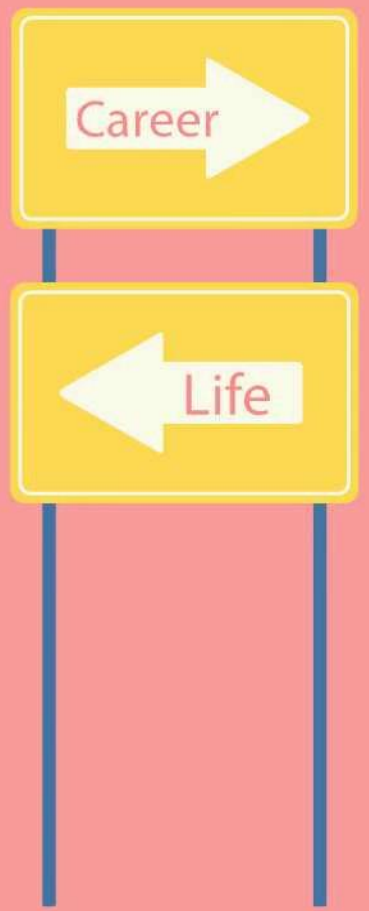
LOCAL COMPLICATIONS OF THE LOCAL ANESTHESIA



By assist. Lec.
Abrar Nizar Alattar

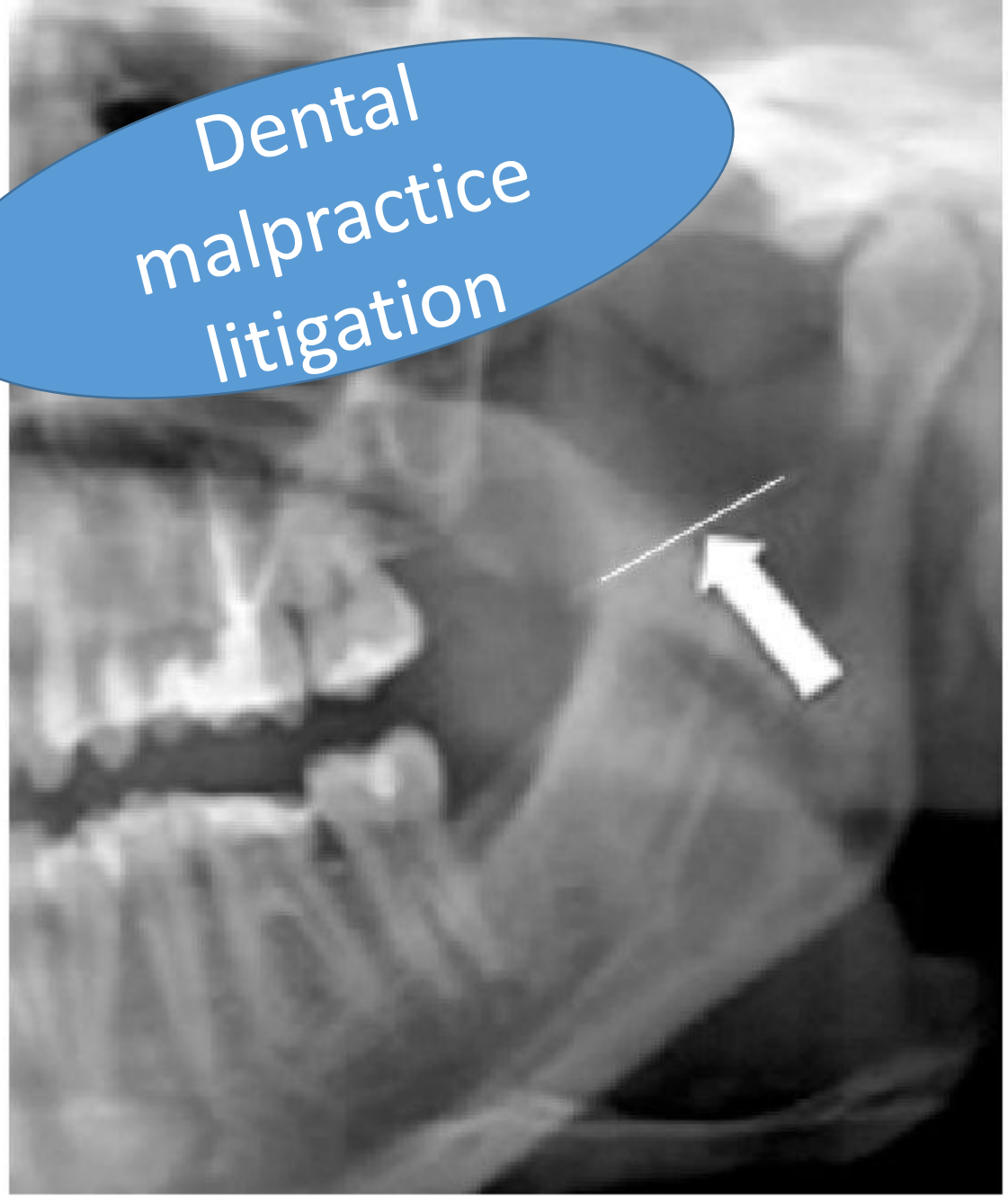

If you failed to plan
Then you are
planning for failure

Complications of local anesthesia

- Needle breakage
- Prolonged anesthesia (paresthesia)
- Facial nerve paralysis
- Ocular complications
- Trismus
- Soft tissue injury
- Hematoma
- Pain on injection
- Burning on injection
- Infection
- Edema
- Sloughing of tissues
- Postanesthetic intraoral lesions

