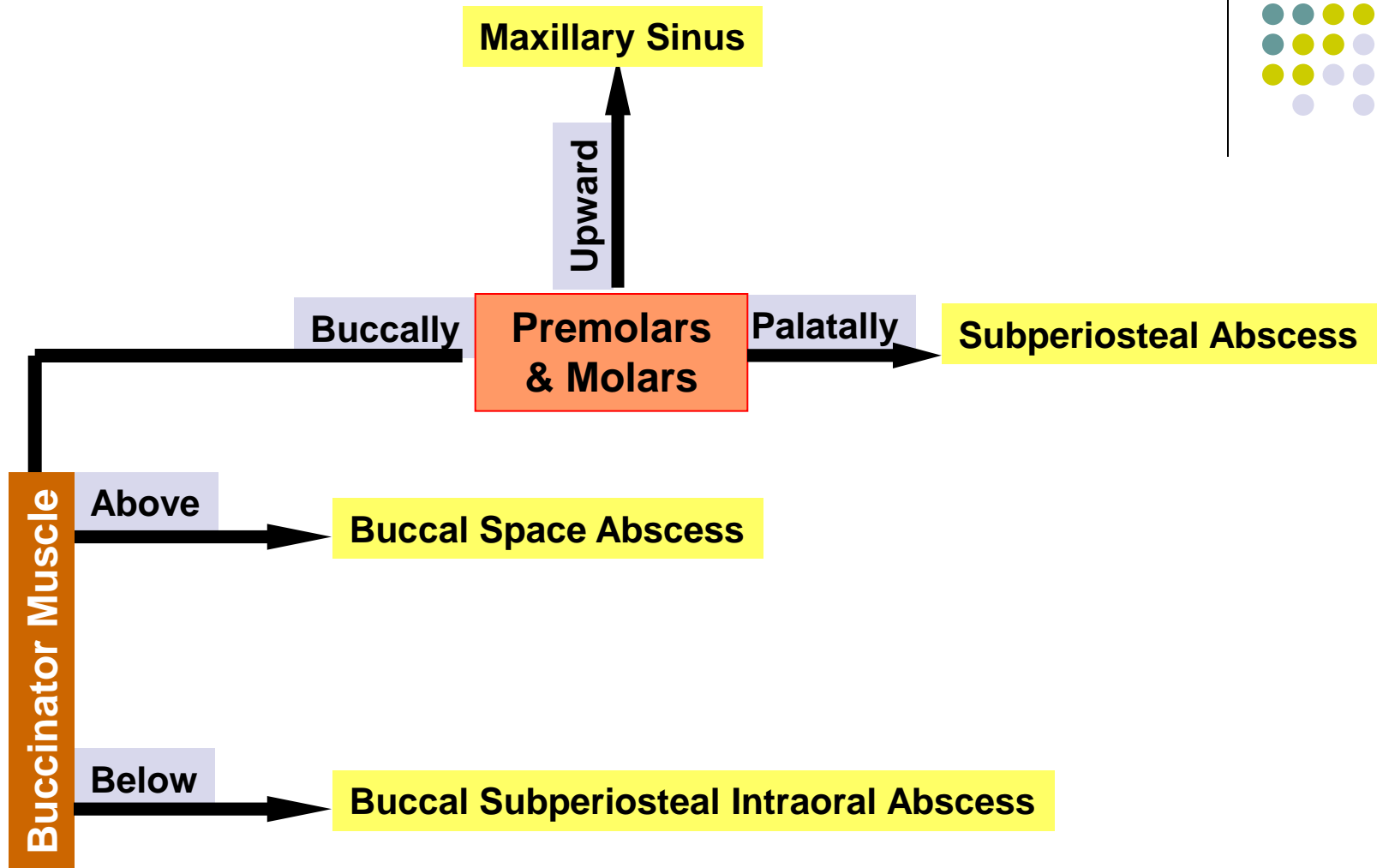
Maxillary Canine

Palatally

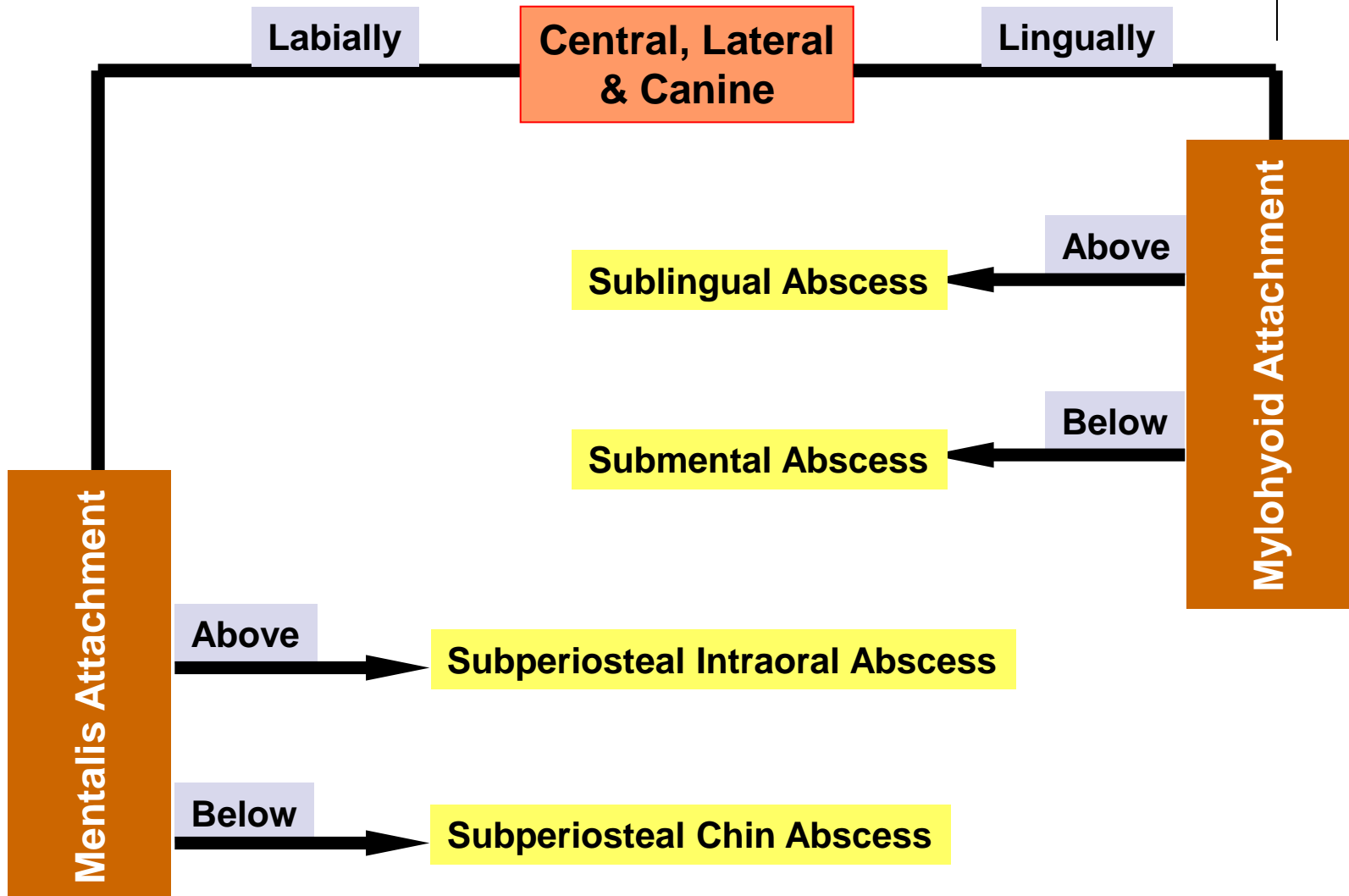
As Central & Lateral

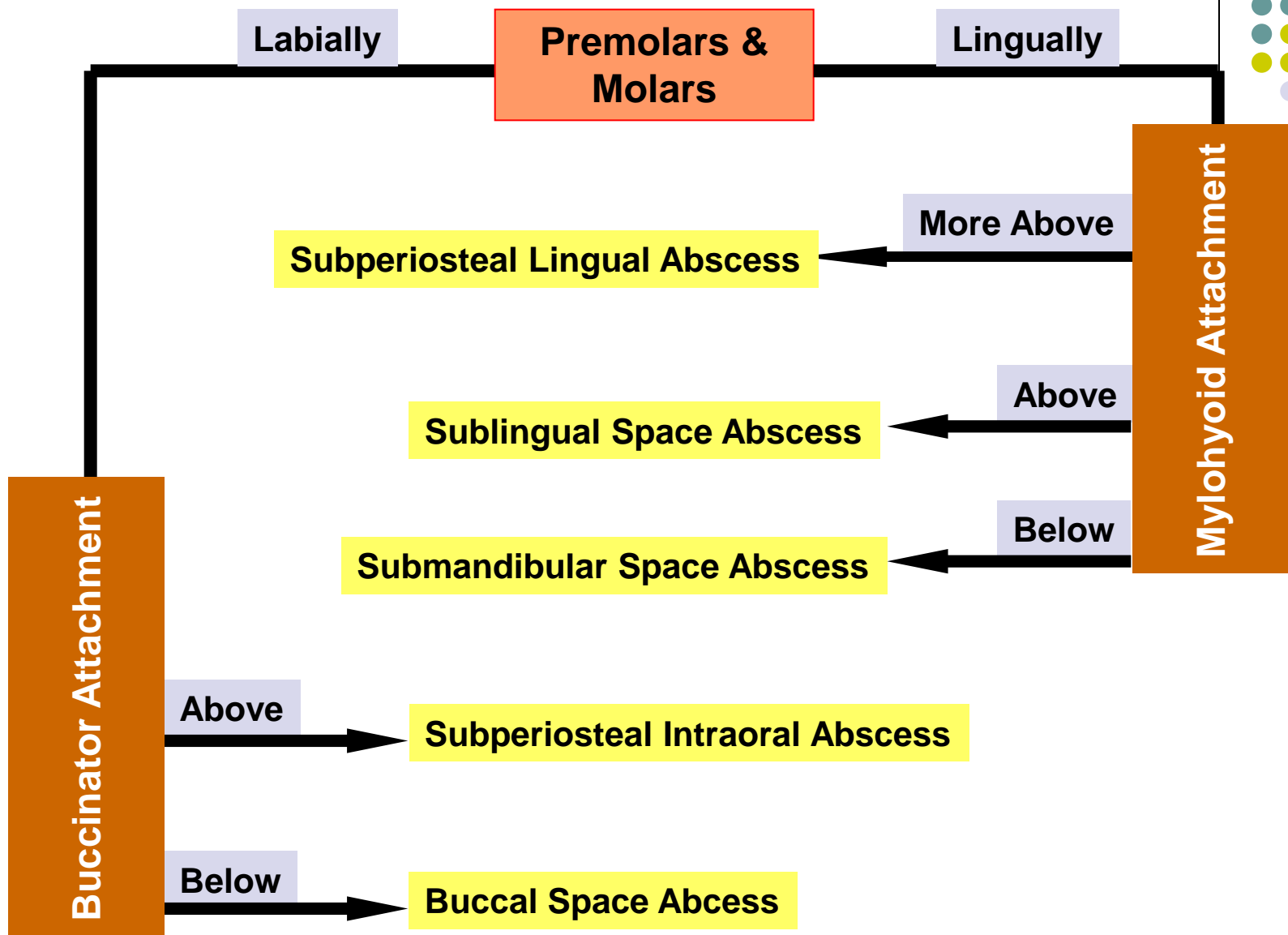


Common with palatal roots of upper molars



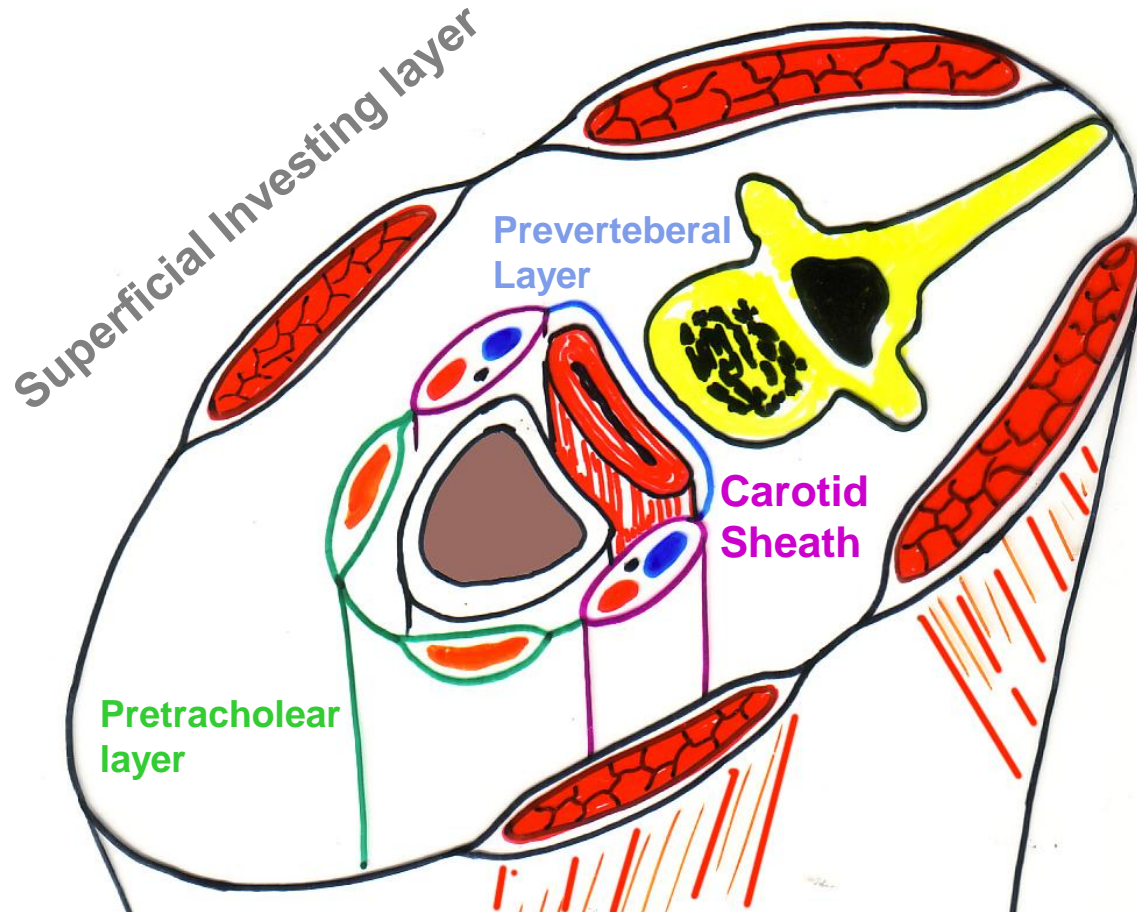
