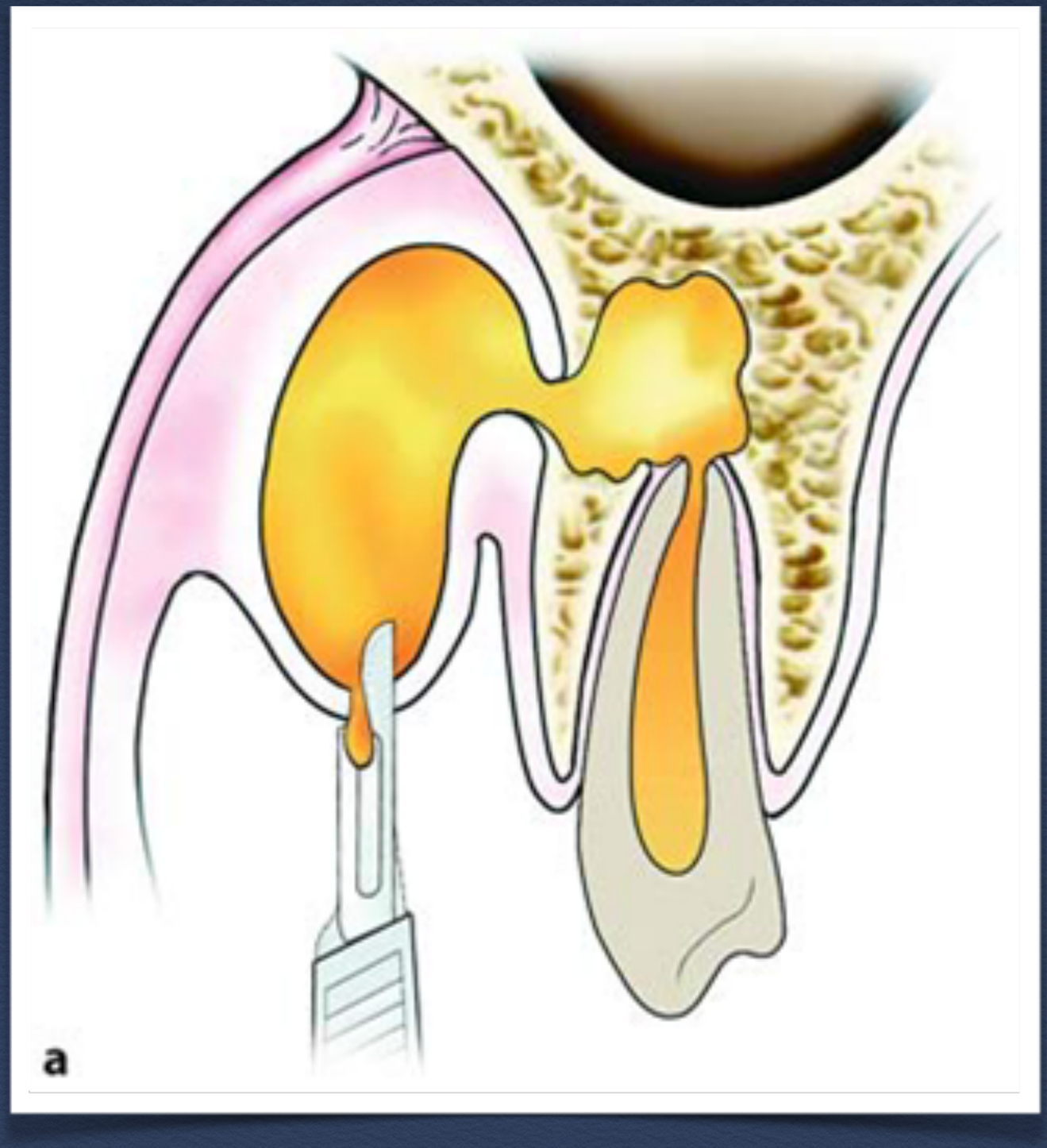


Odontogenic Infections

- These infections may range from low-grade, well-localized infections that require only minimal treatment to severe, life-threatening deep fascial space infections.

- Although the overwhelming majority of odontogenic infections are readily managed by minor surgical procedures and supportive medical therapy that includes antibiotic administration,

- Infections caused by aerobic bacteria alone account for 6% of all odontogenic infections. Anaerobic bacteria alone are found in 44% of odontogenic infections.

- Infections caused by mixed anaerobic and aerobic bacteria comprise 50% of all odontogenic infections

- odontogenic infections seem to pass through four stages

- 1.inoculation stage
- 2.cellulitis stage
- 3.abscess stage.
- 4.resolution stage

- In the first 3 days of symptoms, a soft, mildly tender, doughy swelling represents the inoculation stage, in which the invading streptococci are just beginning to colonize the host

- After 3 to 5 days, the swelling becomes hard, red, and acutely tender as the infecting mixed flora stimulates the intense inflammatory response of the cellulitis stage.

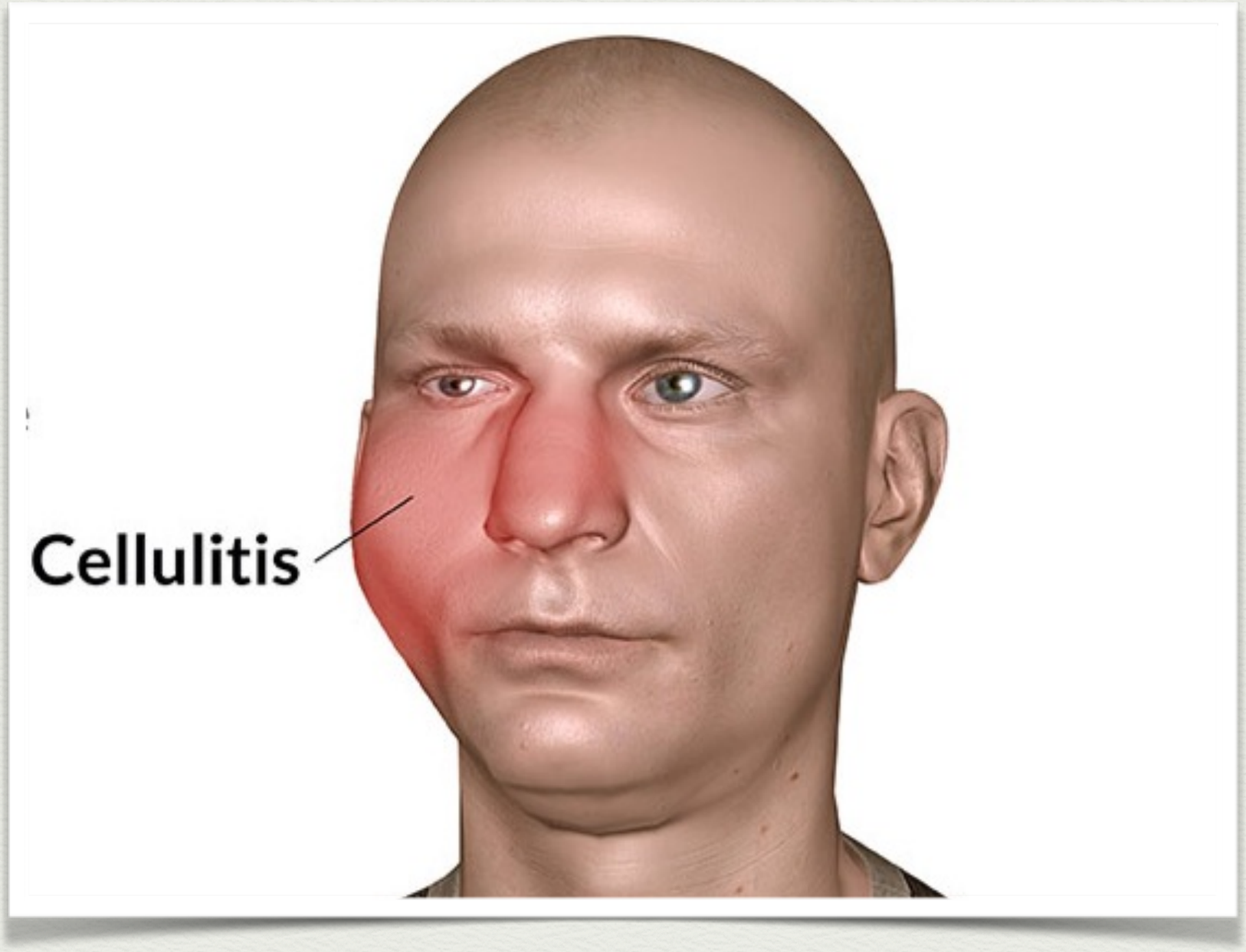


Figure 16-7 Cellulitis involving the submental and submandibular region. The cellulitis is indurated on palpation, and the patient is sick.