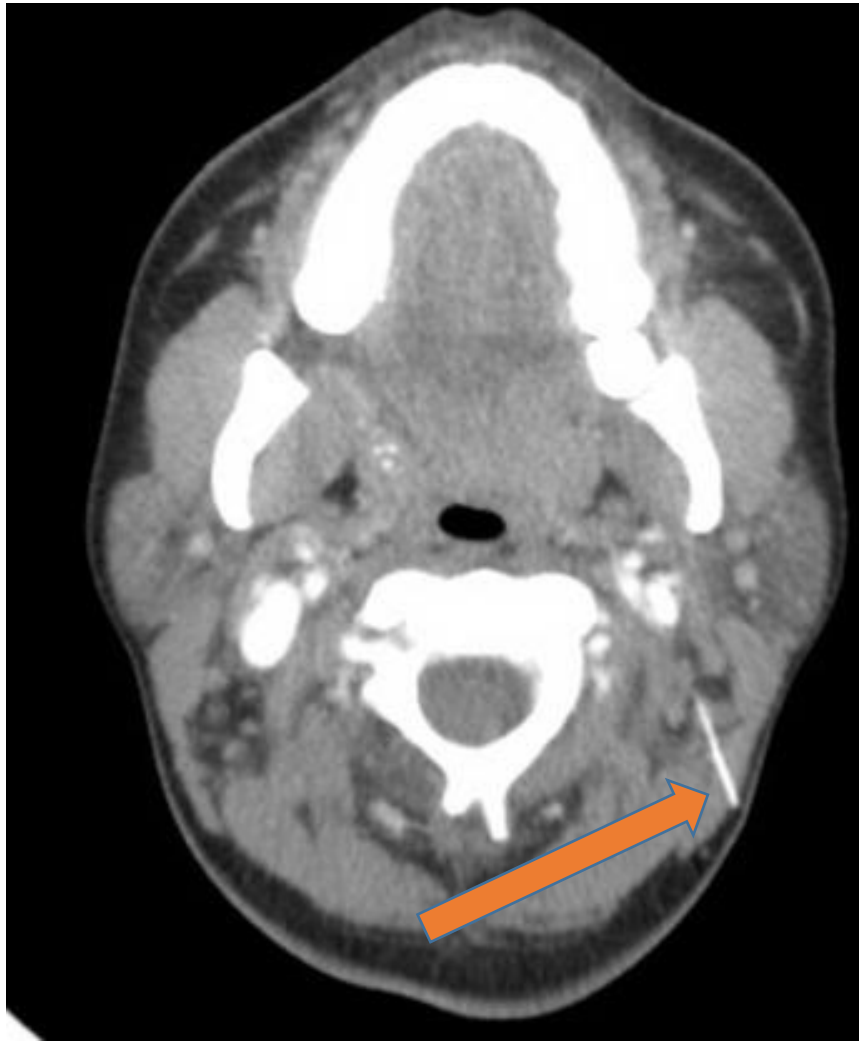
Needle breakage

- Became extremely rare complication since non re-usable stainless steel needle was introduced
- Most commonly with IANB,
- less extent PSA NB
- Causes
- Short needle,
- 30-gauge
- needle is inserted to its hub (“hubbing the needle”)



Needle breakage

- Problem
- The needle fragment remaining in the tissue poses a risk of serious damage being inflicted on the soft tissues for as long as the fragment remains. Although it does not often occur, needle fragments can migrate



needle fragment migrating into the posterior cervical space after IANB

Needle breakage

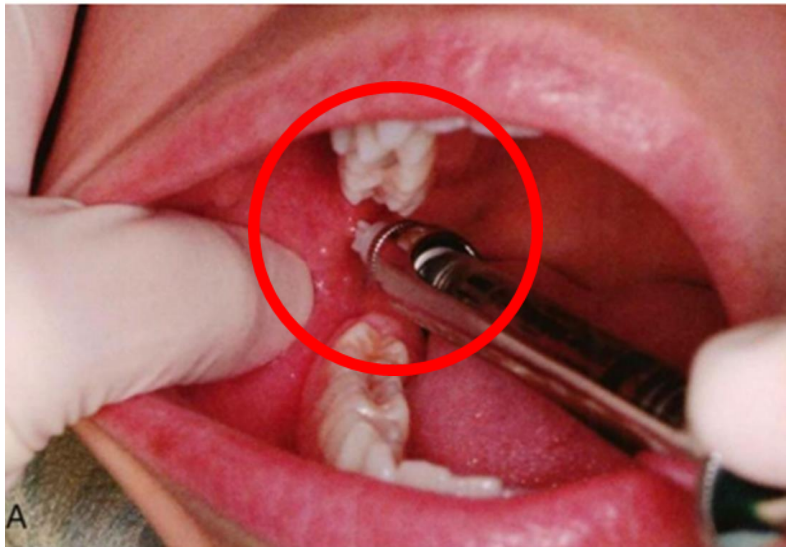
- Prevention

Observe extra caution when inserting needles in younger children or in extremely phobic adult or child patients.

Do not use short needles for IANB in adults or larger children.

Do not use 30-gauge needles for IANB in adults or children.

Do not insert a needle into soft tissue to its hub, unless it is absolutely essential for the success of the injection.

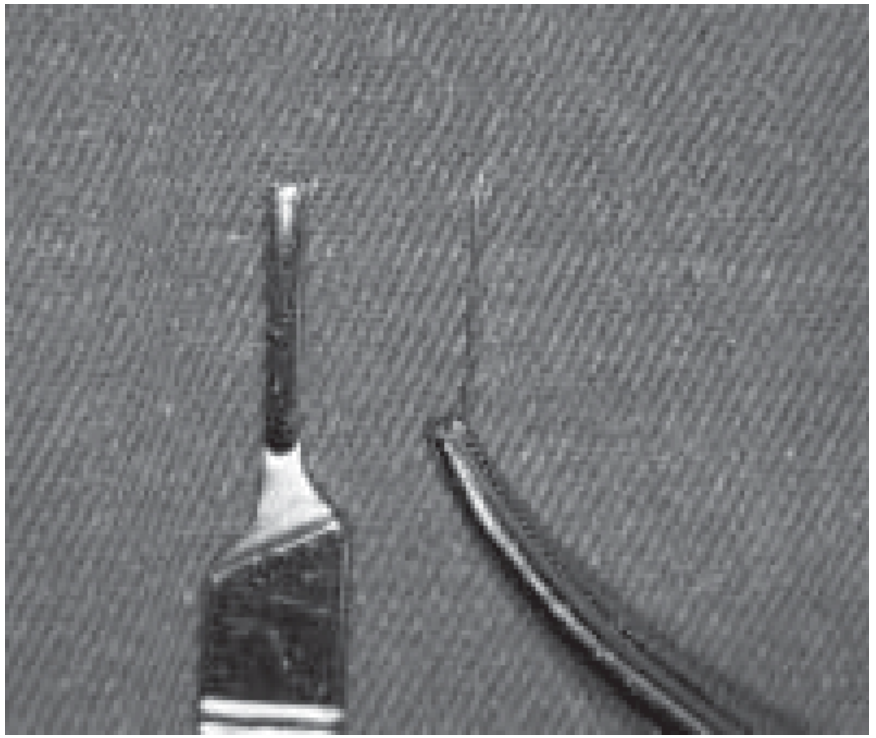


Do not bend needles before inserting them into soft tissue.