Mandibular Teeth







C. Organization of Superficial and Deep Cervical Fascia

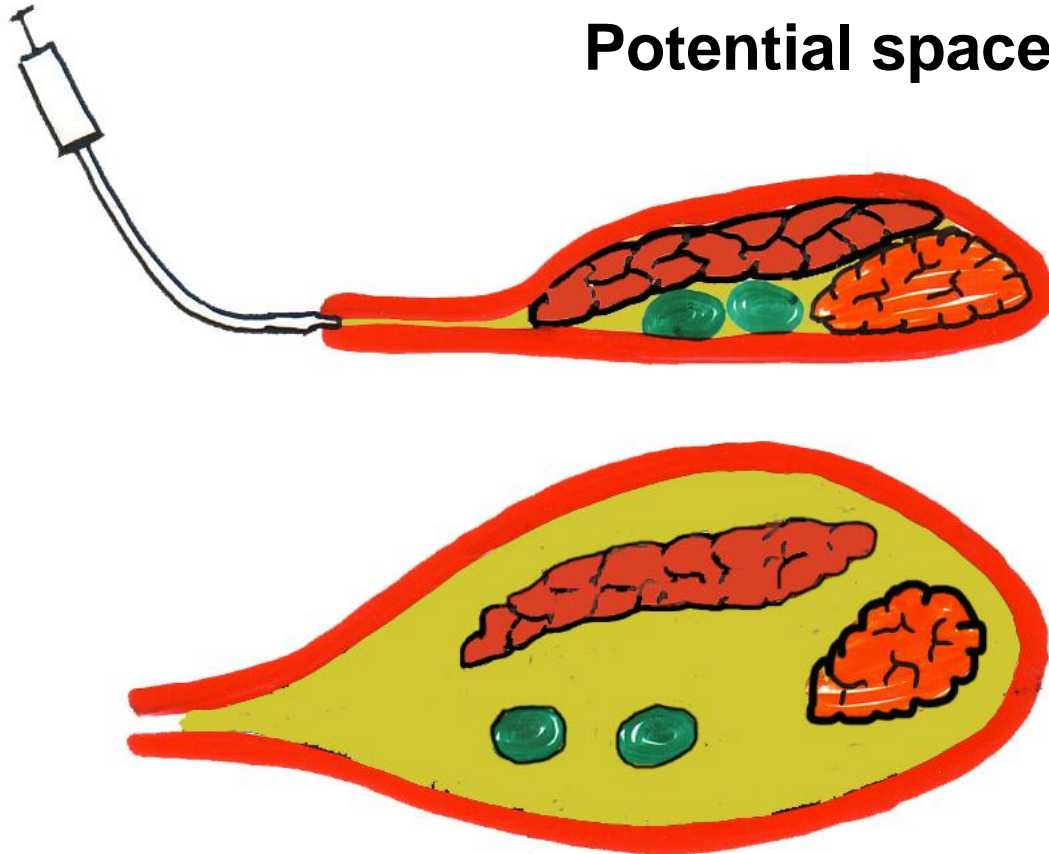


Fascia is a connective tissue membranous layers of variable thickness in all regions of the body. It surrounds