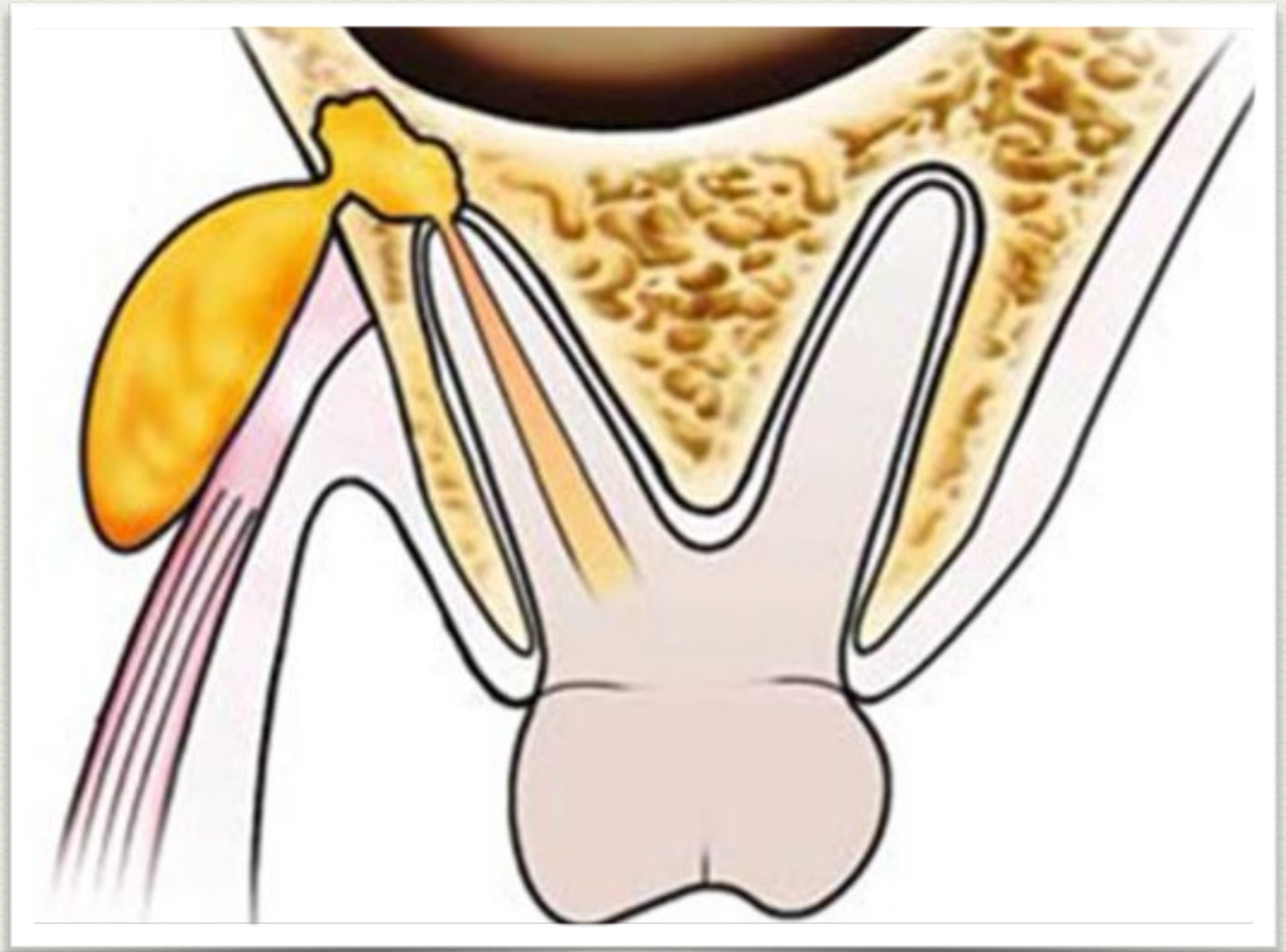
- At 5 to 7 days after the onset of swelling, the anaerobes begin to predominate, causing a liquefied abscess in the center of the swollen area. This is the abscess stage.

Figure 16-8 Well-localized abscess with fluctuance in the center and induration at its periphery. (Courtesy of Richard G. Topazian, DDS.)

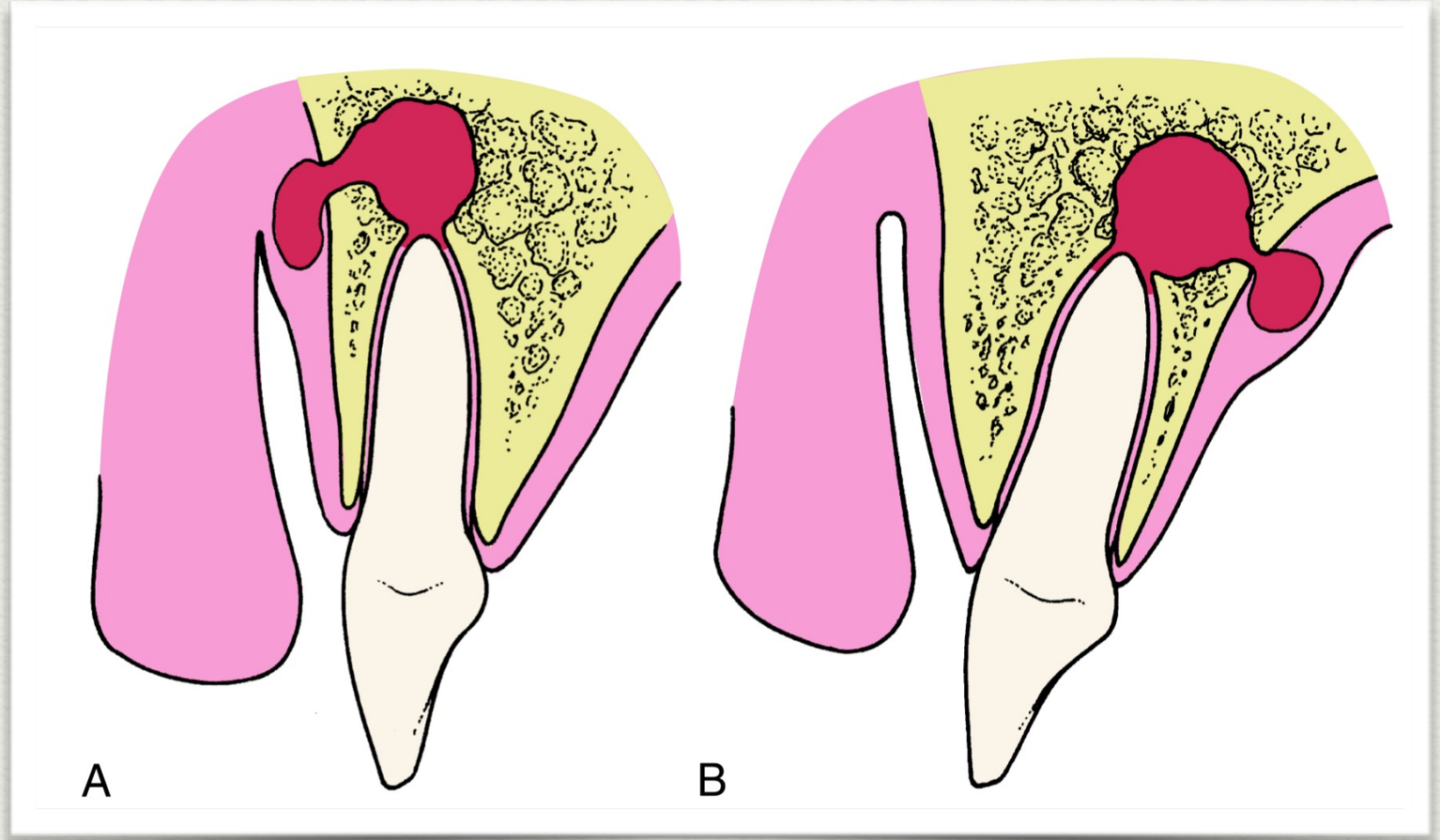
- Finally, when the abscess drains spontaneously through skin or mucosa, or it is surgically drained, the resolution stage begins as the immune system destroys the infecting bacteria, and the processes of healing and repair ensue.

Characteristic	Edema (Inoculation)	Cellulitis	Abscess
Duration	0–3 days	1–5 days	4–10 days
Pain, borders	Mild, diffuse	Diffuse	Localized
Size	Variable	Large	Smaller
Color	Normal	Red	Shiny center
Consistency	Jelly-like	Boardlike	Soft center
Progression	Increasing	Increasing	Decreasing
Pus	Absent	Absent	Present
Bacteria	Aerobic	Mixed	Anaerobic
Seriousness	Low	Greater	Less

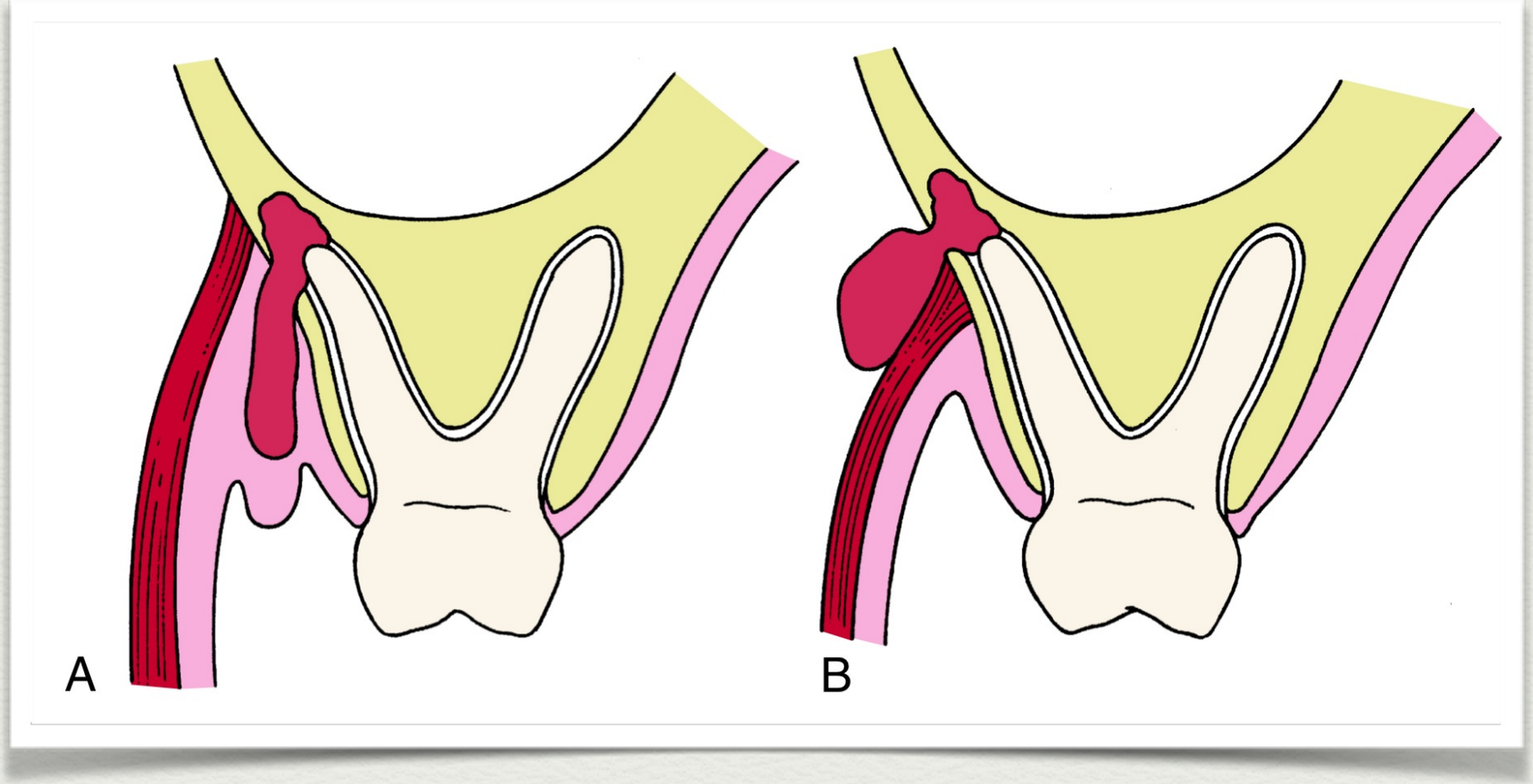
- The location of the infection arising from a specific tooth is determined by the following two major factors:
- (1) the thickness of the bone overlying the apex of the tooth and
- (2) the relationship of the site of perforation of bone to muscle attachments of the maxilla and mandible