Needle breakage

- Management
- Otherwise immediate referral of the patient to an appropriate specialist (e.g., an oral and maxillofacial surgeon)
- CT+removal under G.A

Retrieval of the fragment with a hemostat is easily accomplished. Litigation does not occur in such incidents



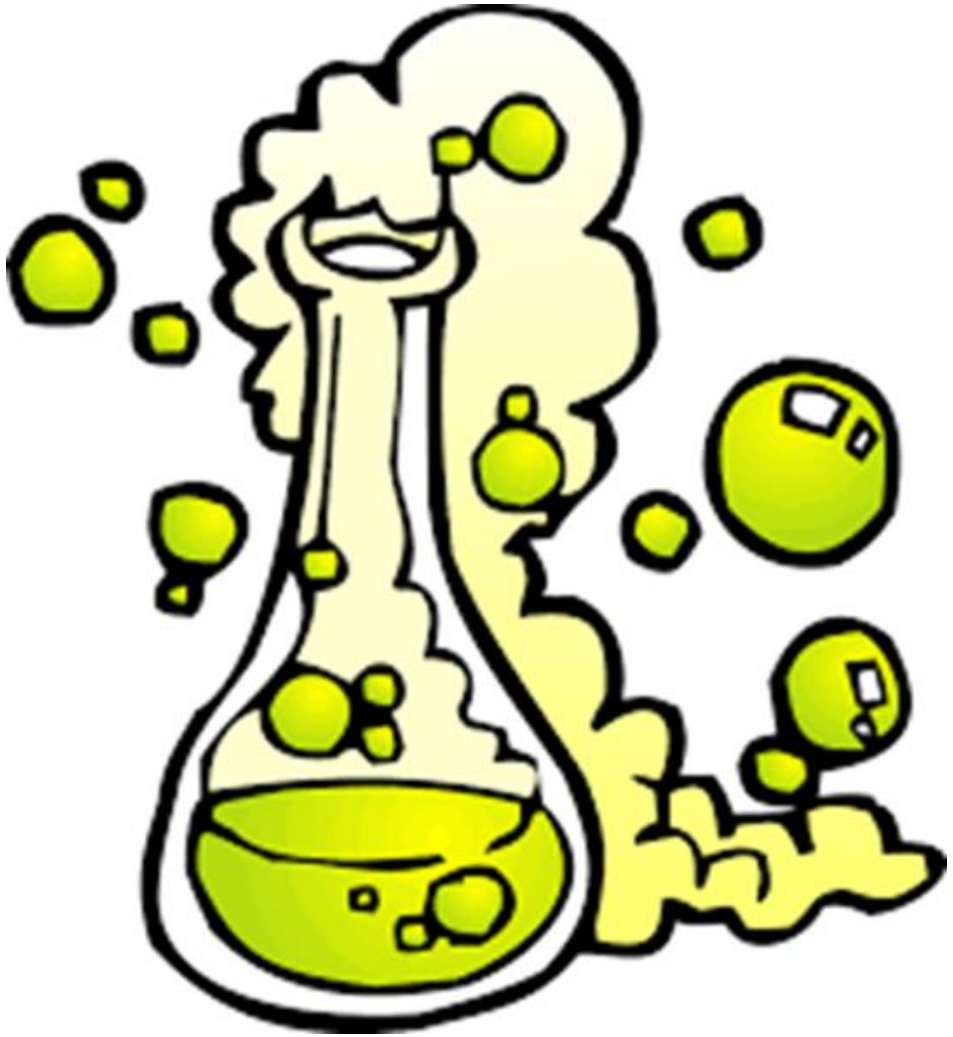
Prolonged Anesthesia or Paresthesia

- Paresthesia is defined as persistent anesthesia (anesthesia well beyond the expected duration), or altered sensation well beyond the expected duration of anesthesia.
- In addition, the definition of paresthesia should include hyperesthesia (an increased sensitivity to noxious stimuli) and dysesthesia (a painful sensation occurring to usually non-noxious stimuli), in which the patient experiences both pain and numbness

Dental malpractice litigation

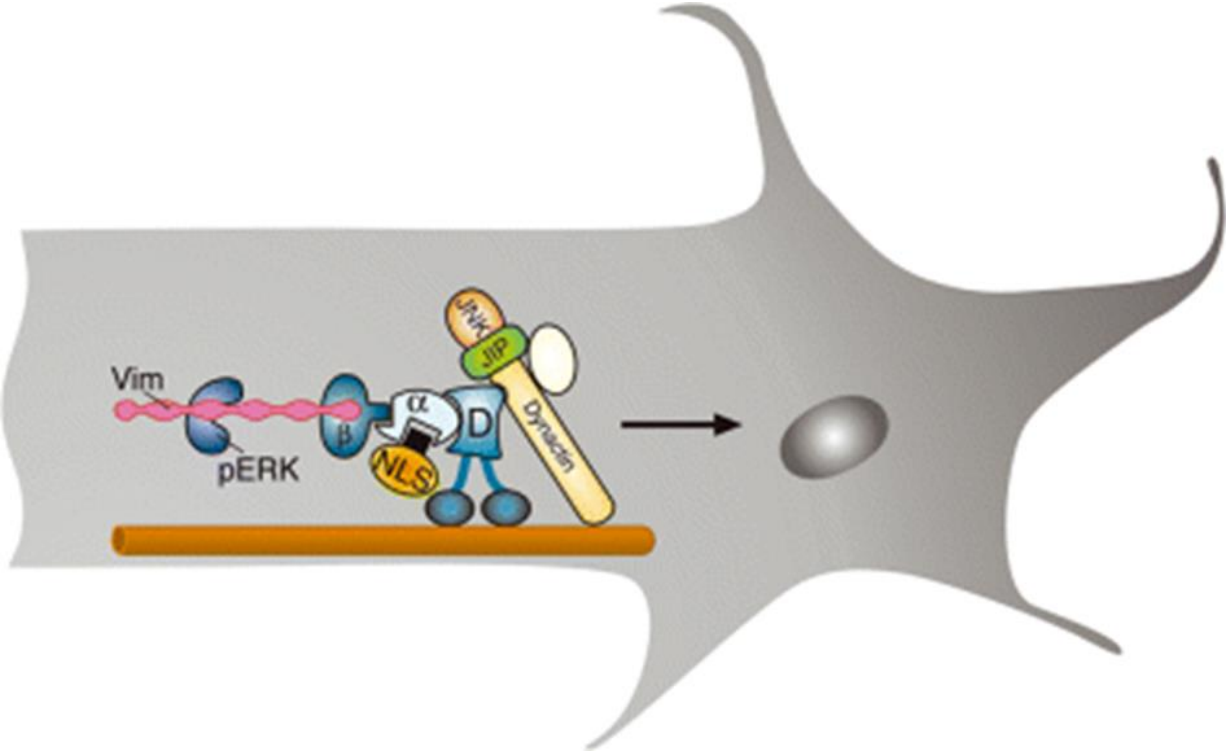
Prolonged Anesthesia or Paresthesia

- Causes
- Injection of a local anesthetic solution contaminated by alcohol or sterilizing solution near a nerve produces irritation, resulting in edema and increased pressure in the region of the nerve, leading to paresthesia. These contaminants, especially alcohol, are neurolytic and can produce long-term trauma to the nerve (paresthesia lasting for months to years).



