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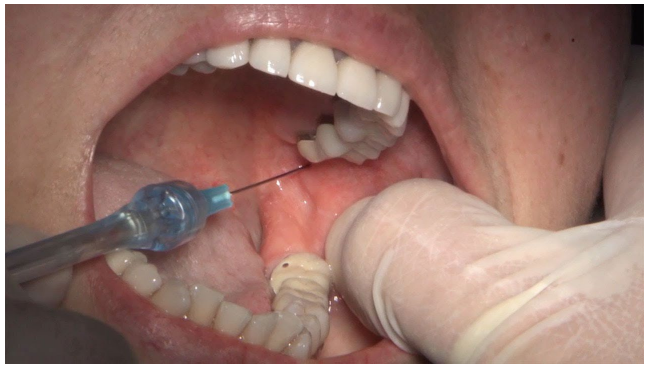


UDHS | UNIVERSITY DENTAL HOSPITAL SHARJAH
مستشفى الأسنان الجامعي بالشارقة

Complications of Local Anesthesia Lecture 1 DHS-4

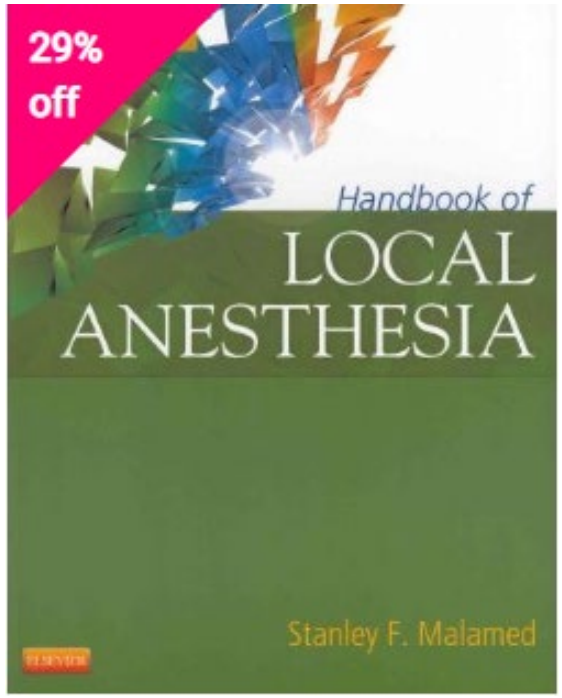
PREPARED BY:

DR. ALI AL QABBANI

LECTURER

DEPARTMENT OF CRANIOFACIAL HEALTH SCIENCES

DDS. M.SC. MAXILLOFACIAL SURGERY



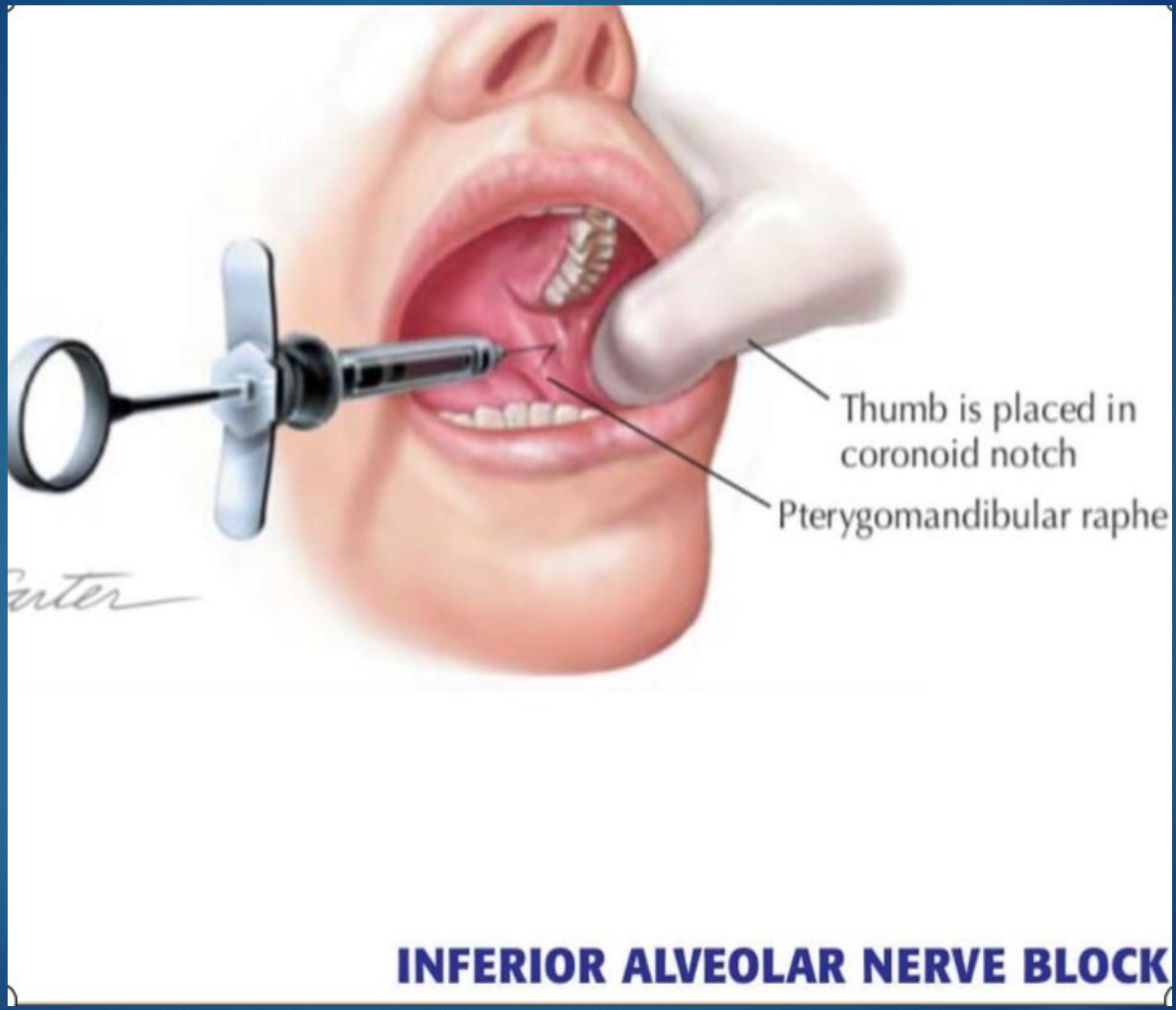
Chapter

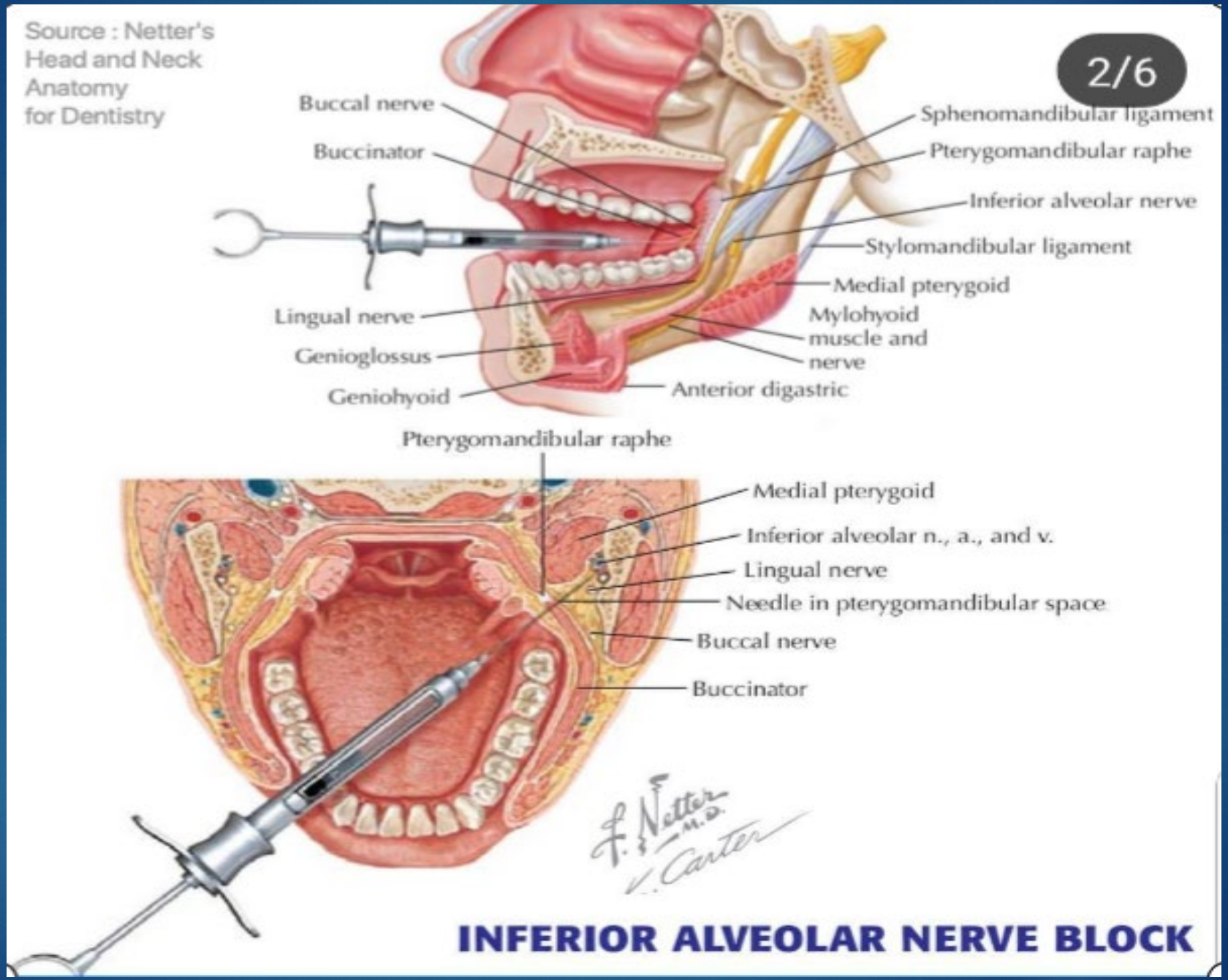
Complications Associated with Local Anesthesia in Oral and Maxillofacial Surgery