- When infection erodes through bone, it will enter soft tissue through thinnest bone.
- A, Tooth apex is near thin labial bone, so infection erodes labially.
- B, Right apex is near palatal aspect, so palatal bone will be perforated

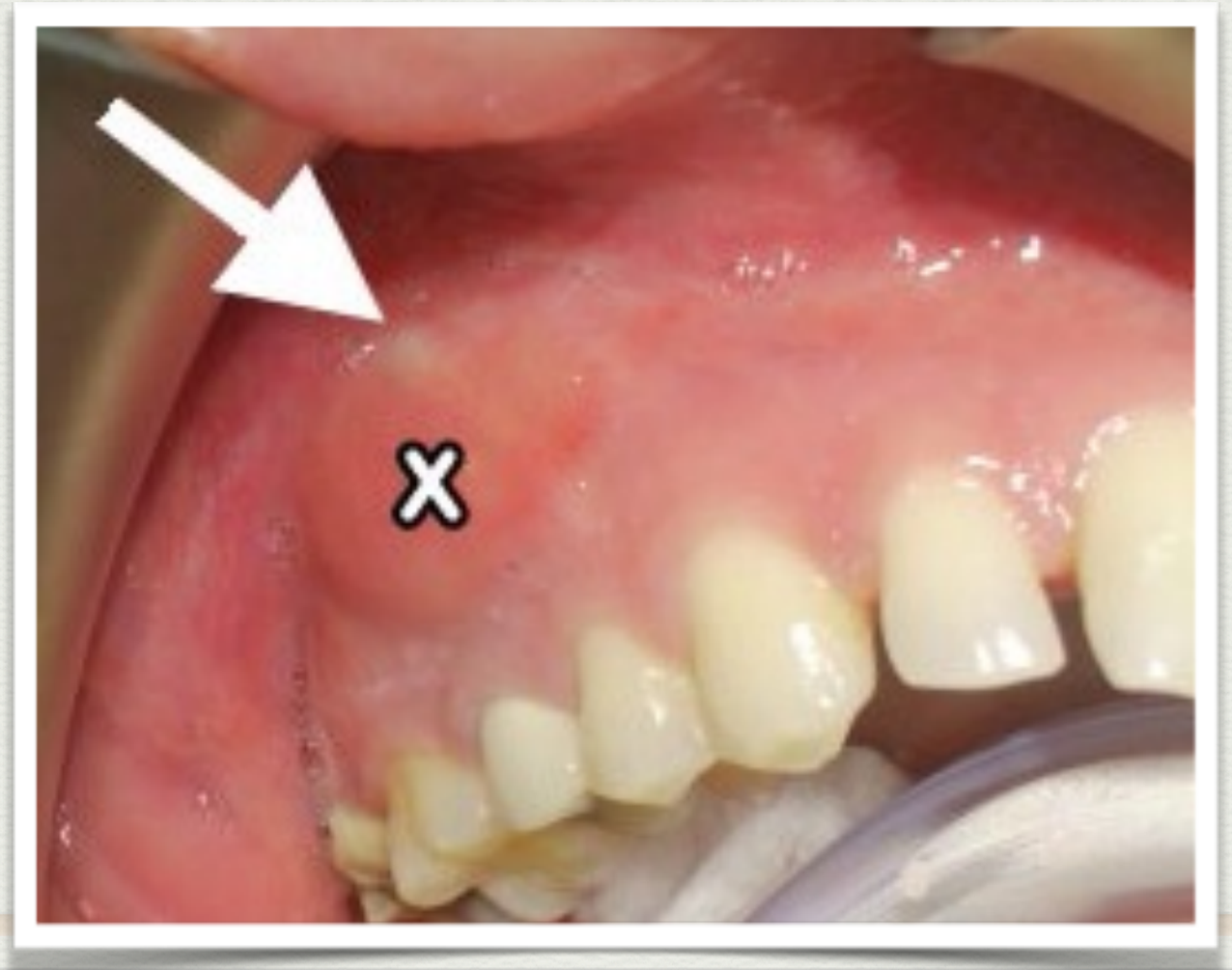


- Relationship of point of bone perforation to muscle attachment determines fascial space involved.
- A, When tooth apex is lower than muscle attachment, vestibular abscess results.
- B, If apex is higher than muscle attachment, the adjacent fascial space is involved

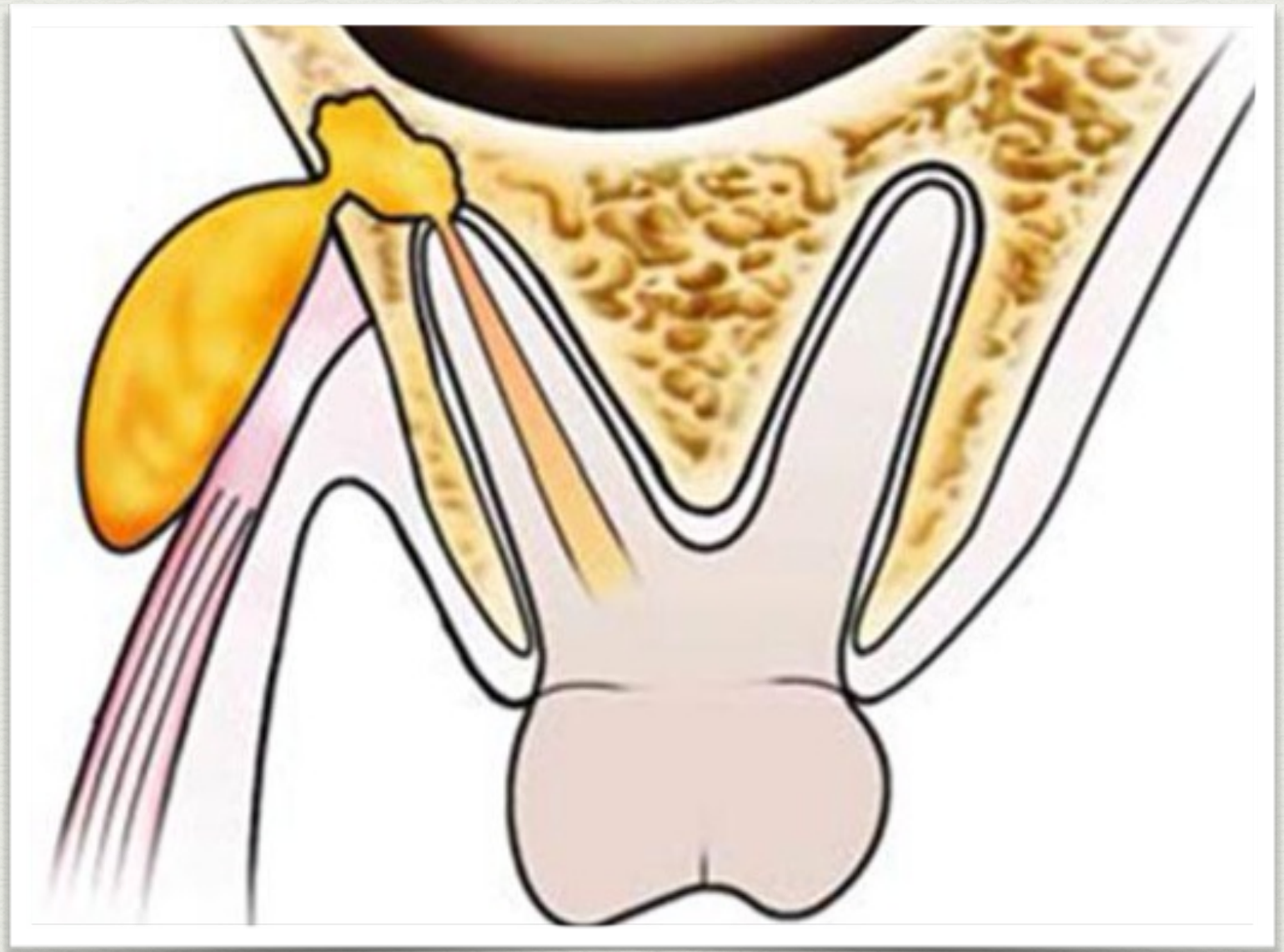


- Infections from most of the maxillary teeth erode through the facial cortical plate.