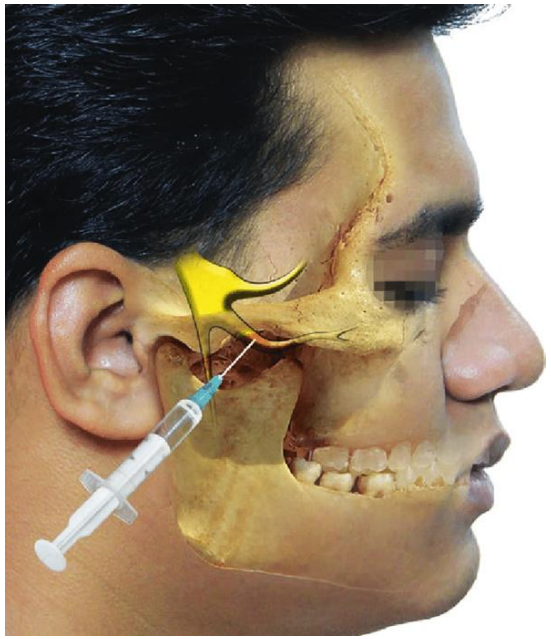
Prolonged Anesthesia or Paresthesia

- Causes
- In 2006 Hillerup and Jensen in Denmark suggested that articaine should not be used by IANB because it had, in their opinion, a greater propensity for paresthesia.
- Even though All local anesthetics may cause nerve injury (they are neurotoxic in nature)

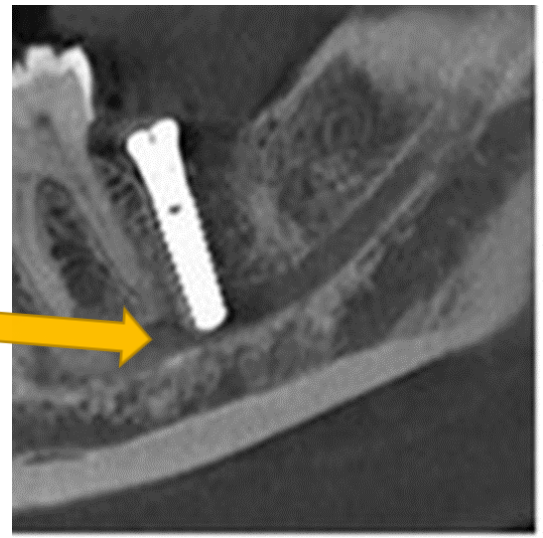


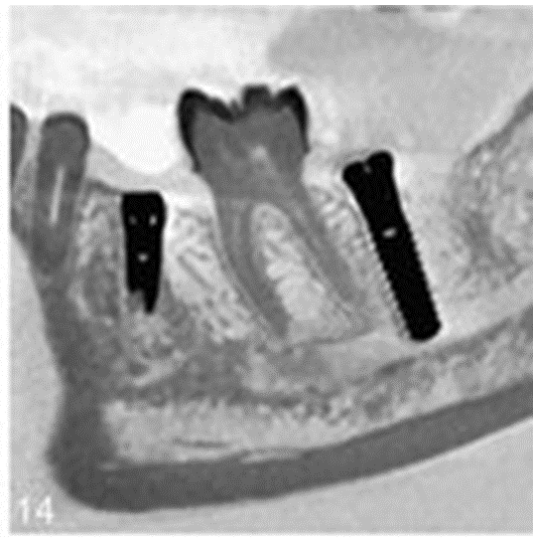
Prolonged Anesthesia or Paresthesia

- Causes
- Trauma to the nerve sheath can be produced by the needle during injection. Many patients report the sensation of an "electric shock" throughout the distribution of the involved nerve. Although it is exceedingly difficult (and is highly unlikely) to actually sever a nerve trunk or even its fibers



Trauma





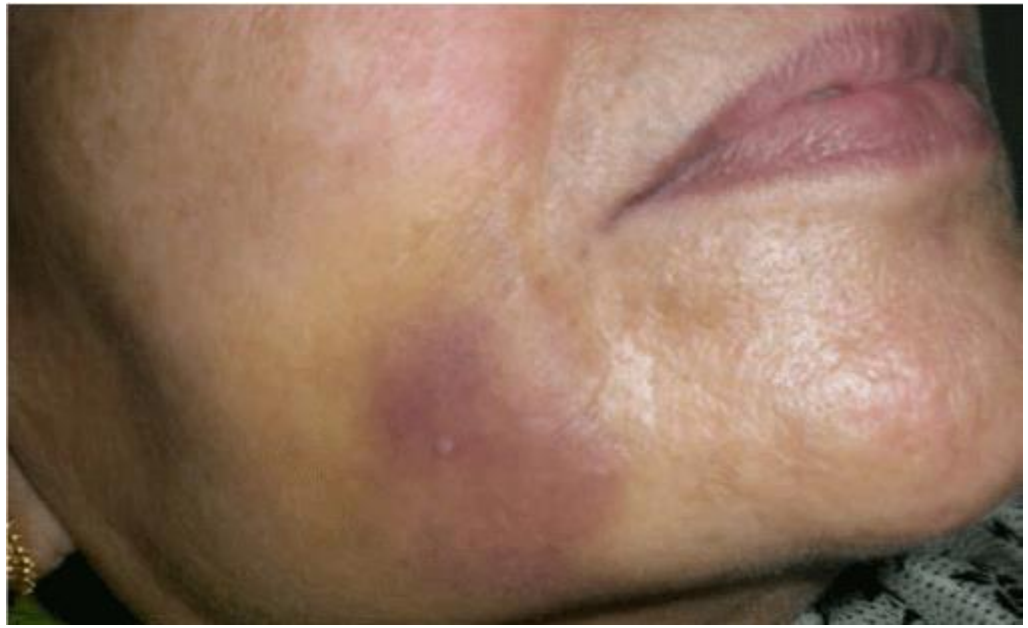
Prolonged Anesthesia or Paresthesia

- Causes
- Hematoma due to vascular penetration

(e.g. PSA NB)