all organs of the body and divided into **SUPERFICIAL FASCIA**, found immediately under the skin and **DEEP FASCIA** which forms sheaths for muscles and glands

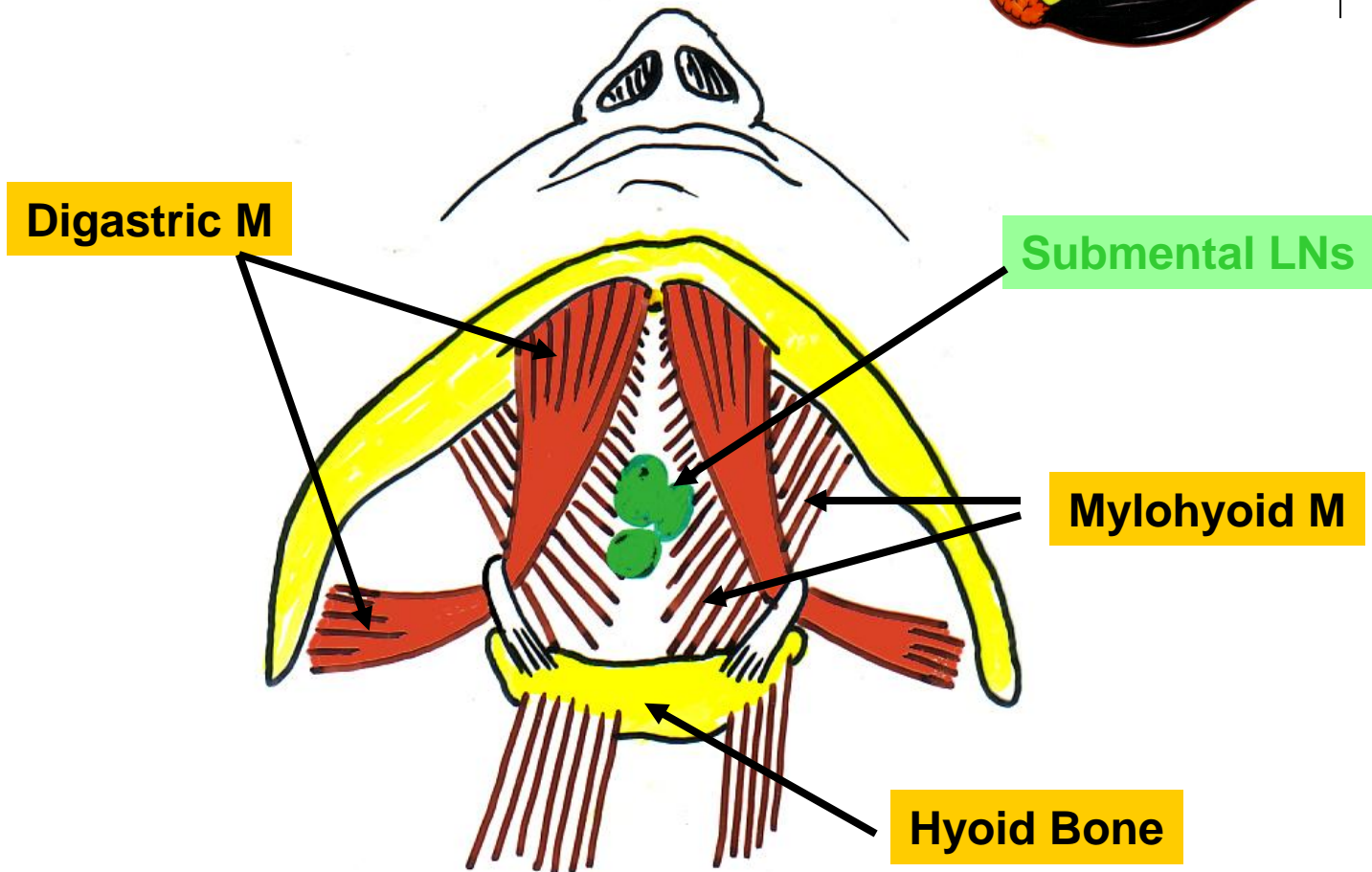
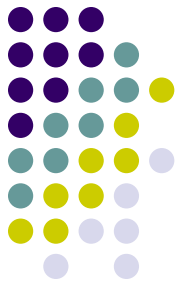