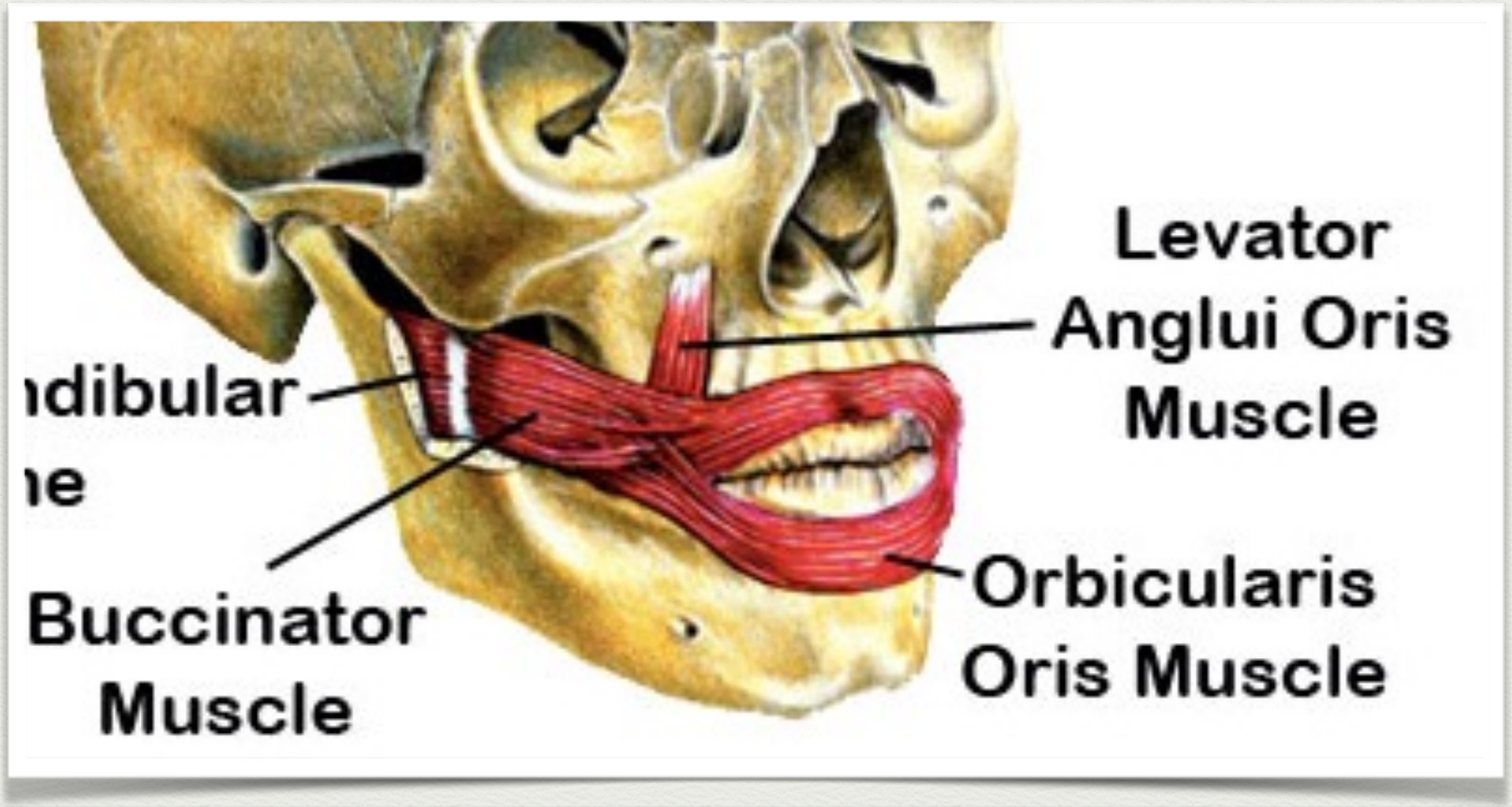
- These infections also erode through the bone below the attachment of the muscles that attach to the maxilla, which means that most maxillary dental abscesses appear initially as vestibular abscesses



- More commonly, the maxillary molars cause infections that erode through the bone superior to the insertion of the buccinator muscle, which results in a buccal space infection



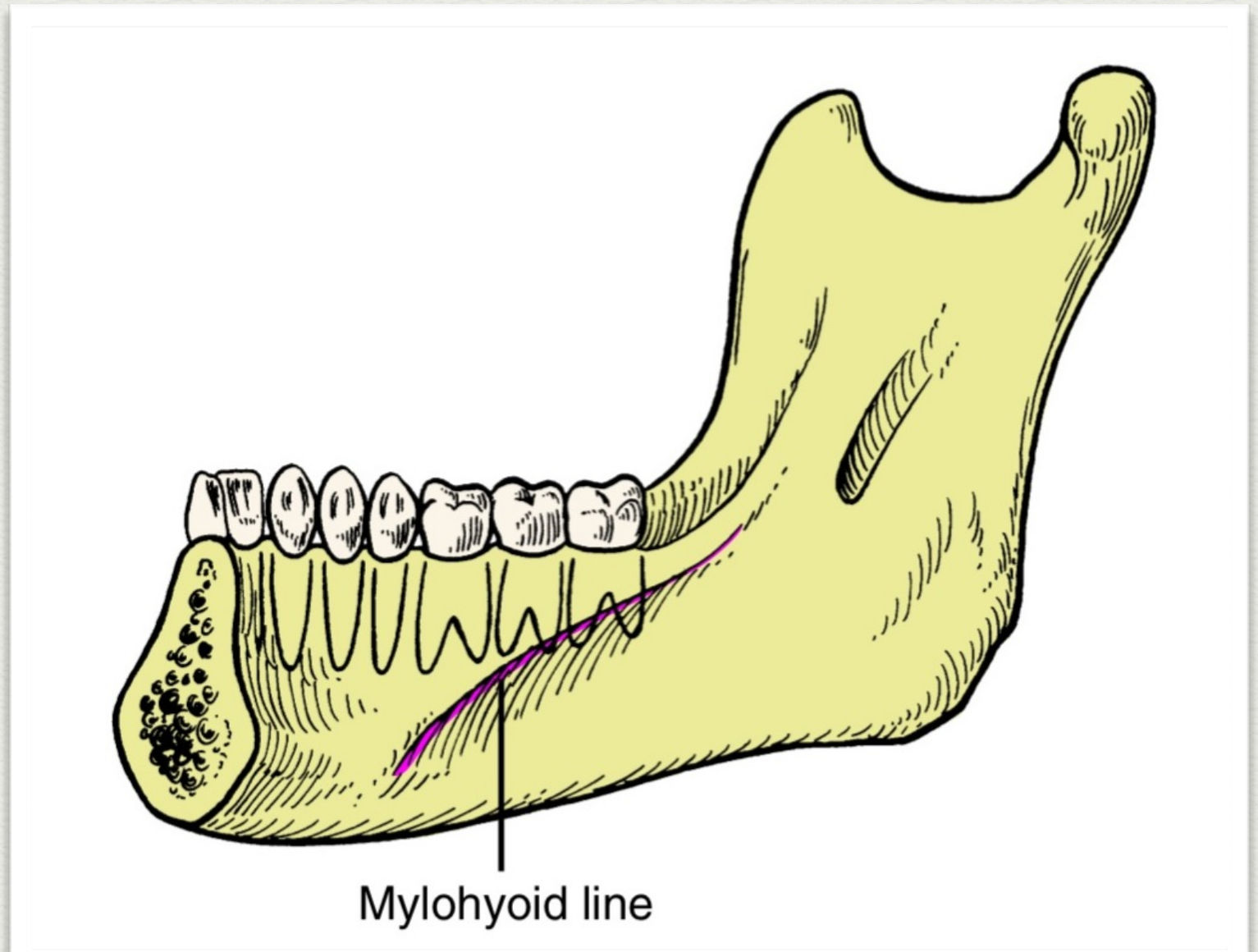
- on occasion a long maxillary canine root allows infection to erode through the bone superior to the insertion of the levator anguli oris muscle and causes an infraorbital (canine) space infection



- Mandibular molar infections erode through the lingual cortical bone more frequently than in the case of the anterior teeth.

- First molar infections may drain buccally or lingually. Infections of the second molar can perforate buccally or lingually (but usually lingually), and third molar infections almost always erode through the lingual cortical plate.

- The mylohyoid muscle determines whether infections that drain lingually go superior to that muscle into the sublingual space or below it into the submandibular space.



- The most common odontogenic deep fascial space infection is a vestibular space abscess

- Occasionally, patients do not seek treatment for these infections, and the process ruptures spontaneously and drains, resulting in resolution or chronicity of the infection

- Sometimes, the abscess establishes a chronic sinus tract that drains to the oral cavity or to skin.

- As long as the sinus tract continues to drain, the patient experiences no pain.

- Antibiotic administration usually stops the drainage of infected material temporarily, but when the antibiotic course is over, the drainage recurs

Principle 1: Determine Severity of Infection

- the dentist should ask how the patient feels in general. Patients who feel fatigued, feverish, weak, and sick are said to have malaise.

- Malaise usually indicates a generalized reaction to a moderate-to-severe infection

- Patients with severe infections have temperatures elevated to 101°F or higher (greater than 38.3°C)

- The patient's pulse rate increases as the patient's temperature increases. Pulse rates of up to 100 beats per minute (beats/min) are not uncommon in patients with infections.

- The vital sign that varies the least with infection is the patient's blood pressure.
- Only if the patient has significant pain and anxiety will an elevation occur in systolic blood pressure.
- However, septic shock results in hypotension

- The normal respiratory rate is 14 to 16 breaths per minute (breaths/min).

- Patients with mild to moderate infections may have elevated respiratory rates greater than 18 breaths/min.

toxic appearance

- Patients who have more than a minor, localized infection have an appearance of fatigue, feverishness, and malaise. This is referred to as a toxic appearance.

- Surgical treatment may range from something as straightforward as an endodontic access opening and extirpation of the necrotic tooth pulp to treatment as complex as the wide incision of the soft tissue in the submandibular and neck regions for a severe infection or even open drainage of the mediastinum.