Basak Keskin Yalcin

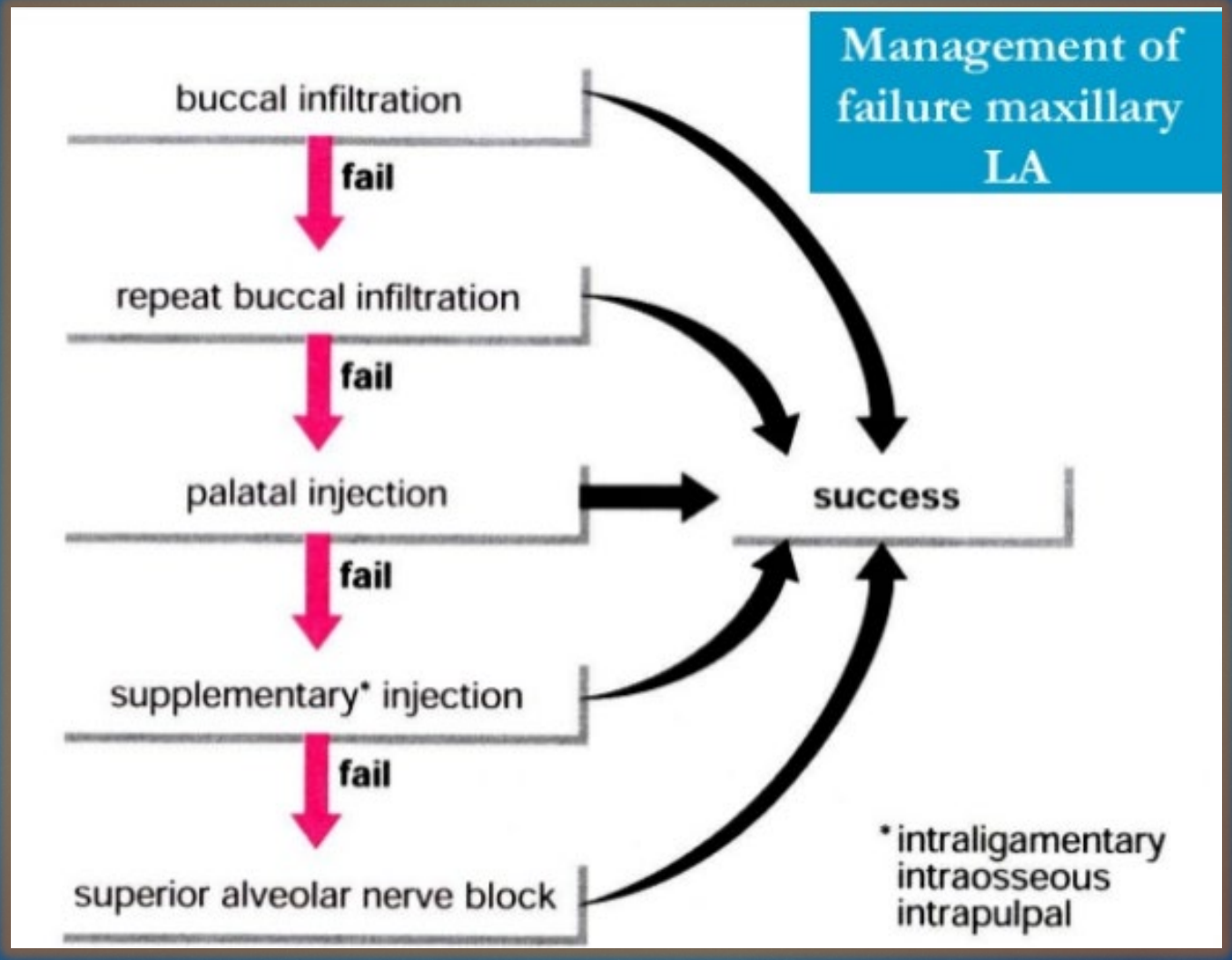
Stanley F. Malamed

References

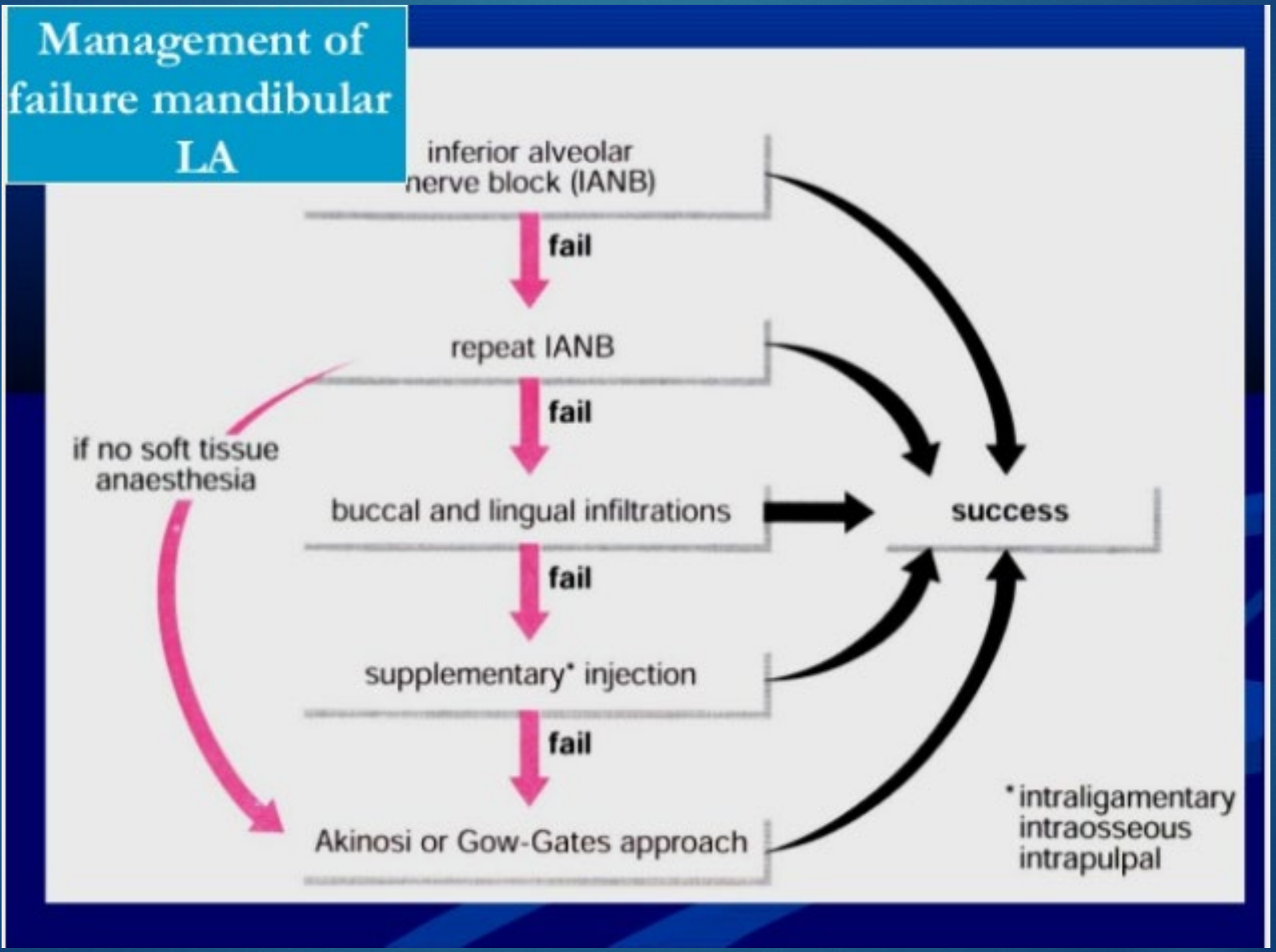

Thumb is placed in coronoid notch
Pterygomandibular raphe
INFERIOR ALVEOLAR NERVE BLOCK