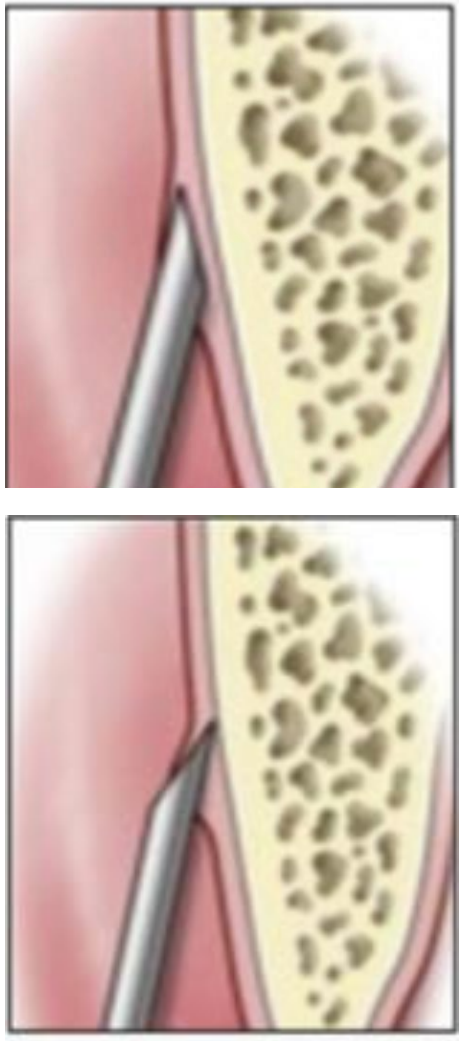
- Increased pressure around the nerve lead to paresthesia

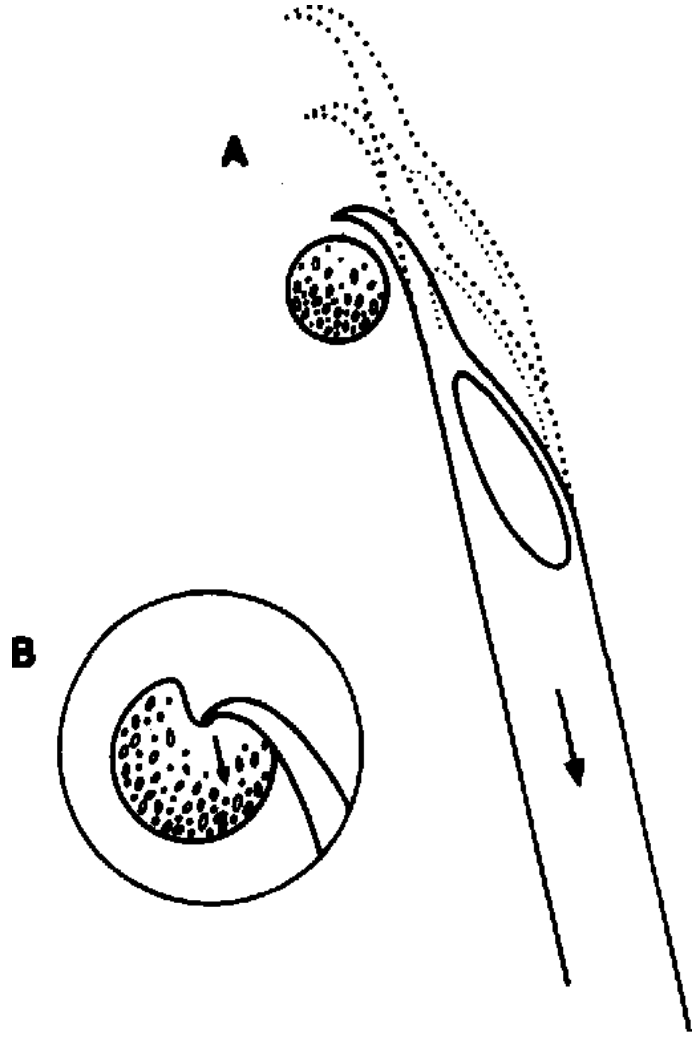
Hematoma



Prolonged Anesthesia or Paresthesia

- Causes and prevention
- The barb occurred when the needle came into contact with the medial aspect of the mandibular ramus. Withdrawal of the needle from tissue increased the likelihood of involvement of the lingual or inferior alveolar nerve (e.g. paresthesia) and the development of trismus. Avoid forceful injection





Prolonged Anesthesia or Paresthesia

- Problem
- Persistant anesthesia can lead to self-inflicted soft tissue injury.
- Biting or thermal or chemical insult can occur without a patient's awareness until the process has progressed to a serious degree.
- When the lingual nerve is involved, the sense of taste (via the chorda tympani nerve) also may be impaired

Prolonged Anesthesia or Paresthesia

- Prevention
- Strict adherence to injection protocol and
- proper care and handling of dental cartridges help minimize the risk of paresthesia. Nevertheless, cases of paresthesia will still occur in spite of care taken during the injection.
- Whenever a needle is inserted into soft tissues, anywhere in the body, in an attempt to deposit a drug (e.g., local anesthetic) as close to a nerve as possible without actually contacting it, it is simply a matter of time before such contact does occur.

Prolonged Anesthesia or Paresthesia

- Management
- Reassure the patient
- Record the incident on the dental chart.
- Arrange an appointment to examine the patient