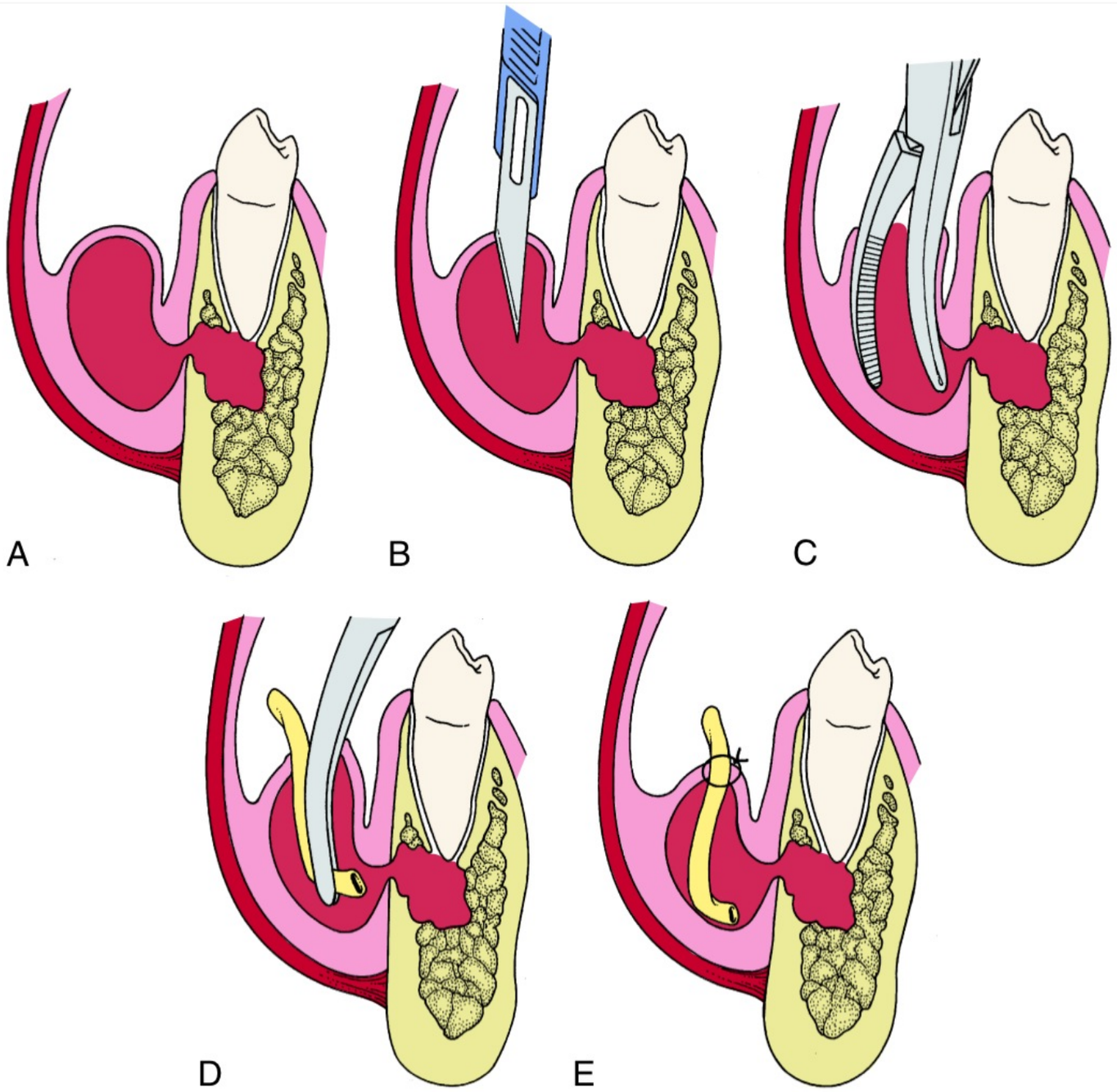


Figure 16-9 **A,** Periapical infection of lower premolar extends through buccal plate and creates sizable vestibular abscess. **B,** Abscess is incised with No. 11 blade. **C,** Beaks of hemostat are inserted through incision and opened so that beaks spread to break up any loculations of pus that may exist in abscessed tissue. **D,** A small drain is inserted to depths of abscess cavity with a hemostat. **E,** The drain is sutured into place with a single black silk suture. Note that pus usually flows out along, rather than through, a tubular drain.

Box 16-3 **Indications for Culture and Antibiotic Sensitivity Testing**

- Infection spreading beyond the alveolar process
- Rapidly progressive infection
- Previous, multiple antibiotic therapy
- Nonresponsive infection (after more than 48 hours)
- Recurrent infection
- Compromised host defenses

Determine the need for antibiotic administration

Box 16-4 **Indications for Therapeutic Use of Antibiotics**

- Swelling extending beyond the alveolar process
- Cellulitis
- Trismus
- Lymphadenopathy
- Temperature higher than 101°F
- Severe pericoronitis
- Osteomyelitis

Box 16-5 **Situations in Which Use of Antibiotics Is Not Necessary**

- Patient demand
- Severe pain
- Toothache
- Periapical abscess
- Dry socket
- Multiple dental extractions in a patient who is not immunocompromised
- Mild pericoronitis (inflammation of the operculum only)
- Drained alveolar abscess

- Odontogenic infections are caused by a highly predictable group of bacteria, and the antibiotic sensitivity of these organisms is well known and consistent

Box 16-6 **Effective Orally Administered Antibiotics Useful for Odontogenic Infections**

- Penicillin
- Amoxicillin
- Clindamycin
- Azithromycin
- Metronidazole
- Moxifloxacin

- recommending that dentists use only narrow spectrum antibiotics to treat simple infections

- Broad-spectrum antibiotics may be used for complex infections

Box 16-7 **Narrow-Spectrum and Broad-Spectrum Antibiotics**

Narrow-Spectrum Antibiotics Useful for Treating Simple Odontogenic Infections

- Penicillin
- Amoxicillin
- Clindamycin
- Metronidazole

Broad-Spectrum Antibiotics Useful for Treating Complex Odontogenic Infections

- Amoxicillin with clavulanic acid (for sinus infections)
- Azithromycin
- Tetracycline
- Moxifloxacin

Prophylaxis Against Infectious Endocarditis

Box 16-13 **Cardiac Conditions Associated with the Highest Risk of Adverse Outcome from Endocarditis for Which Prophylaxis with Dental Procedures Is Recommended**

- Prosthetic cardiac valve
- Previous infective endocarditis
- Congenital heart disease (CHD)*
  - Unrepaired cyanotic CHD, including palliative shunts and conduits
  - Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure†
  - Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
- Cardiac transplant recipients who have cardiac valvulopathy

*Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of CHD.
†Prophylaxis is recommended because endothelialization of prosthetic material occurs within 6 months after the procedure.

Box 16-15 **Dental Procedures in Which Prophylaxis Is Not Recommended**

- Restorative dentistry
- Routine local anesthetic injection
- Intracanal endodontic therapy and placement of rubber dams
- Suture removal
- Placement of removable appliances
- Making of impressions
- Taking of oral radiographs
- Fluoride treatments
- Orthodontic appliance adjustment
- Shedding of primary teeth

Table 16-6 Antibiotic Regimens for Prophylaxis of Bacterial Endocarditis

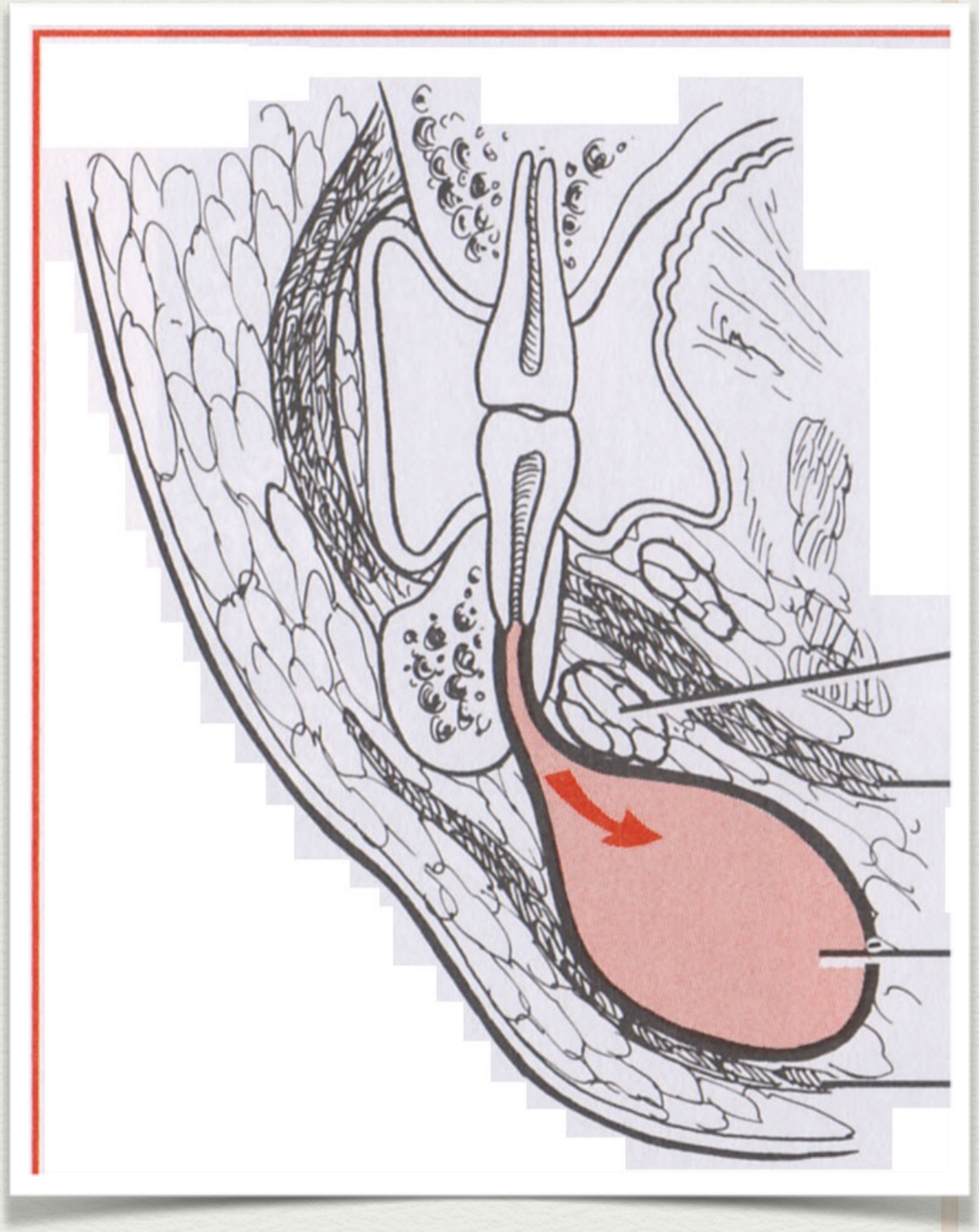
Situation	Agent	REGIMEN 30–60 MIN BEFORE PROCEDURE: Adults	Children*
Oral	Amoxicillin	2 g	50 mg/kg
Parenteral	Ampicillin	2 g IM or IV	50 mg/kg IM or IV
	Cefazolin/ ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV
Penicillin allergy, oral	Cephalexin†	2 g	50 mg/kg
	Clindamycin	600 mg	20 mg/kg
	Azithromycin/ clarithromycin	500 mg	15 mg/kg
Penicillin allergy, parenteral	Cefazolin/ ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV
	Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