Source : Netter's
Head and Neck
Anatomy
for Dentistry
2/6
Buccal nerve
Buccinator
Lingual nerve
Genioglossus
Geniohyoid
Sphenomandibular ligament
Pterygomandibular raphe
Inferior alveolar nerve
Stylomandibular ligament
Medial pterygoid
Mylohyoid
muscle and
nerve
Anterior digastric
Pterygomandibular raphe
Medial pterygoid
Inferior alveolar n., a., and v.
Lingual nerve
Needle in pterygomandibular space
Buccal nerve
Buccinator
F. Netter M.D.
J. Carter
INFERIOR ALVEOLAR NERVE BLOCK

Management of failure of Maxillary Anesthesia



Management of failure of Mandibular Anesthesia



Definition of complications of local anesthesia in dental practice

- Any deviation from the normally expected pattern during or after administering the local anesthesia

Complications of local anesthesia

PRE OPERATIVE EVALUATION

One of the important attempts in clinical oral surgery practice is to maintain safe and effective local anesthesia. Dental procedures are frequently performed under local anesthesia; thus, drug-related complications are often encountered.

SELECTION OF PROPER LOCAL ANETHESIA

Complications of local anesthesia

- **"The practitioner should be aware of the possible complications and management methods. The aim of this lecture is to review the local and systemic complications associated with the local anesthetic in oral and maxillofacial surgery practice".**

Causes of failure to achieve local anesthesia

- Wrong techniques
- Inadequate dose
- Anatomical variations
- Injection into blood vessels
- Infection → sepsis → acidity
- Patient immaturity

COMPLICATIONS OF LOCAL ANESTHESIA

- **SYSTEMATIC COMPLICATIONS**

- **LOCAL COMPLICATIONS**

Complications of local anesthesia

Common local complications associated with local anesthesia are reported as:

1. **needle fracture**
2. **Pain at injection**
3. **prolongation of anesthesia and various sensory disorders,**
4. **lack of effect,**
5. **trismus,**
6. **infection,**
7. **edema,**
8. **hematoma,**
9. **gingival lesions**
10. **soft tissue injury**
11. **ophthalmologic complications.**

Complications of local anesthesia

Complications associated with local anesthetics can be evaluated systemically and locally.

Common systemic reactions due to local anesthesia are reported as

1. Psychogenic reactions,

2. Systemic toxicity,

3. Allergy

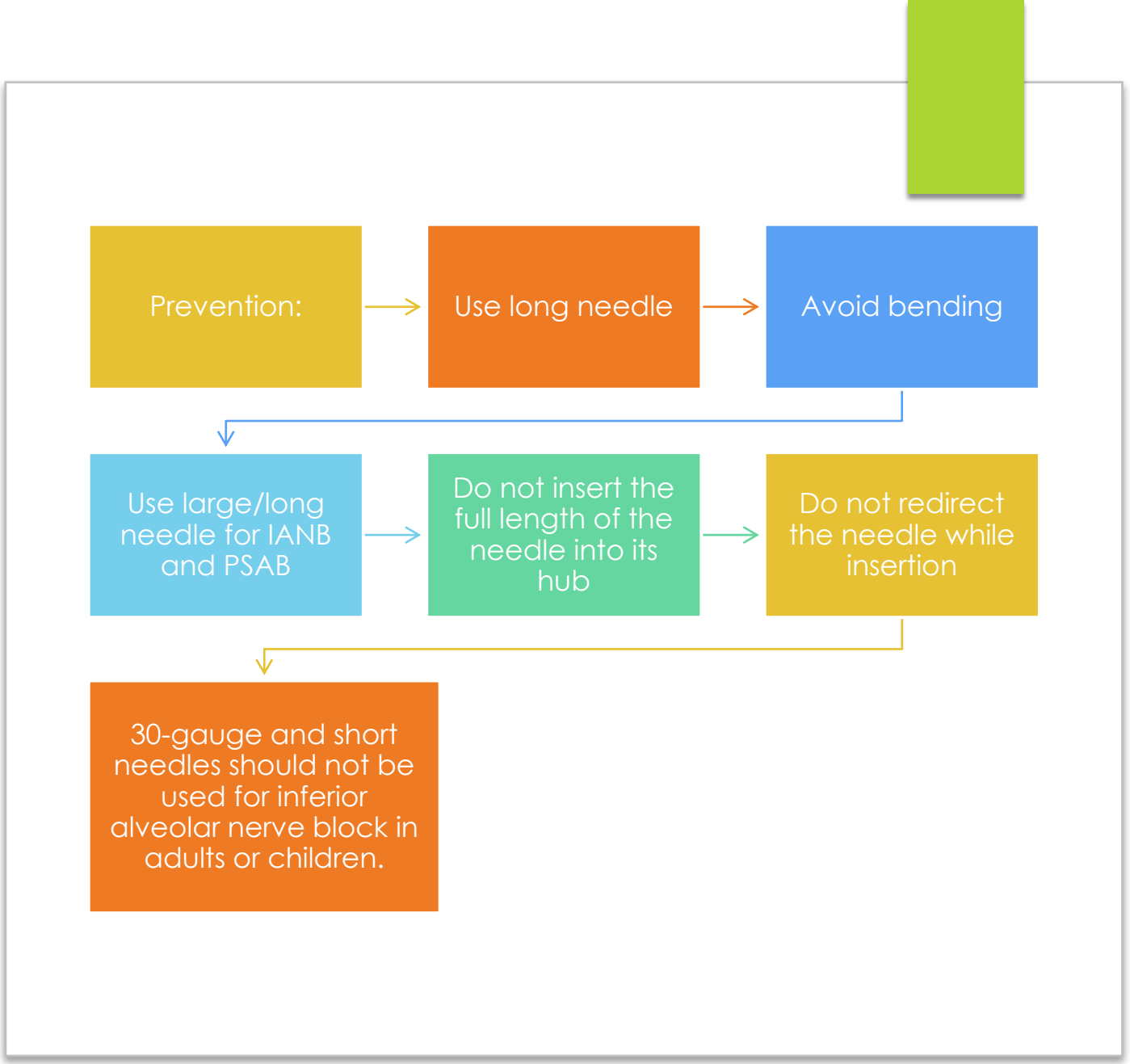
4. Methemoglobinemia.