1-Observation 1-2 months

2-Evaluation tests

3-consultation of two OMFS for surgical interference if indicated

Prolonged Anesthesia or Paresthesia

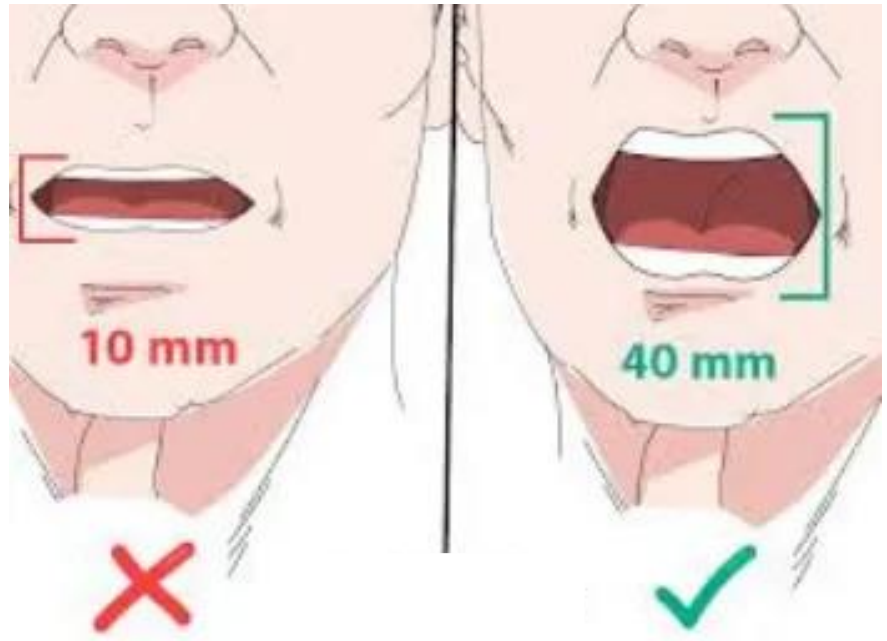
Test	Description
1-Mechanoceptive	
Static light touch	Patient is asked to tell when light touch is felt and to determine the point to the exact location
Brush direction	Patient is asked to tell when feeling brush touch and to determine the direction of movement
Two points discrimination	Patient is asked to determine single and two points of touch using two instruments, with the distance between them can be changed
2-Nociceptive	
Pin pressure nociceptive	Patient is asked to determine feeling pin brick
Thermal discrimination	Patient is asked to determine feeling cold or heat

Trismus

- Trismus, from the Greek trismos=a scream; a grinding,
- is defined as a prolonged, tetanic spasm of the jaw muscles by which the normal opening of the mouth is restricted (locked jaw).

Trismus

- Problem
- In the acute phase of trismus, pain is produced by hemorrhage leads to muscle spasm and limitation of movement.
- The second, or chronic phase usually develops if treatment is not begun.
- Chronic hypomobility occurs secondary to organization of the hematoma, with subsequent fibrosis and scar contracture. Infection may produce hypomobility through increased pain, increased tissue reaction (irritation), and scarring



Trismus

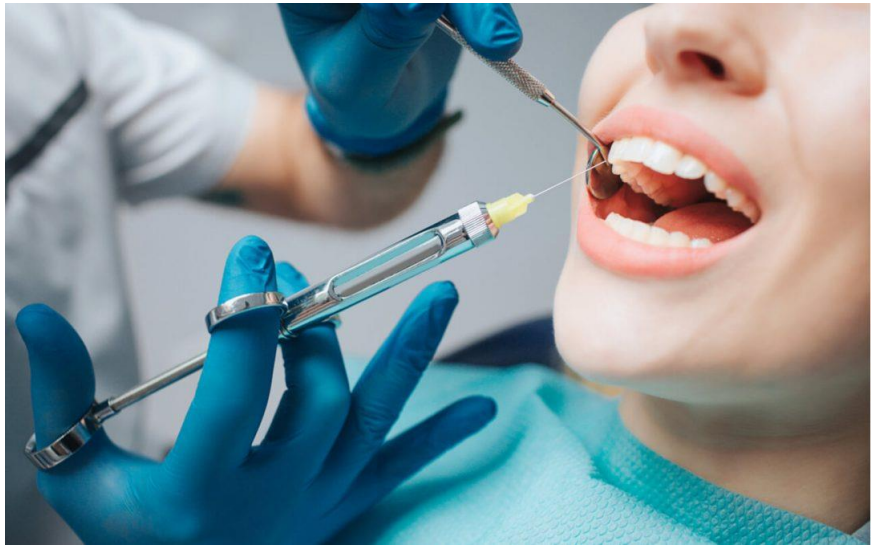
Normal
Mouth Opening

Trismus

- Causes and prevention
- Trauma to muscles or blood vessels in the infratemporal fossa is the most common causative factor in trismus associated with dental injection of local anesthetics. Gaining knowledge of anatomy and proper technique
- Hemorrhage is another cause of trismus. Large volumes of extravascular blood can produce tissue irritation, leading to muscle dysfunction as the blood is slowly resorbed (over approximately 2 weeks). Gaining knowledge of anatomy and proper technique

Trismus

- Causes and prevention
- Local anesthetic solutions into which alcohol or cold sterilizing solutions have diffused produce irritation of tissues (e.g., muscle), leading potentially to trismus. Proper care for cartridge
- Local anesthetics have been demonstrated to be slightly myotoxic to skeletal muscles. The injection of local anesthetic solution intramuscularly or supramuscularly leads to a rapidly progressive necrosis of exposed muscle fibers. Avoid IM injection of LA



Trismus

- Causes and prevention
- Low-grade infection after injection can also cause trismus. Aseptic tech.
- Every needle insertion produces some damage to the tissue through which it passes. It stands to reason, then, that multiple needle penetrations correlate with a greater incidence of postinjection trismus. Sharp needle ,avoid repeated injections use block whenever possible
- Excessive volumes of local anesthetic solution deposited into a restricted area produce distention of tissues, which may lead to postinjection trismus. This is more common after multiple missed IANBs. Minimum effective volume

Trismus

Trismus is not always preventable

Trismus

- Management
- With mild pain and dysfunction, the patient reports minimum difficulty opening his or her mouth.
- Arrange an appointment for examination.
- In the interim, prescribe

1-Heat therapy consists of applying hot, moist towels to the affected area for approximately 20 minutes every hour

Trismus

- Management
- With mild pain and dysfunction.

2-Warm saline rinses, For a warm saline rinse, a teaspoon of salt is added to a 12-ounce glass of warm water; the rinse is held in the mouth on the involved side (and spit out) to help relieve the discomfort of trismus

3-Analgesics, Aspirin (325 mg) or NSAID is usually adequate as an analgesic in managing pain associated with trismus. Its anti-inflammatory properties are also beneficial