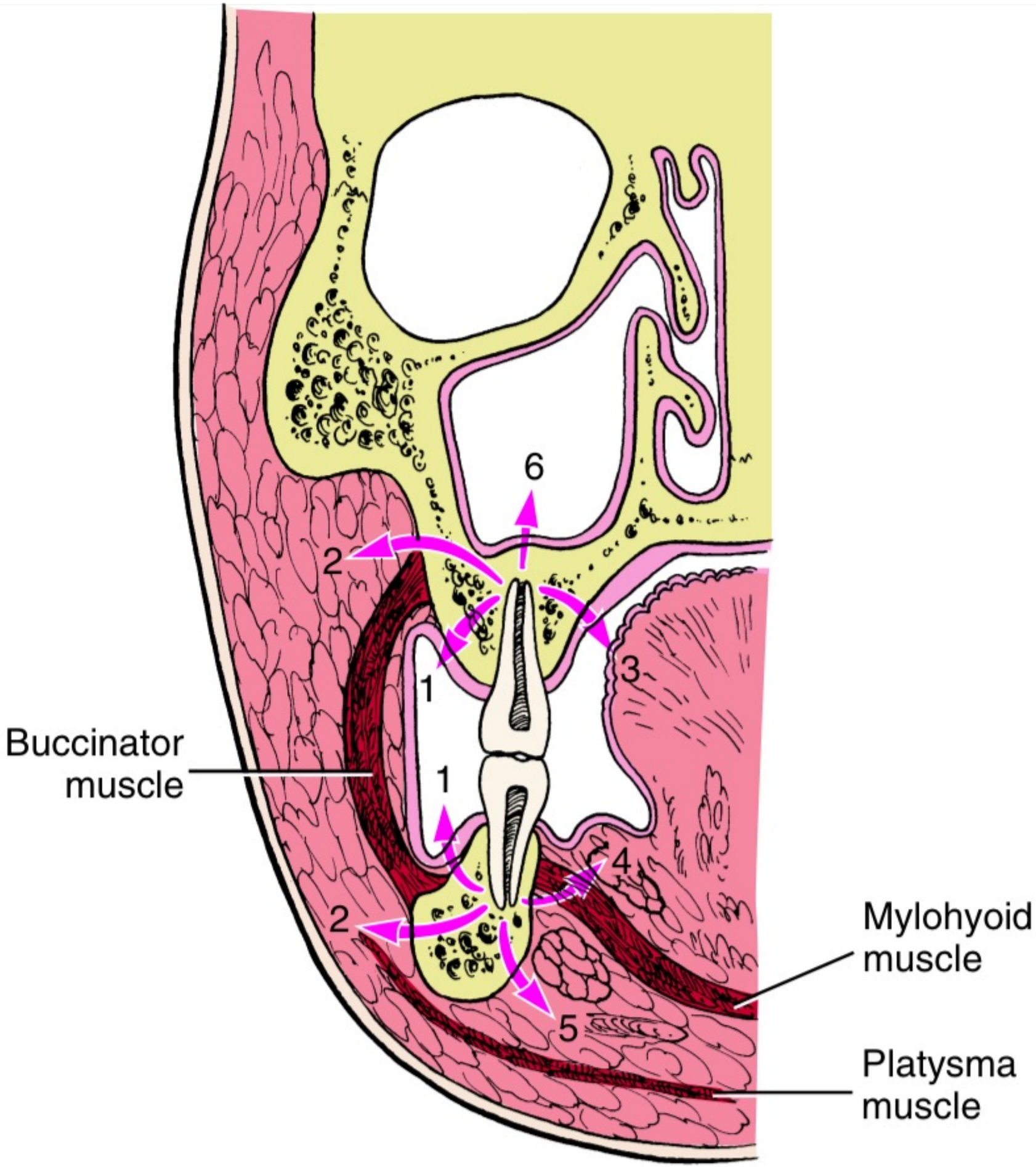
*Total children's dose should not exceed adult dose.
†Cephalosporins should not be used in patients with immediate-type hypersensitivity reaction to penicillins. Other first-generation or second-generation oral cephalosporins may be substituted in equivalent adult or pediatric doses.
IM, Intramuscularly; *IV*, intravenously.

DEEP FASCIAL SPACE INFECTIONS

- In healthy persons, the deep fascial spaces are only potential spaces that do not exist.

- The loose areolar tissue within these spaces serves to cushion the muscles, vessels, nerves, glands, and other structures that it surrounds and to allow relative movement between these structures.




6
2
1
3
1
Buccinator
muscle
4
2
Mylohyoid
muscle
5
Platysma
muscle

- The canine root is often sufficiently long to allow erosion to occur through the alveolar bone that is superior to the origin of the levator anguli oris and below the origin of the levator labii superioris muscle.

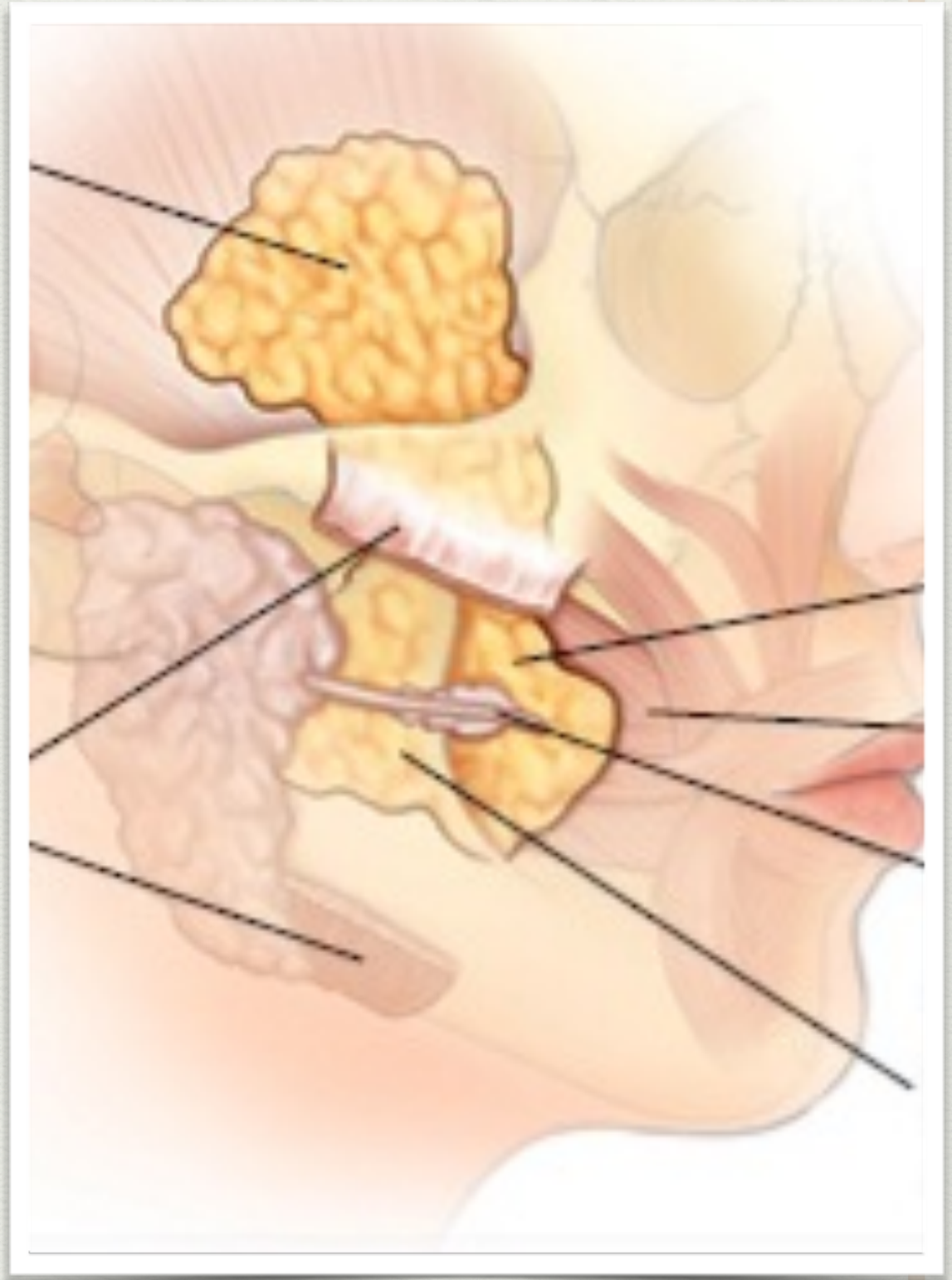
- When this space is infected, swelling of the anterior face obliterates the nasolabial fold .