Needle Breakage

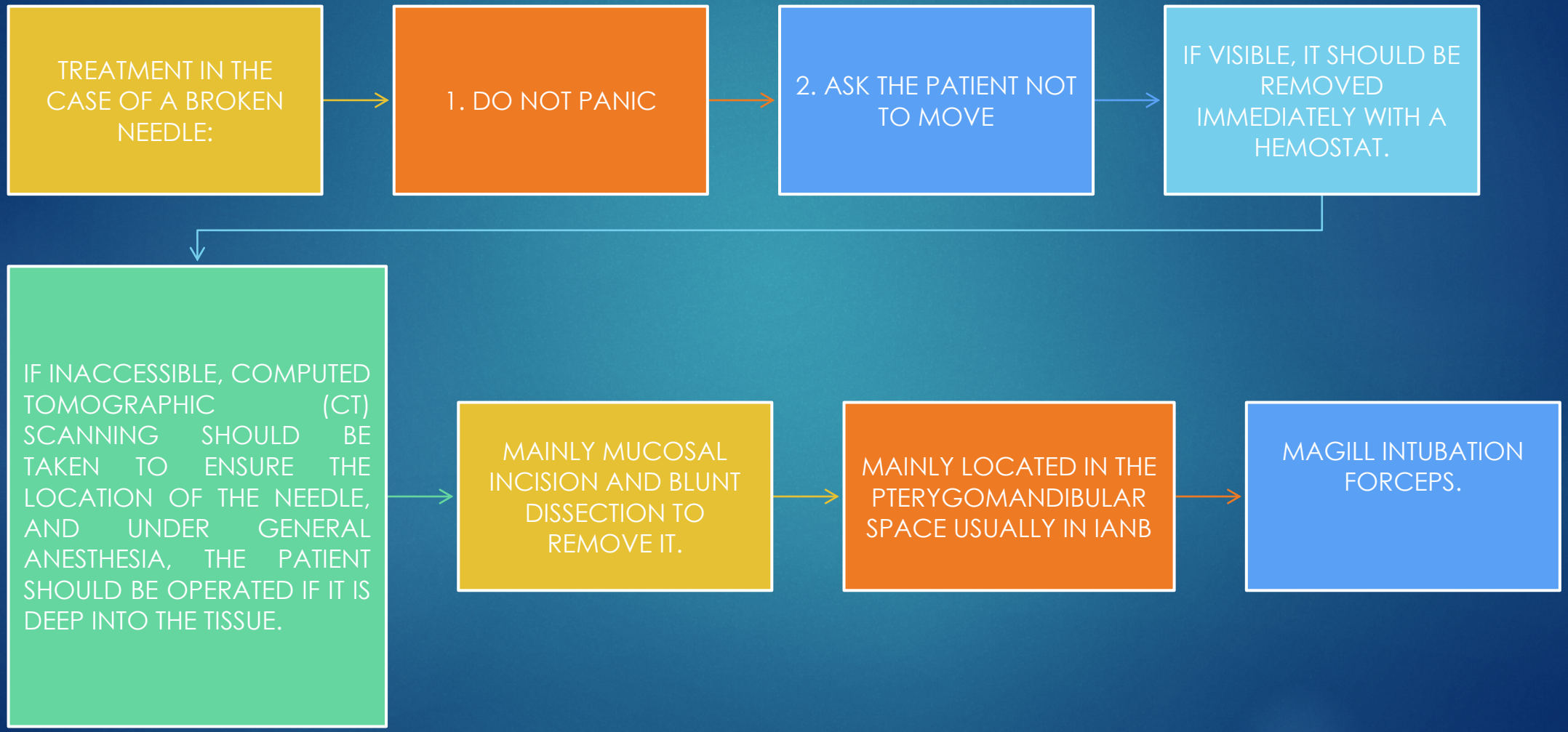
- Very Rare because of using disposable needles
- Causes:
- Unexpected move of the patient head
- Bending of the needle
- Full insertion of the needle
- Use of smaller needles
- Manufacturing defect
- Happens with 30-gauge needles

and during inferior alveolar nerve block.

Needle Breakage



Needle Breakage



Magill intubation forceps

Pain on Injection

- Due to many reasons:
- 1. Temperate of the solution
- 2. Velocity of injection
- 3. Dull needles
- 4. Aggressive insertion of the needle, damaging soft tissues, blood vessels, nerves, or the periosteum and causing more pain and other complications.
- Be gentle in introducing the needle.

Pain on Injection

- Lidocaine causes an intense burning sensation when injected locally.
- When the needle penetrates a nerve, the patient may also feel a sudden "electric" shock.

- In order to prevent discomfort, topical anesthetic application, warming anesthetics to body temperature, using a smaller-gauge needle (27 gauge), switching to a new needle when you have to inject multiple times in the same lesion or when you have multiple injection sites, and injecting slowly and with low pressure which reduces pain are done. A rate of 30 seconds per mL of solution is recommended.