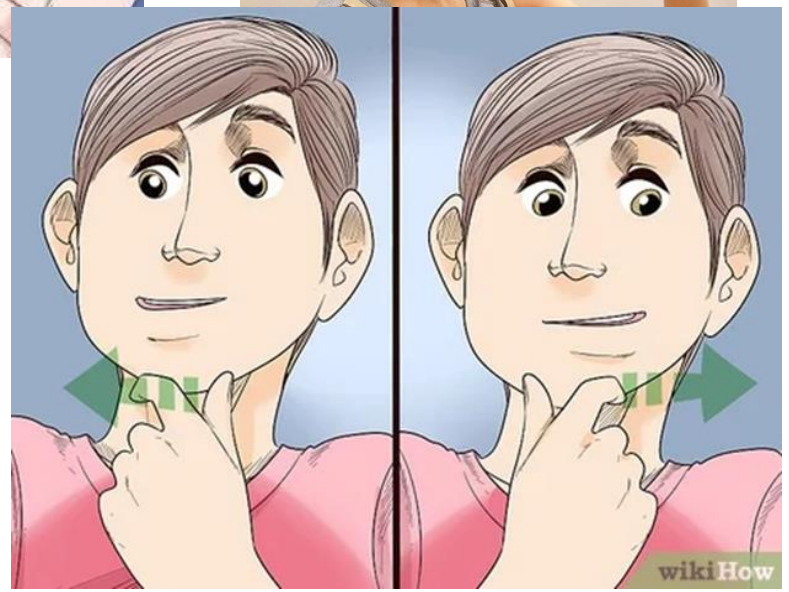
And if necessary, Muscle relaxants (Orphinadrin) to manage the **initial phase** of muscle spasm. Diazepam (approximately 10 mg bid) or another benzodiazepine is used for muscle relaxation if deemed necessary

Analgesics and Muscle relaxant initially

Trismus

- Management
- With mild pain and dysfunction

4- The patient should be advised to initiate ***physiotherapy*** consisting of opening and closing the mouth, as well as lateral excursions of the mandible, for 5 minutes every 3 to 4 hours. Chewing gum (sugarless, of course!) is yet another means of providing lateral movement of the temporomandibular joint



Trismus

- Management
- With mild pain and dysfunction
- In virtually all cases of trismus related to intraoral injections that are managed as described, patients report improvement within 48 to 72 hours. Therapy should be continued until the patient is free of symptoms.
- If pain and dysfunction continue unabated beyond 48 hours, consider the possibility of infection. ***Antibiotics should be added to the treatment regimen*** described and continued for 7 full days. Complete recovery from injection-related trismus takes about 6 weeks

Trismus

1 cm opening

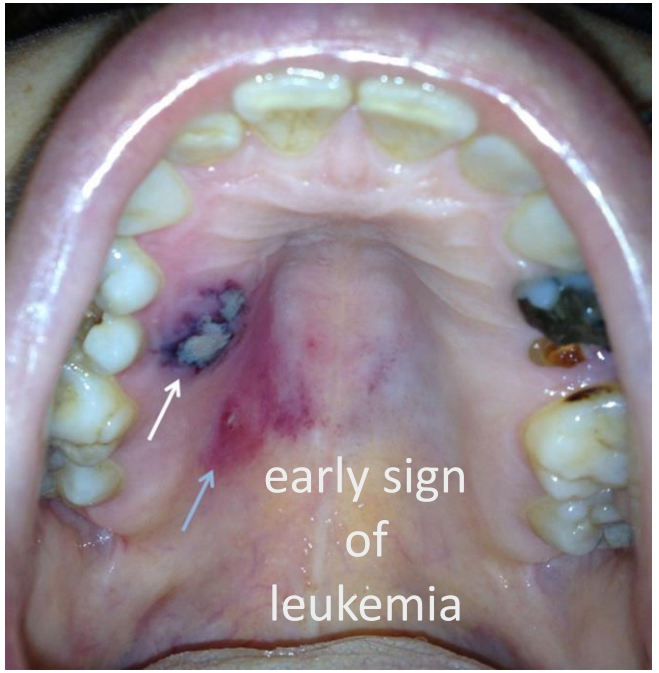
- Mangement
- For severe pain or dysfunction,
- if no improvement is noted within 2 or 3 days without antibiotics or within 5 to 7 days with antibiotics, or if the ability to open the mouth has become limited, the patient should be referred to an OMFS for evaluation.
- Other therapies, including the use of ultrasound or appliances, are available for use in these situations.
- Temporomandibular joint involvement is rare in the first 4 to 6 weeks after injection. Surgical intervention to correct chronic dysfunction may be indicated in some instances

Hematoma

- The effusion of blood into extravascular spaces can be caused by inadvertent nicking of a blood vessel (artery or vein) during administration of a local anesthetic.
- A hematoma that develops subsequent to the nicking of an artery usually increases rapidly in size until treatment is instituted because of the significantly greater pressure of blood within an artery.
- Nicking of a vein may or may not result in the formation of a hematoma. Tissue density surrounding the injured vessel is a determining factor.

Hematoma

- Causes
- The denser the surrounding tissues (e.g., palate), its firm adherence to bone the less likely a hematoma is to develop, but in looser tissue (e.g., infratemporal fossa), large volumes of blood may amass before a swelling is ever noted and therapy instituted



Hematoma

- Problem
- A hematoma rarely produces significant problems, aside from the resulting “bruise,” which may or may not be visible extraorally. Possible complications of hematoma include trismus and pain.
- Swelling and discoloration of the region usually subside gradually over 7 to 14 days.

A hematoma constitutes an inconvenience to the patient and an embarrassment to the operator.

Hematoma

- Prevention
- 1 Knowledge of the normal anatomy involved in the proposed injection is important. Certain techniques are associated with a greater risk of visible hematoma. The PSA nerve block is the most common, followed by the IANB (a distant second) and the mental/incisive nerve block (a close third when the foramen is entered)
- 2 Modify the injection technique as dictated by the patient's anatomy. For example, the depth of penetration for a PSA nerve block may be decreased in a patient with smaller facial characteristics.
- 3 Use a short needle for the PSA nerve block to decrease the risk of hematoma.
- 4 Minimize the number of needle penetrations into tissue.
- 5 Never use a needle as a probe in tissues.

Hematoma

Hematoma is not always preventable.

Whenever a needle is inserted into tissue, the risk of inadvertent puncturing of a blood vessel is present

Hematoma

- Management
- Immediate
- When swelling becomes evident during or immediately after a local anesthetic injection, direct pressure should be applied to the site of bleeding. For most injections, the blood vessel is located between the surface of the mucous membrane and the bone; localized pressure should be applied for not less than 2 minutes. This effectively stops the bleeding.