- Spontaneous drainage of infections of this space commonly occurs near the medial or the lateral canthus of the eye because the path of least resistance is to either side of the levator labii superioris muscle, which attaches along the center of the inferior orbital rim

Figure 17-3 Moderate-severity infections that hinder access to the airway. **A,** Submasseteric space abscess that is causing severe trismus. **B,** Infection of the space of the body of the mandible and submandibular space. (**A,** From Topazian RG, Goldberg MH, Hupp JR, editors: *Oral and maxillofacial infections*, ed 4, Philadelphia, PA, 2002, Saunders.)

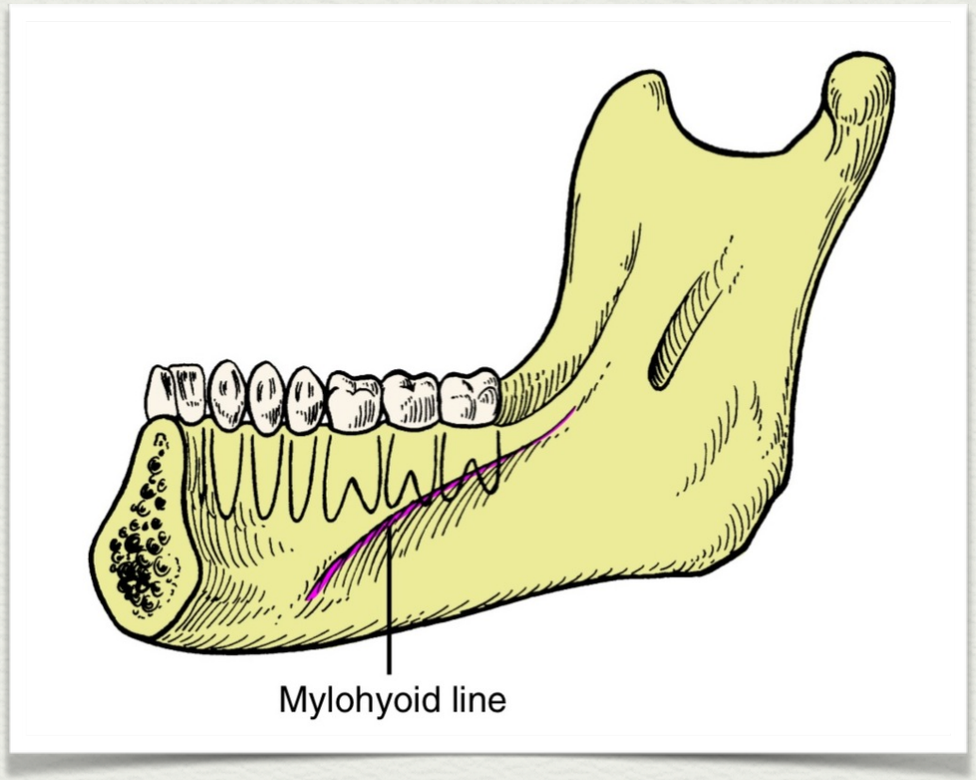
- Involvement of the buccal space usually results in swelling below the zygomatic arch and above the inferior border of the mandible.

- Infections may follow the extensions of the buccal fat pad into the superficial temporal space, the infratemporal space, the infraorbital space, and the periorbital space



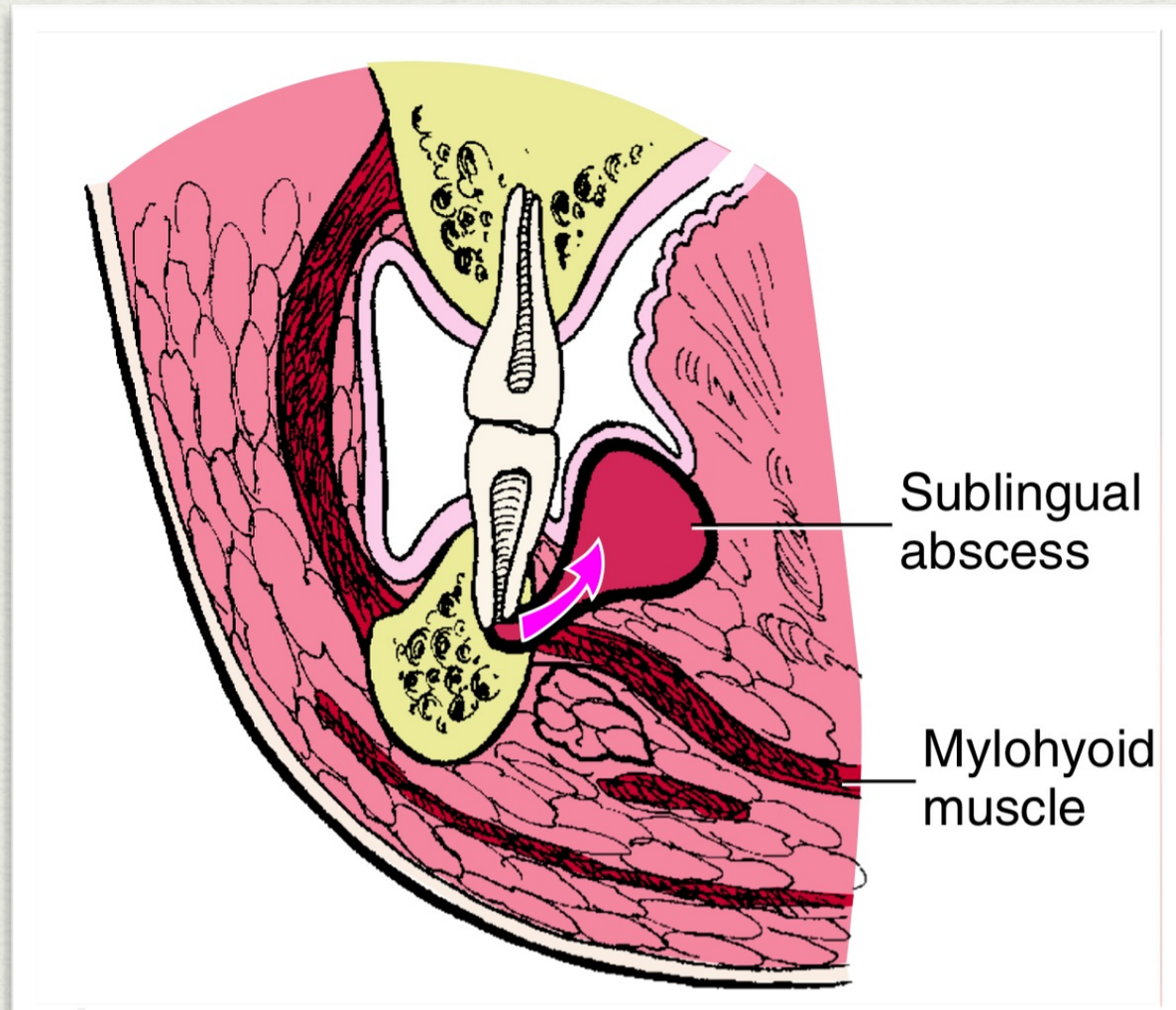
- submaxillary space as one large space , encompasses the three anatomic spaces : submandibular, sublingual, and submental spaces.

- The factor that determines whether the infection is submandibular or sublingual is the attachment of the mylohyoid muscle on the mylohyoid ridge of the medial aspect of the mandible



- The sublingual space lies between the oral mucosa of the floor of the mouth and the mylohyoid muscle.

- The posterior border of the sublingual space is open, and therefore, it freely communicates with the submandibular space

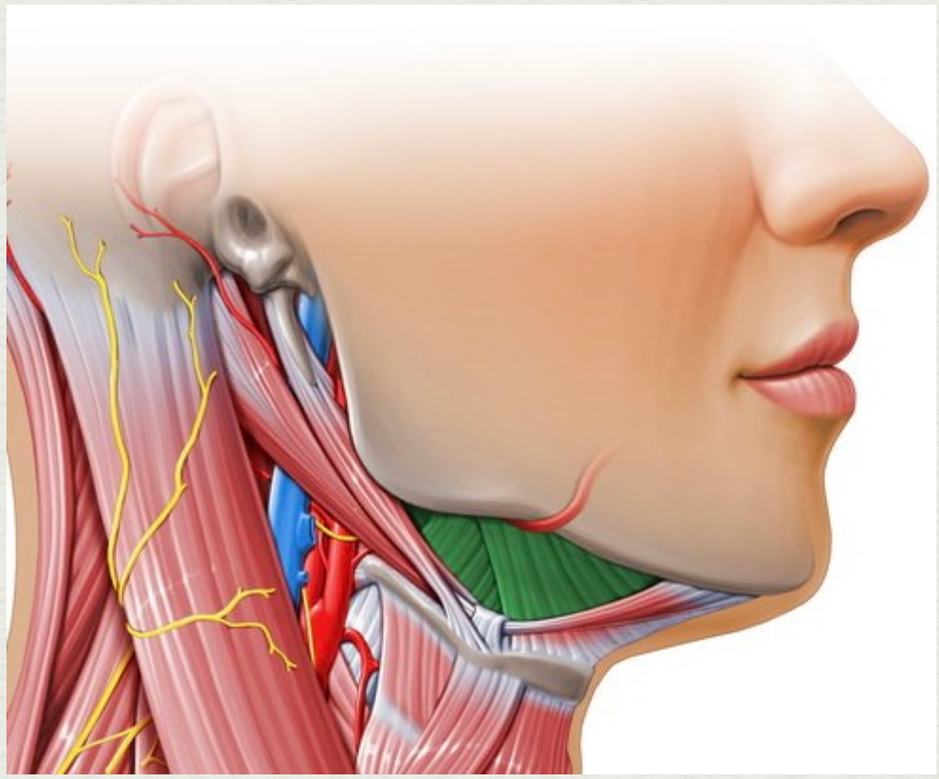


- Clinically, little or no extraoral swelling is produced by an infection of the sublingual space, but much intraoral swelling is seen in the floor of the mouth on the infected side.