Prolongation of anesthesia and various sensory disorders

- Prolonged anesthesia, paresthesia, or neuralgia may occur following dental local anesthetic blocks. This may be temporary, where after a few days, weeks, or months, sensation returns or it may be permanent.
- The nerve may be damaged during injection by direct injury, or the needle may damage the intraneural blood supply, resulting in a hematoma, or the needle may traumatize the medial pterygoid muscle which results in trismus.
- Neurotoxicity of the local anesthetic is another theory for nerve damage. Procaine and tetracaine cause more damage than bupivacaine or lidocaine. Paresthesia or neuralgia complication is mostly transient but may also be permanent if the anesthetic solution is injected directly into the nerve.

Prolongation of anesthesia and various sensory disorders

- To the FDA Adverse Event Reporting System; about 573 cases of paresthesia and dysesthesia after local anesthetics between 2004 and 2011 were performed. They concluded that the use of prilocaine, articaine, or both drugs has a higher risk of paresthesia.
- In order to decrease local anesthesia-dependent nerve injury, Avoiding high concentration of anesthetic agent for inferior alveolar nerve blocks (use 2% lidocaine as standard).
- The use of a low daily dose of multivitamin B, to regaining nerve healing and function, has been recommended

Lack of effect

- **Reasons for unsuccess in obtaining local anesthesia :**
- Anatomical variations (accessory nerve supply, alteration in foramen location, atypical development of the nerves (bifid mandibular canals), and bone density.
- Pathological and psychological factors (Pathological reasons for the failure of anesthesia are trismus, infection, inflammation, and previous surgery or trauma.
- Inflammatory diseases altering the pharmacokinetics and pharmacodynamics of local anesthetics cause a response to decrease and unfavorable effects to increase)
- Choice of technique and solution
- Poor technique.

Lack of effect

- 1. Pulpitis and apical periodontitis
- 2. Acute periodontal abscess pericoronitis
- 3. Psychological determinants such as anxiety can also cause local anesthesia failure
- Poor technique failure mostly occurs to obtain mandibular anesthesia. If the needle is inserted and advanced too deeply and too far dorsally, the terminal branches of the facial nerve within the deep lobe of the parotid gland are affected (facial nerve paralysis).

Lack of effect

- Direct anesthesia to the facial nerve reflex vasospasms of the external carotid artery can lead to ischemia of the facial nerve, so facial nerve palsy paralysis occurs immediately after mandibular anesthesia injection.
- The patient is unable to wrinkle the forehead, raise the eyebrow, close the upper eyelid, retract the commissure of the lips to smile, and turn down the lower lip on the affected side.
- The removal of contact lenses and closing of the eye on the affected side in Bell's palsy prevent corneal abrasion or drying.

- Immediate onset or lately sometimes.

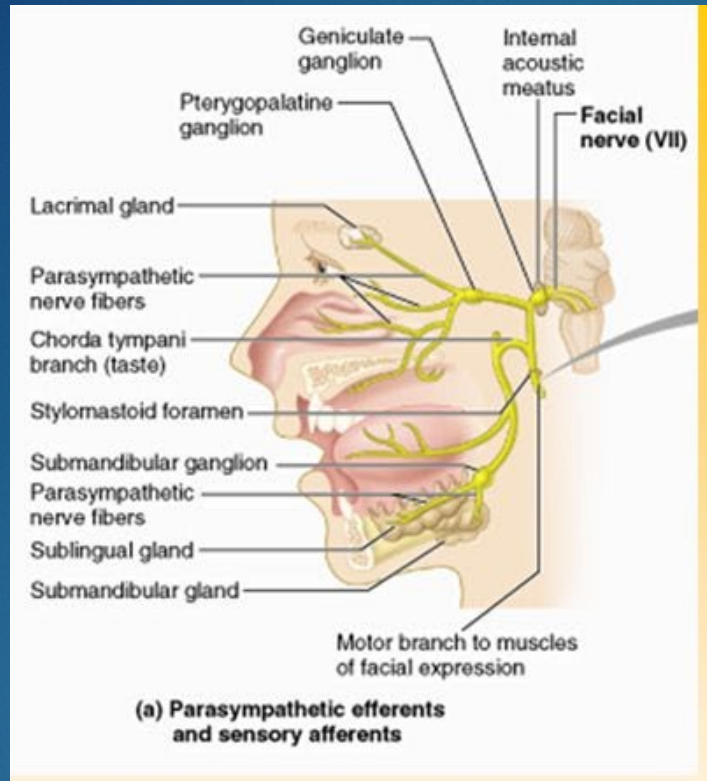
Facial Nerves (VII)

Both (sensory and motor)

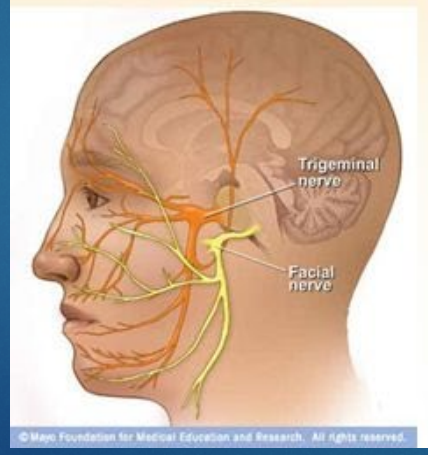
Muscles of facial expression: temporal, zygomatic, buccal, mandibular, cervical (m)

Taste buds (anterior) (s)