Fascial Space is

Potential space



Submental Space





- **Spread of Infection**

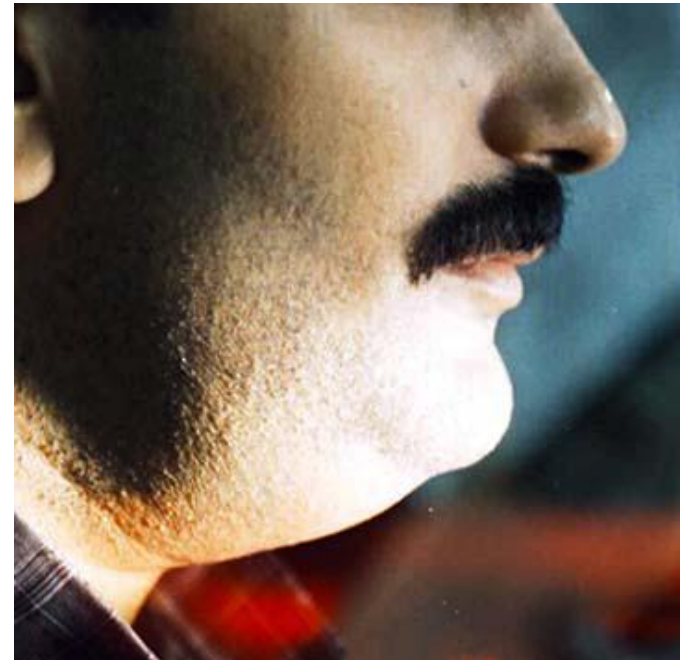
- Dental infection in lower anterior teeth
- Extension of infection from submandibular or sublingual spaces

- **Signs & Symptoms**

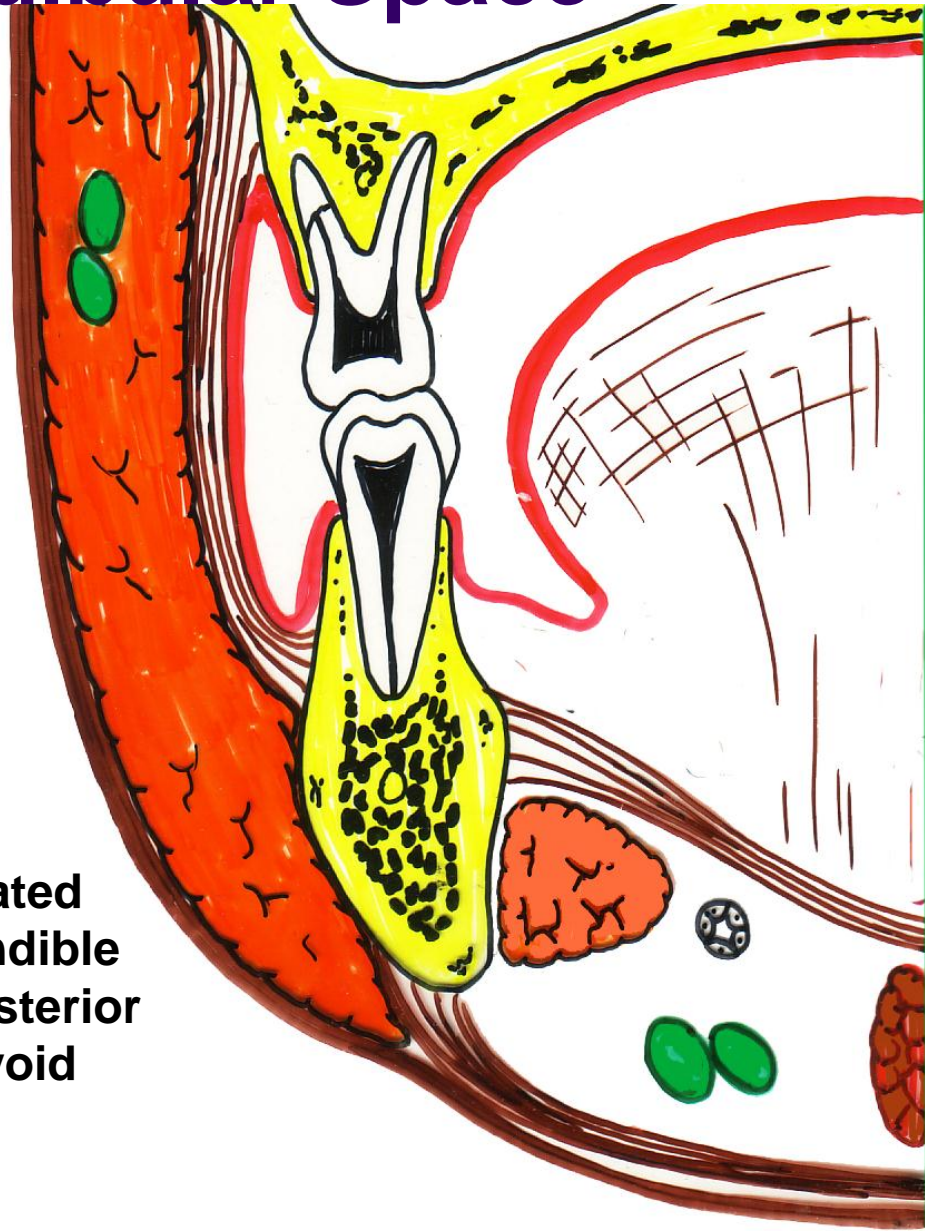
- Firm swelling beneath the chin
- Skin is taut
- Discomfort on swallowing

- **Treatment**

- Therapeutic
- I&D



Submandibular Space



This space is located medial to the mandible and below the posterior portion of mylohyoid muscle

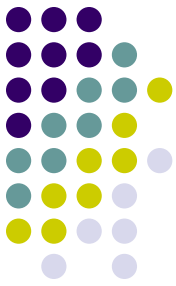


- **Communications**

- Anteriorly: Submental space around the diaphragmatic muscle
- Posteriorly: Lateral Pharyngeal space

- **Route of Infection**

- Spread from communicating spaces
- Dental infection on lower premolars and molars if opened lingually below the mylohyoid attachment
- Secondary to submandibular lymphadenopathy



- **Signs & Symptoms**

- Swelling in submandibular region
- Moderate limitation of mouth opening
- In severe cases there may be systemic signs and symptoms