- The infection often becomes bilateral, and the tongue becomes elevated

- Infection of submandibular space causes swelling that can look like an inverted triangle, with the base at the inferior border of the mandible,

- the sides determined by the anterior and posterior bellies of the digastric muscle, and the apex at the hyoid bone



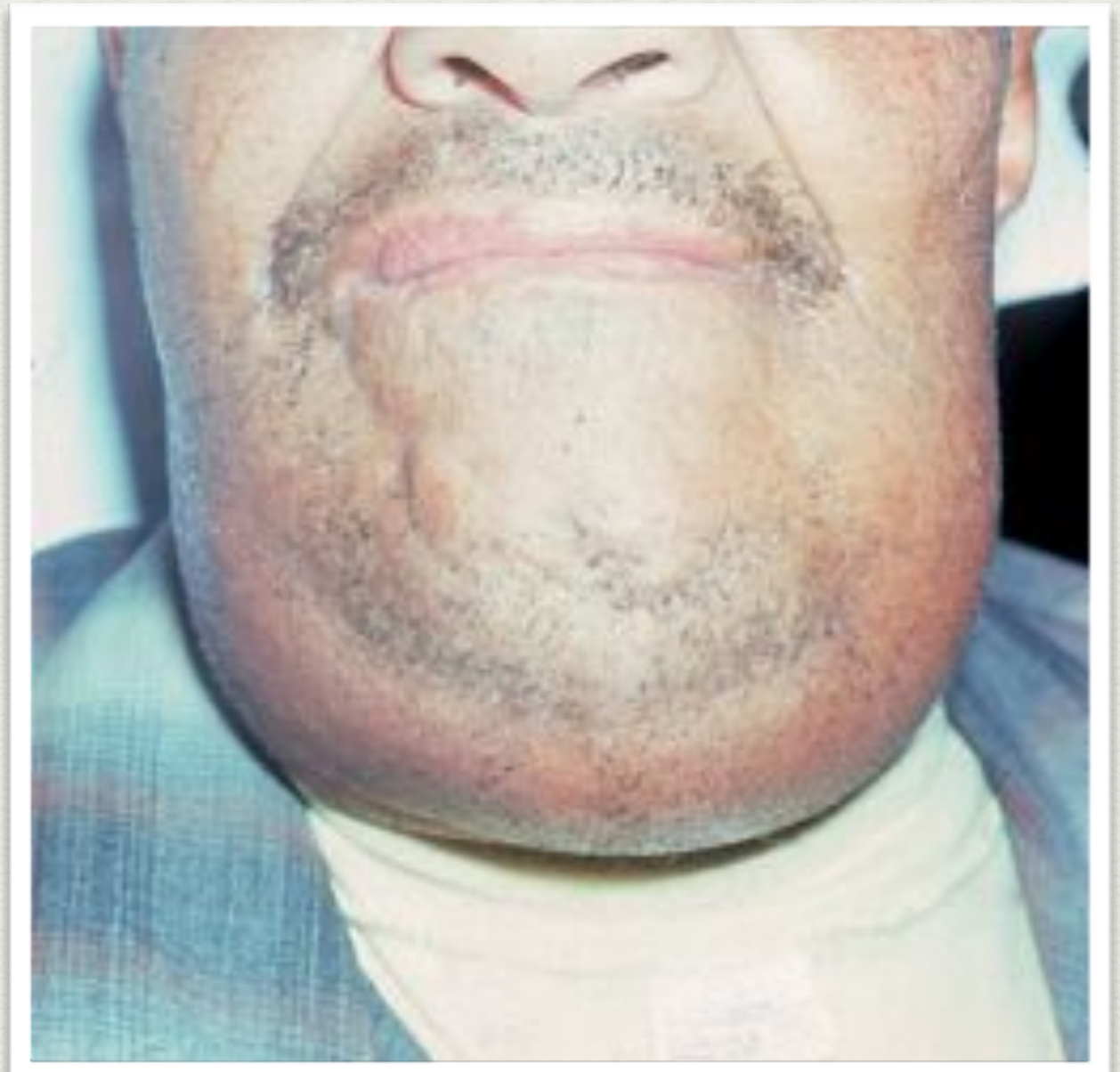
- The submental space lies between the anterior bellies of the right and left digastric muscles and between the mylohyoid muscle and the overlying fascia.

- Isolated submental space infections are rare, caused by infections of the mandibular incisors.

- More commonly, submental space involvement is the result of the spread of a submandibular space infection, which can easily pass around the anterior belly of the digastric muscle to enter the submental space.

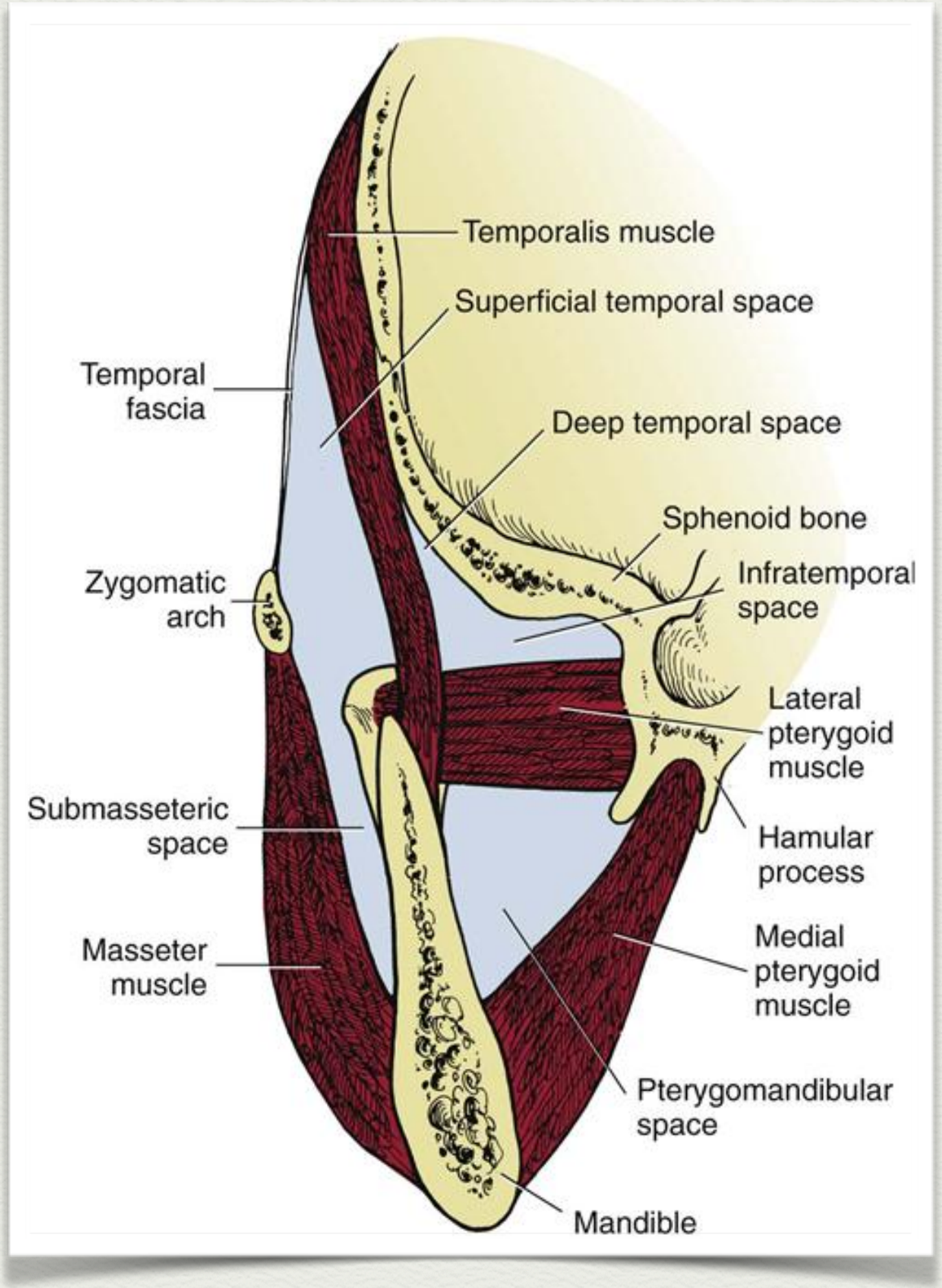
- Such an aggressive infection can then easily pass from the submental space to the contralateral submandibular space to involve all three spaces

- When the perimandibular spaces (submandibular, sublingual, and submental) are bilaterally involved in an infection, it is known as Ludwig's angina



- This infection is a rapidly spreading cellulitis that can obstruct the airway and commonly spreads posteriorly to the deep fascial spaces of the neck

- the pterygomandibular space, between the medial pterygoid muscle and the medial surface of the ascending ramus



- The pterygomandibular space is the site into which local anesthetic solution is injected when an inferior alveolar nerve block is performed.

- Infections of this space spread primarily from the mandibular third molar.

- When the pterygomandibular space alone is involved, little or no facial swelling is observed; however, the patient almost always has significant trismus.

- Therefore, trismus without swelling is a valuable diagnostic clue for pterygomandibular space infection

Necrotizing fasciitis

- it is the result of the rapid spread of infection on the superficial surface of the anterior, or investing, layer of the deep cervical fascia, just deep to the platysma muscle.

- Necrosis of the overlying platysma, subcutaneous tissue, and skin occurs because of thrombosis and occlusion of the arterioles that pass through the platysma to provide blood supply to overlying tissue.