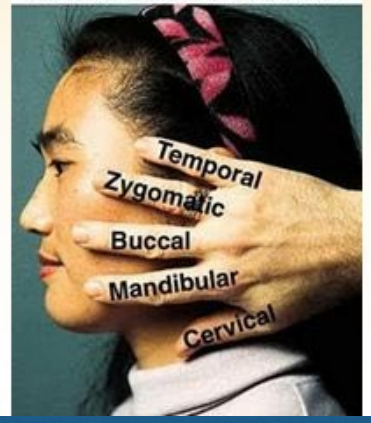
Imbalance: Bell's Palsy – paralysis of facial muscles on affected side and partial loss of taste sensation; Lower eyelid droops, corner of mouth sags, tears drip continuously from eye and eye cannot be completely closed

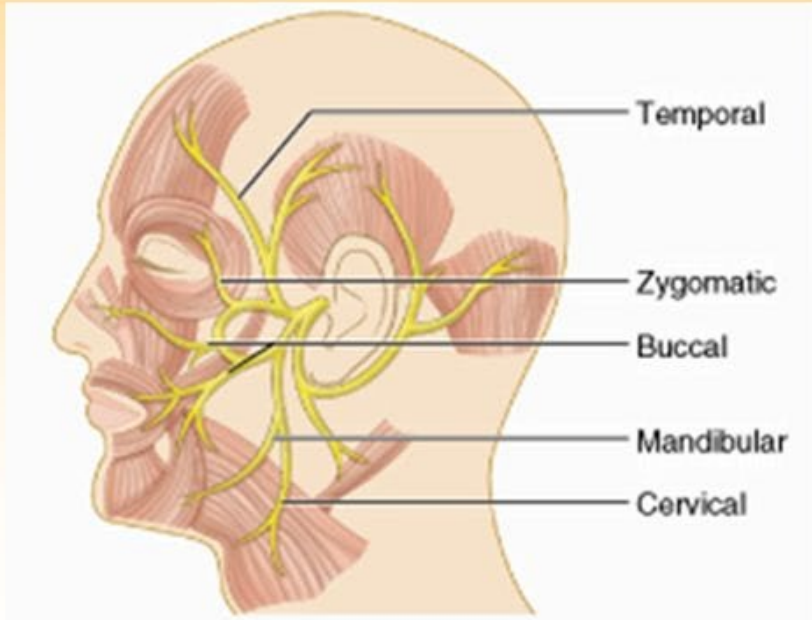


(a) Parasympathetic efferents and sensory afferents



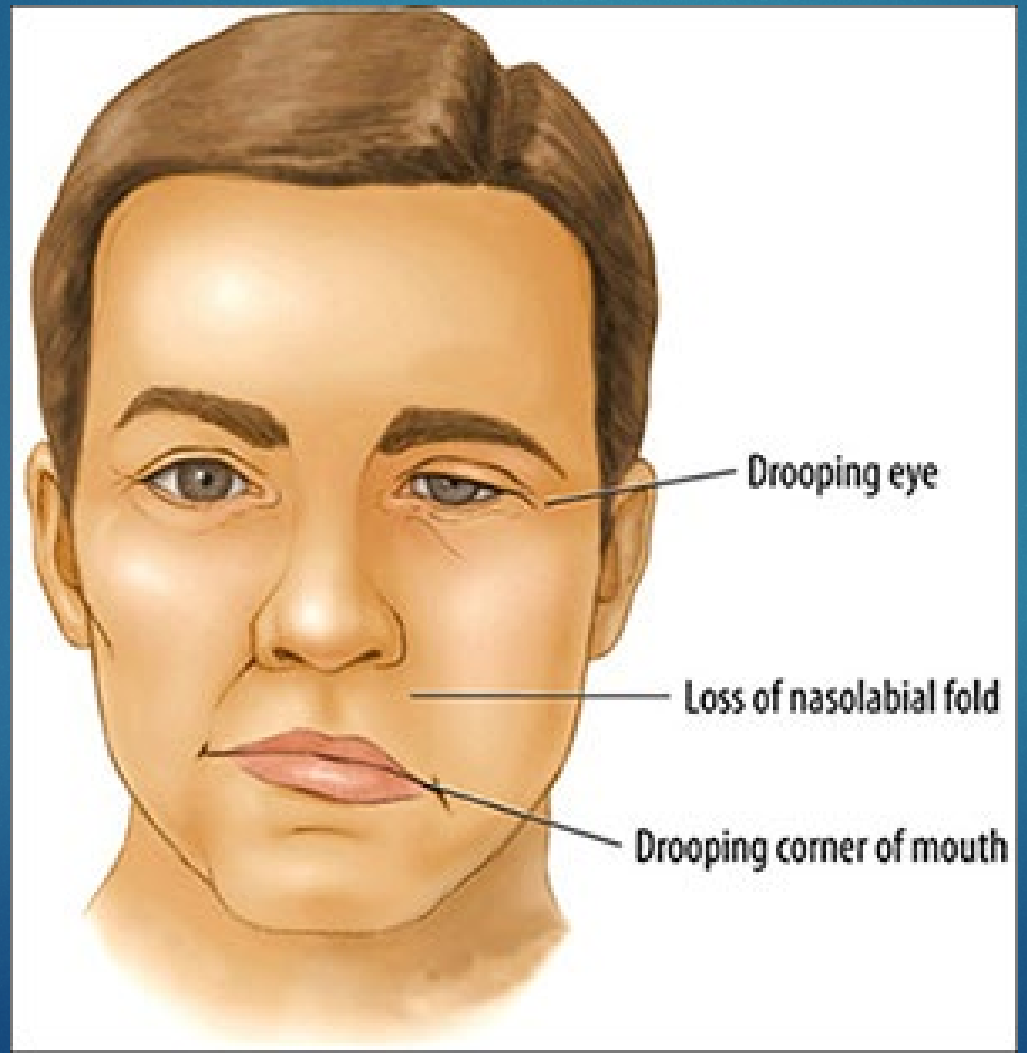
Branches of the Facial Nerve





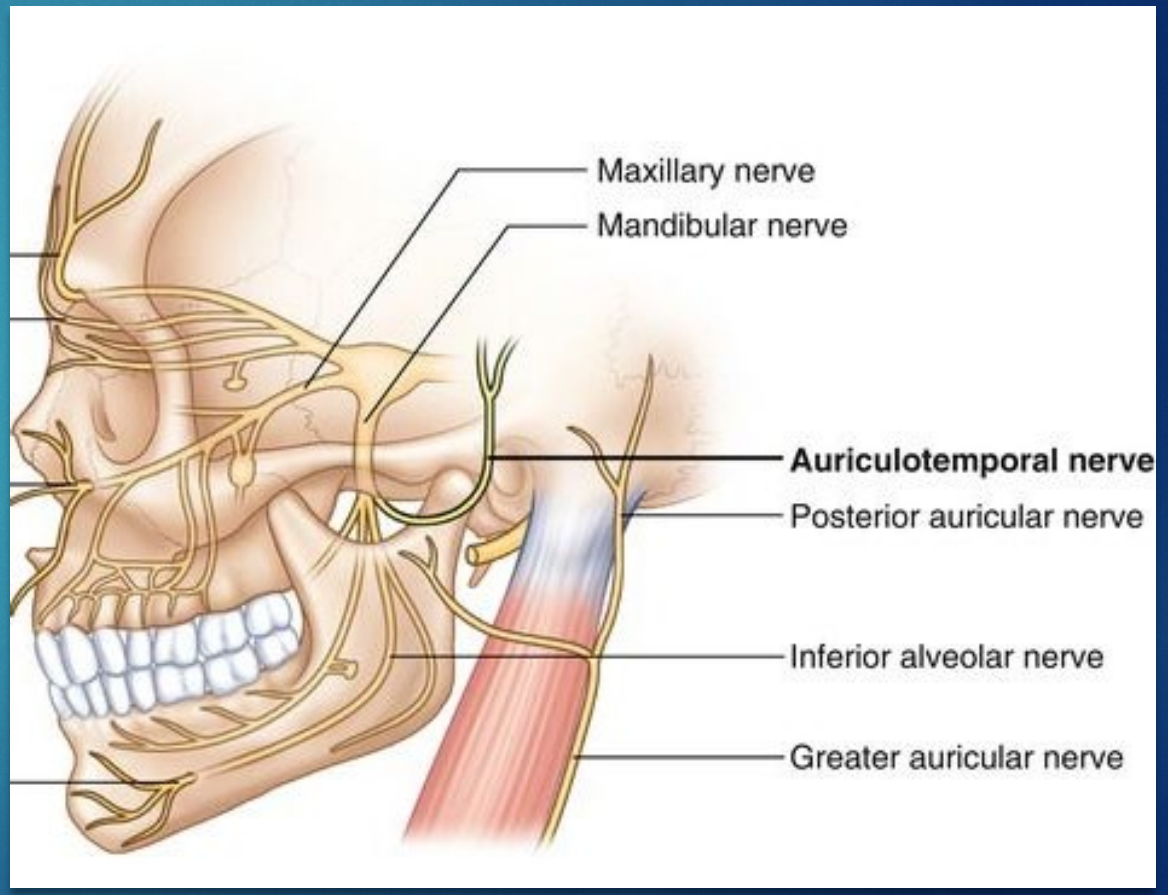
(b) Motor branches to muscles of facial expression and scalp muscles

Clinical presentations of facial palsy Bells pulsy



Lack of effect

- If the needle is inserted too high and deep, N. auriculotemporalis will be affected, and the feeling of "numbness" will occur. There has been a report of sudden unilateral deafness following inferior dental nerve anesthesia.



Trismus

- is defined as a painful circumstance with inability to open the mouth normally.
- Several factors cause trismus such as:
- 1. multiple injections in a short period of time in the same area,
- 2. intramuscular injections inside the muscle
- 3. trauma to muscles (either the lateral pterygoid muscle or the temporal muscle) which cause hematoma formation and fibrosis.

Trismus

- 4. Needle fracture in the muscles inserting to styloid process,
- 5. Inaccurate positioning of the needle when giving the inferior nerve block or maxillary posterior injections
- 6. Inflammation of the masseter muscles, a low-grade infection, and excessive volumes of local anesthetic solution deposited into a bounded region which cause expansion of tissues.

Trismus

- Treatment :
- Most cases will resolve spontaneously
- Heat therapy
- Soft diet;