- **Treatment**

- I&D if suppuration occurs
- Antibiotics

Sublingual Space



Surgical Anatomy

It is V-shaped trough lateral to the tongue

- **Above:** Mucosa of floor of the mouth
- **Inferiorly:** Mylohyoid M
- **Antrolaterally:** Body of the mandible
- **Medially:** Median raphe of tongue, Hyoglossus, Genioglossus and Geniohyoid
- **Posteriorly:** Hyoid bone

Contents

- Deep part of submandibular gland
- Warton's duct
- Sublingual gland
- Lingual nerve
- Hypoglossal nerve





● Communications

- Sublingual space opposite side: Over the hump of genial muscles
- Submandibular space: Around submandibular gland
- Parapharyngeal & Pterygomandibular spaces: Via the tunnel under the superior constrictor for styloglossus muscle

● Route of Infection

- Dental infection: When discharge on the lingual side of the mandible at a point **above the mylohyoid** attachment and **below level of mucosa of the floor of the mouth**. Common with lower **12** and **3**
- Spread of infection from communicating spaces



Signs & Symptoms

“Sublingual Abscess”

- Firm **painful swelling**, unilaterally on the anterior part of the floor
- Edematous tissues has **gelatinous appearance**
- Very little or **no extra-oral swelling**
- **Tongue** deflected medially and superiorly
- Sever **pain** and discomfort with **swallowing**
- Lymphadenopathy
- General symptoms



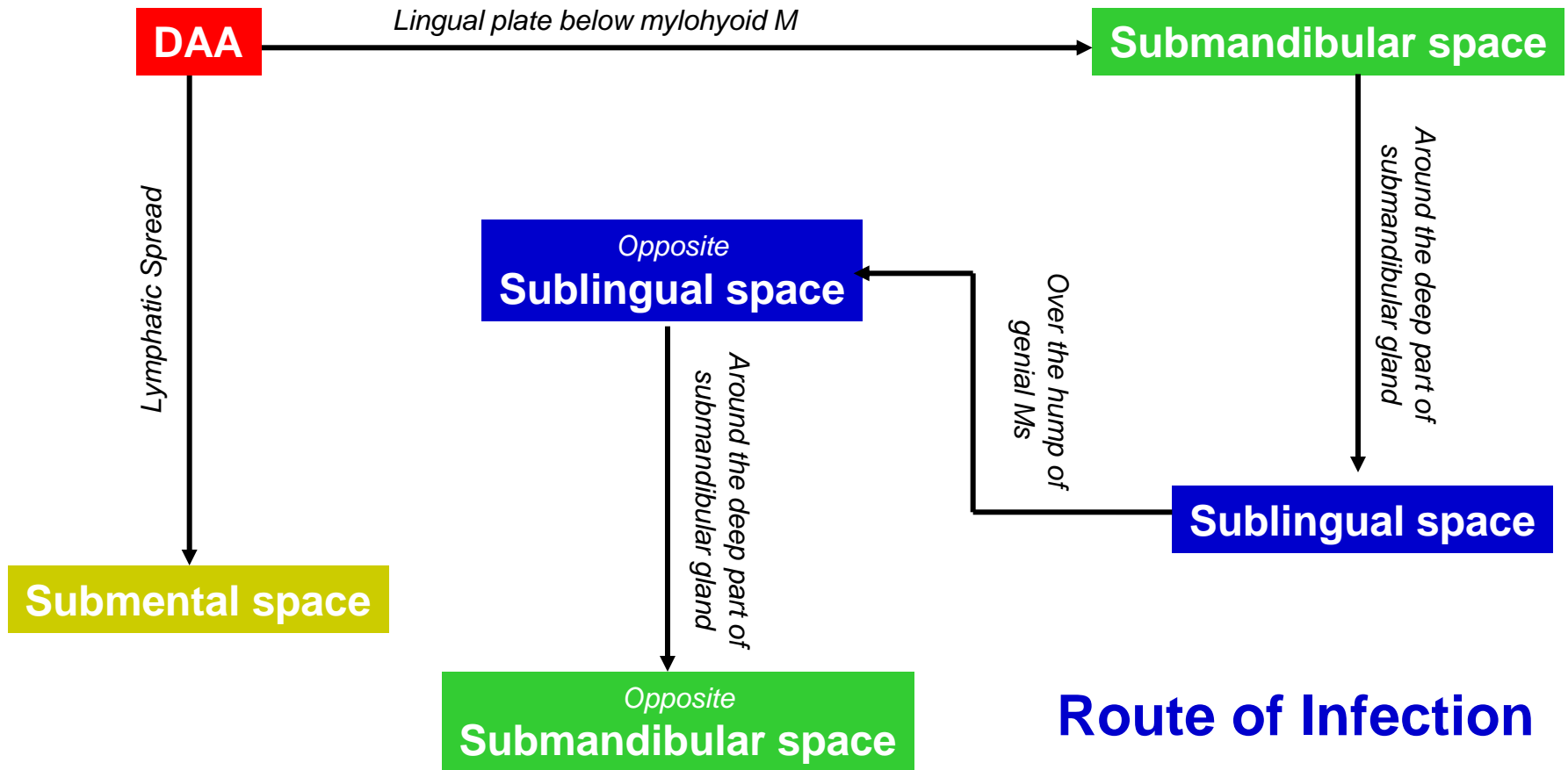
Treatment

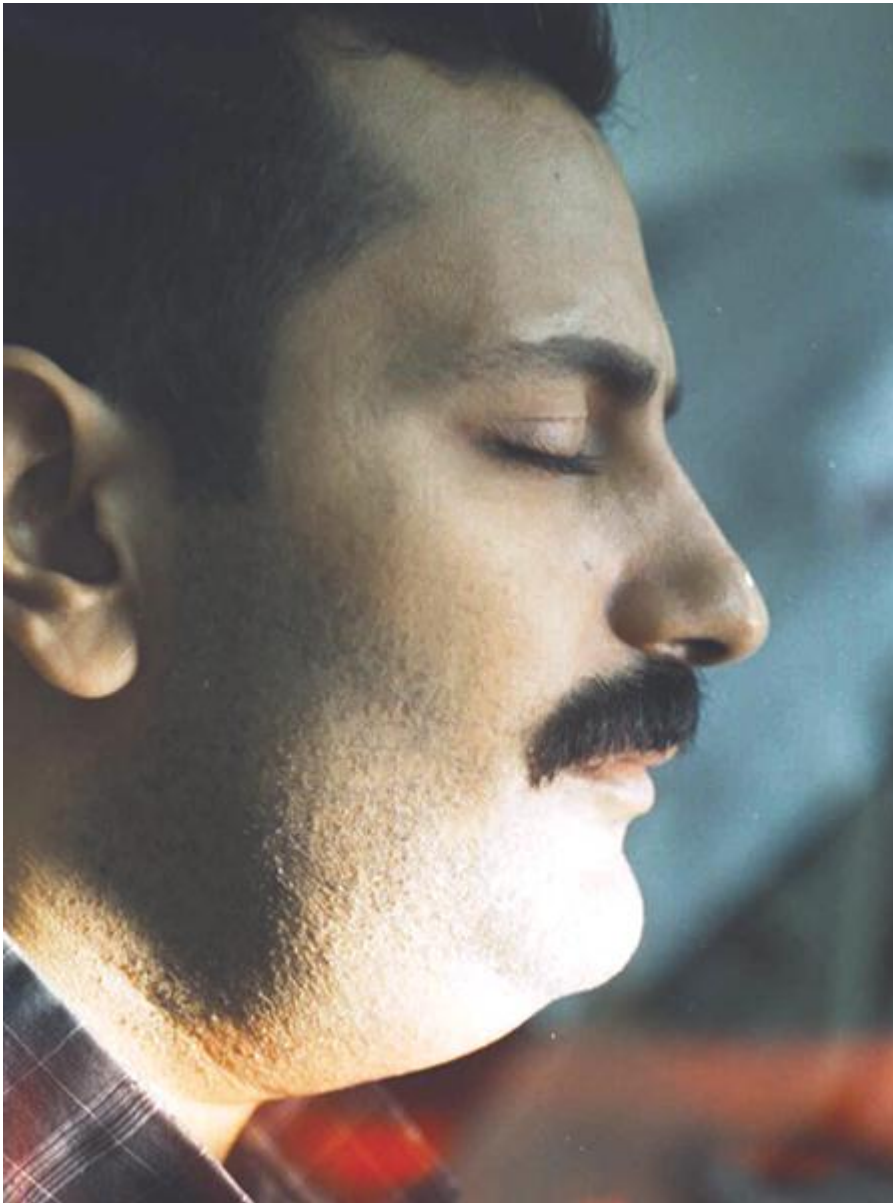
- Antibiotics
- I&D
- Removal of the cause



Ludwig's Angina

The condition is not considered true Ludwig's angina unless all the submandibular spaces are involved bilaterally





Signs & Symptoms

- Board like swelling both intra- and extra-oral
- Swelling is firm, painful, diffuse, with no signs for localization
- Difficulties in swallowing, limitation of mouth opening
- Impaired breathing due to glottis edema that may lead to suffocation
- Later swelling may extend down the neck and reach the level of the clavicle
- High fever, rapid pulse, moderate leuckytosis, fast respiration



Tongue elevated, partially protruded, stiff motion and wooden appearance

Complete **airway obstruction** may occur due to glottis edema, Tracheotomy should be considered

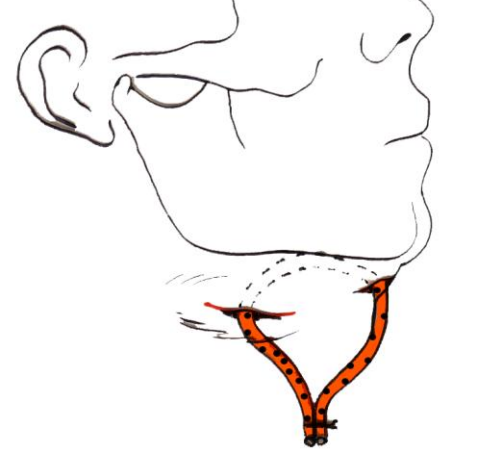


Maged Lotfy – Maxillofacial Infection



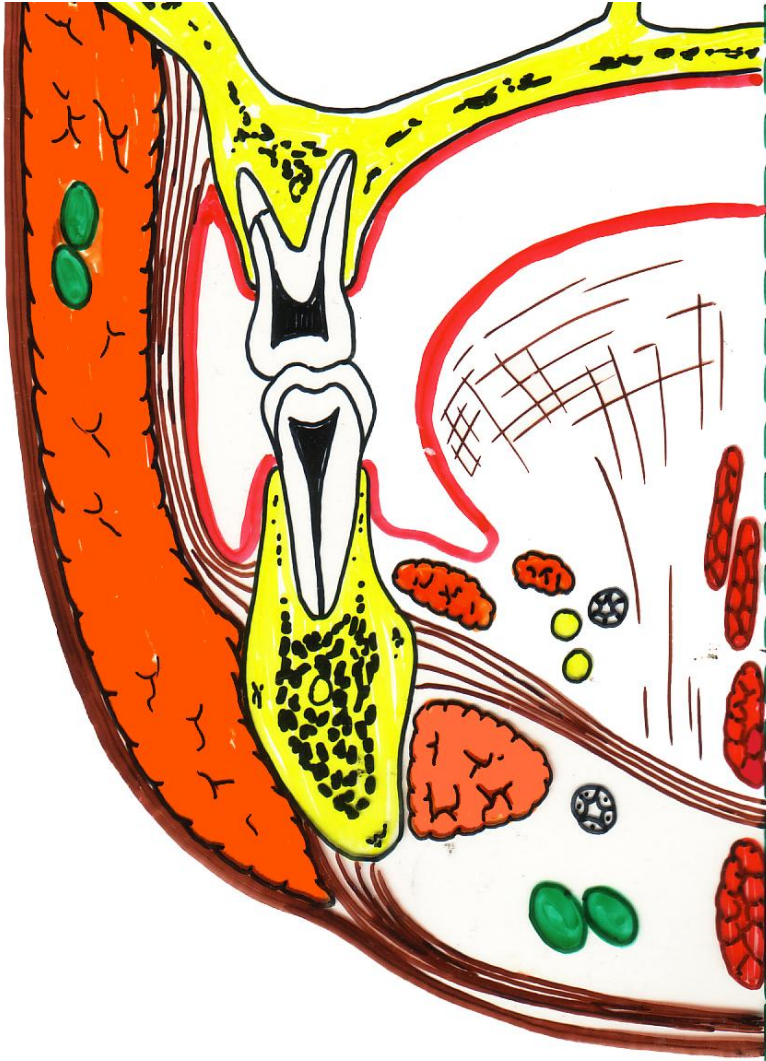
● Treatment

- Anaesthesia: GA is difficult as endotracheal intubation is difficult. Awake intubation is indicated
- Tracheostomy is to be considered but identification of the trachea is difficult in the presence of massive neck swelling
- Antibiotics & Supportive measures
- Surgery: Through & Through I&D