- Prescription of analgesics, anti-inflammatory drugs, antibiotics, muscle relaxants; or physiotherapy. Trismus caused by an infection needs to be treated by antibiotics.
- Usually, trismus will resolve in 6 weeks, with a range of 4 to 20 weeks.

Trismus

- Awareness of the anatomical landmarks and muscles: palpation of bony anterior ramus for temporalis muscle, pterygomandibular fold for pterygoid muscle, and appropriate angulation of the needle and bone contact before injecting are good methods for avoiding trismus via local anesthesia.

- Intraorally the Vazirani-Akinosi technique, the closed-mouth mandibular nerve block technique, or extraoral techniques can provide anesthesia to trismus patients .

Infection

- Infection complication is rare since the usage of disposable needles and glass cartridges. Infection may extend to tissues by penetration of the needle through a contaminated tissue, because of the needle being contaminated before an operation or improper preparation of local anesthetic diluted solutions.

- The area to be penetrated should be cleaned with a topical antiseptic prior to insertion of the needle. Antiseptic mouthwash solutions such as chlorhexidine gluconate should be considered for all regional techniques.

Infection

- Injecting local anesthesia during the presence of infection is important to increase the pH of anesthetic agent in order to increase efficiency because the infected tissue is more acidic.
- This process is called anesthetic buffering and leads to patient comfort during injection, fast onset of anesthesia, and lower post injection tissue injury.

- Recommendation for treatment of infection is antibiotics (penicillin V 500 mg every 6 hour for 7–10 days), analgesics, heat, drainage, and physiotherapy.