Buccal Space



- **Surgical Anatomy**

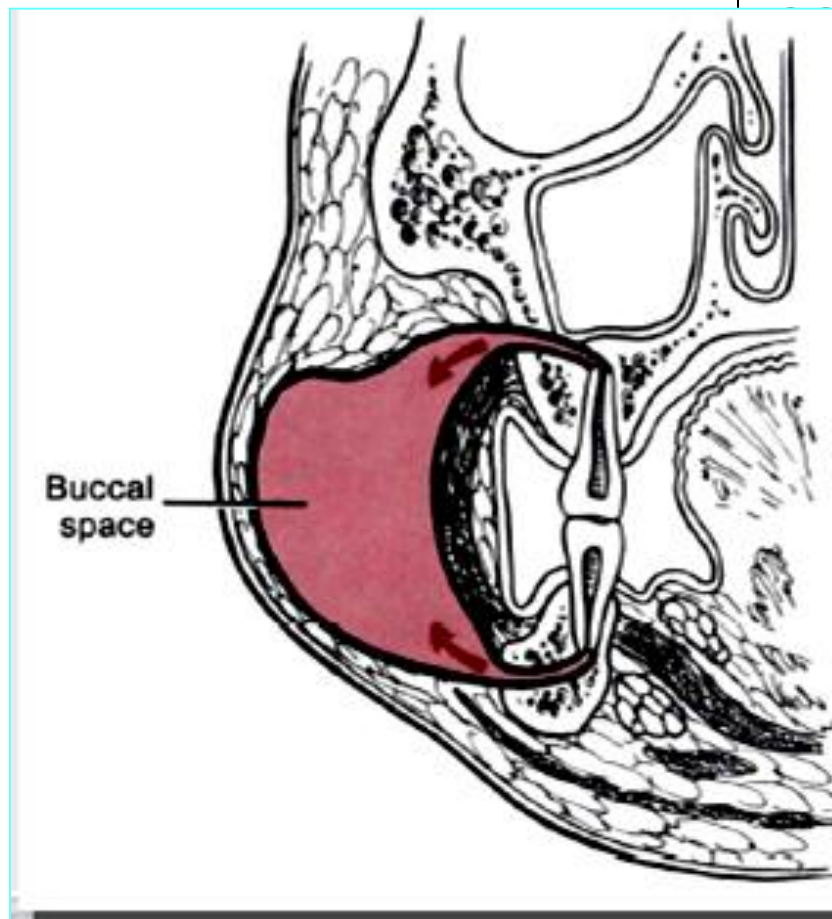
- Antero-Medially: Buccinator muscle
- Postro-Medially: Masseter muscle & anterior border of ramus
- Laterally: Platysma muscle & Deep fascia
- Above: Zygomatic process of maxilla & zygomaticus muscle
- Below: Attachment of the deep fascia to the mandible

- **Contents**

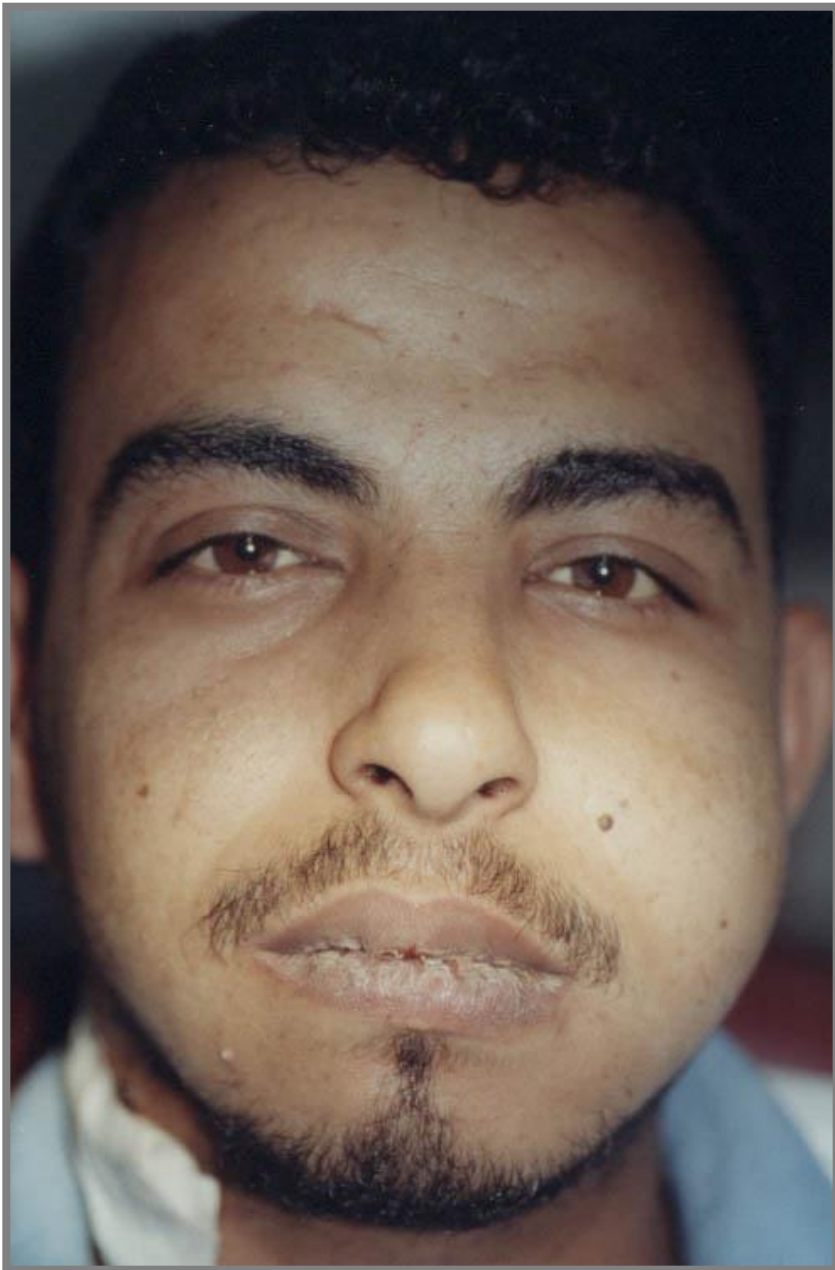
- Buccal pad of fat
- Facial lymph nodes

- **Communications**

- Posterior: Pterygomandibular space
- Superiorly: Infratemporal space







Maged Lotfy – Maxillofacial Infection



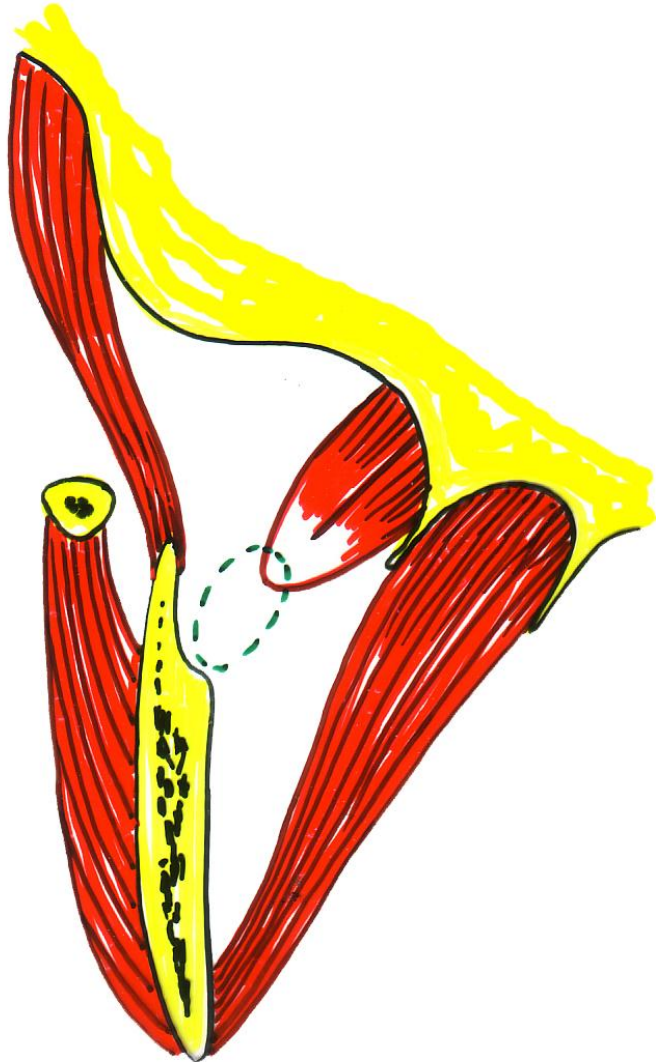
- **Route of Infection**

- Pericoronal infection: Passes under the buccinator origin
- DAA: of any of the molar teeth that passes outside the buccinator attachment to the mandible or the maxilla
- Communicating spaces: By direct extension of infection

- **Treatment**

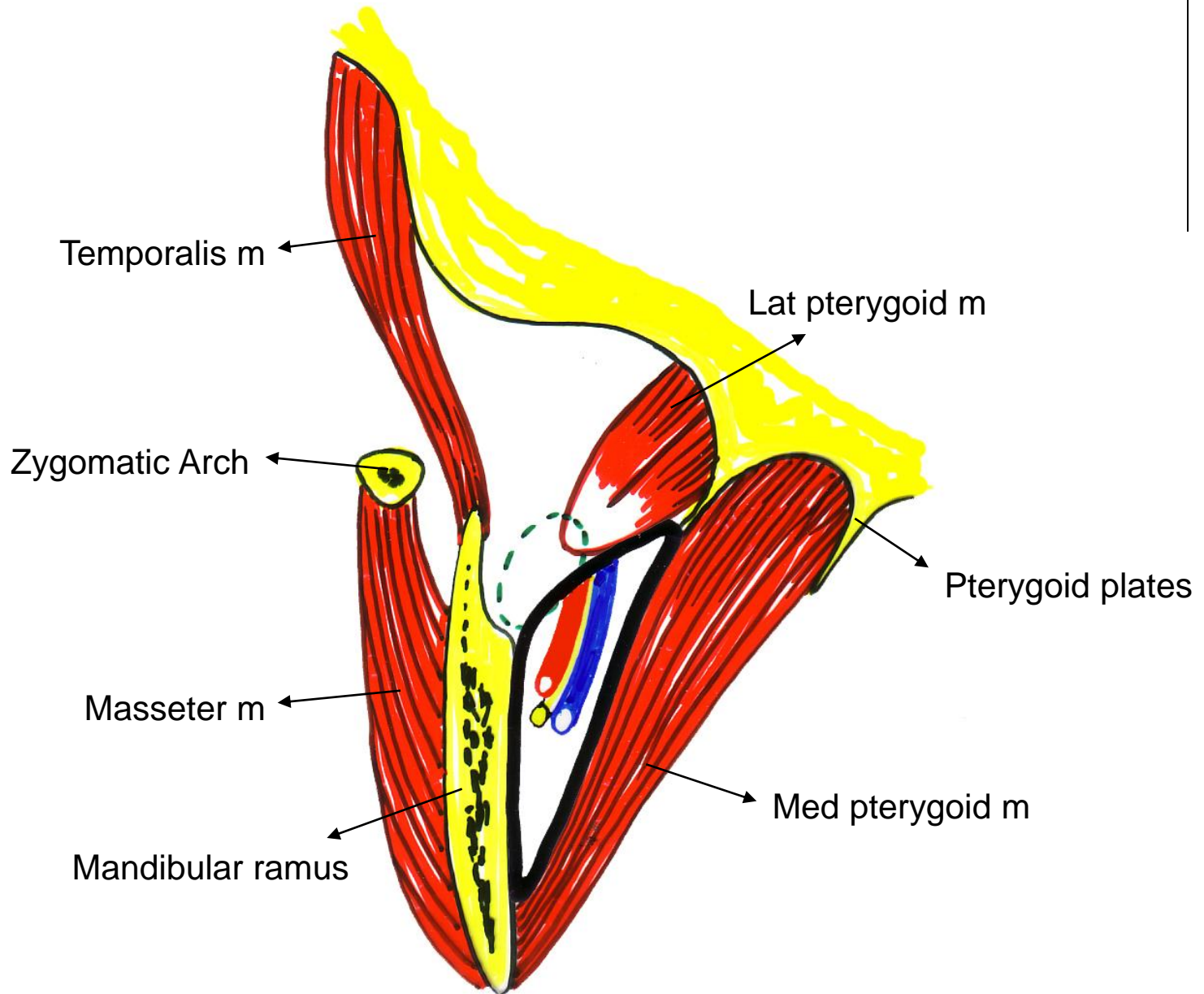
- I&D is done through intraoral incision
- If the abscess pointed through the skin it drained extraorally

Pterygo-Mandibular Space



- **Surgical Anatomy**
 - Laterally: Medial surface of the ramus
 - Medially: Medial pterygoid muscle
 - Above: Lateral pterygoid muscle
- **Contents**
 - Lingual nerve
 - Inferior dental nerve
 - Inferior dental vessels
- **Communications**
 - Posteriorly around medial pterygoid muscle: Lateral pharyngeal space: To lateral pharyngeal space (*This is space is usually occluded by deep part of parotid*)
 - Upward: Direct extension to the infratemporal space







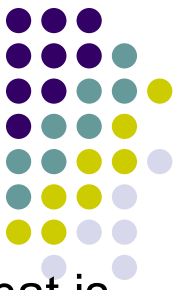
- **Route of infection**
 - Contaminated needle
 - Pericoronitis of lower third molar
 - Direct extension from communicating spaces
- **Pterygomandibular space Abscess**
 - Moderate swelling over the submandibular region and buccal space
 - Sever limitation of mouth opening
 - Tenderness on palpation on the medial aspect of the ramus
 - Neuropexia of the lingual and ID nerve is not common
- **Treatment**
 - Drainage is done via intraoral incision just medial to the anterior border of the ramus

Infratemporal Space

Zygomatico-Temporal Space, Retrozygomatic space



- **Surgical Anatomy**
 - Laterally: Masseter, Ramus, Zygomatic arch & Temporalis
 - Medially: Med & Lat Pterygoid muscles, Lower part of temporal fossa of the skull
- **Contents**
 - Traversed by maxillary artery
 - Pterygoid venous plexus
- **Communications**
 - The space is continuous with the upper part of the Pterygomandibular space



- **Signs & Symptoms**

- Marked limitation of mouth opening
- Swelling over the temporal region that is difficult to recognize except by filling of the space behind the zygomatic arch
- In sever cases there are pyrexia, headache, irritability ... ect

- **Prognosis & Complications**

- Prolonged limitation of mouth opening
- Spread of infection to Cavernous Sinus
- If not treated pus may spread to the inferior temporal line and case necrosis of the bone if not evacuated

- **Treatment – I&D**

- Intraoral: Incision buccal to the upper third molar
- Extraoral: Incision is done at the upper posterior or anterior edge of the temporalis muscle

Lateral Pharyngeal Space

Parapharyngeal Space, Pharyngeo-Maxillary Space



- **Surgical Anatomy**

It is a cone shaped space

- Base: Base of the skull
- Apex: At the greater horn of hyoid bone
- Medially:

- **Contents**

- Traversed by maxillary artery
- Pterygoid venous plexus

- **Communications**

- The space is continuous with the upper part of the Pterygomandibular space