Hematoma

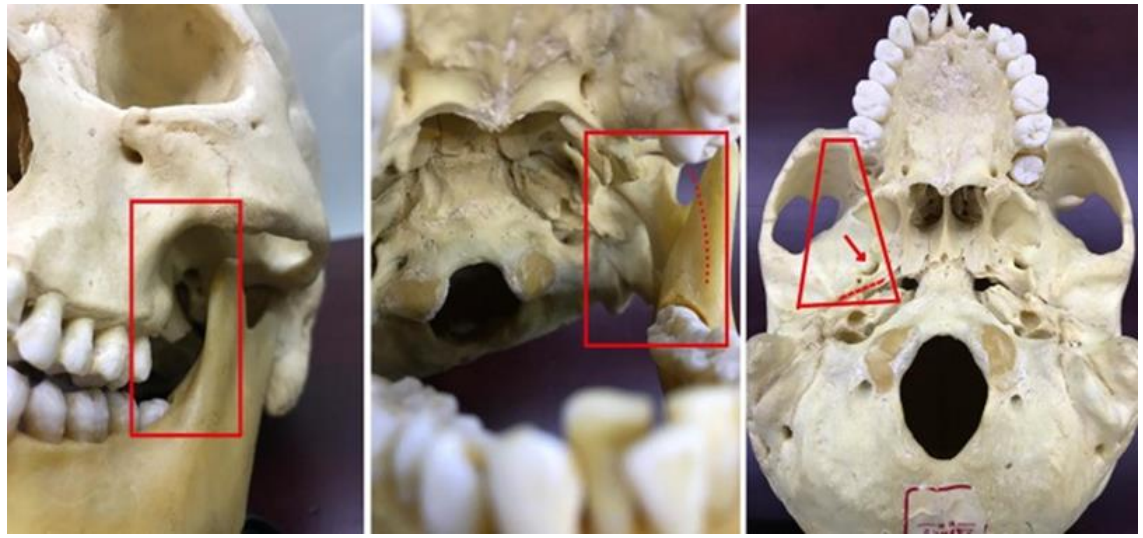
- Management
- Immediate
- IANB Pressure is applied to the medial aspect of the mandibular ramus.
- Anterior Superior Alveolar (Infraorbital) Nerve Block Pressure is applied to the skin directly over the infraorbital foramen.
- Incisive (Mental) Nerve Block Pressure is placed directly over the mental foramen, externally on the skin or intraorally on the mucous membrane.
- Buccal Nerve Block or Any Palatal Injection Place pressure at the site of bleeding.

Hematoma

- Management
- Immediate
- Posterior Superior Alveolar Nerve Block The PSA nerve block usually produces the largest and most esthetically unappealing hematoma.
- The infratemporal fossa, into which bleeding occurs, can accommodate a large volume of blood.
- The hematoma usually is not recognized until a colorless swelling appears on the side of the face around the TMJ area (usually a few minutes after the injection is completed). It progresses over a period of days, extending inferiorly and anteriorly toward the lower anterior region of the cheek.

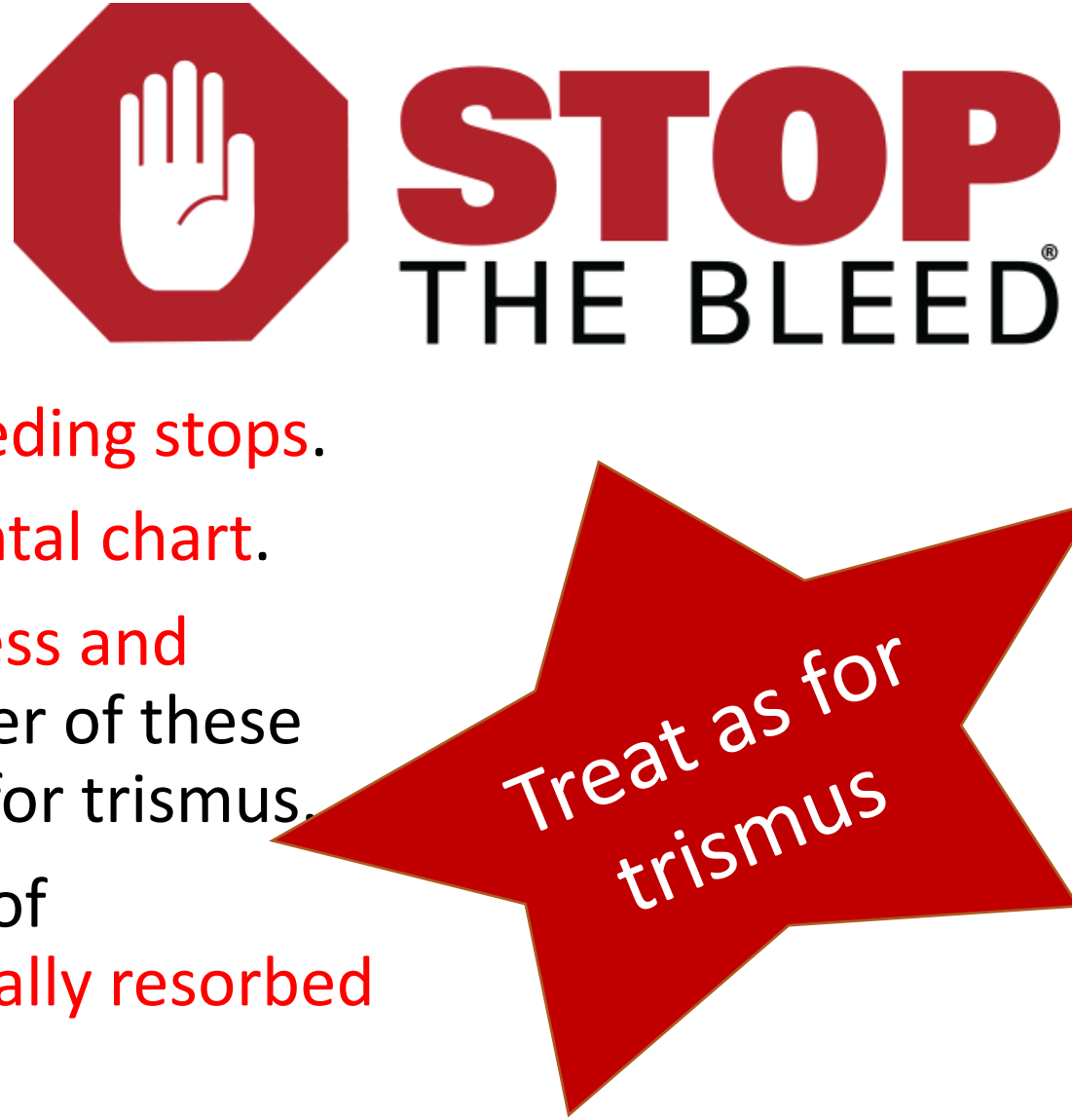
Hematoma

- Management
- Immediate
- Bleeding normally ceases when external pressure on the vessels exceeds internal pressure, or when clotting occurs.
- Digital pressure can be applied to the soft tissues in the mucobuccal fold as far distally as can be tolerated by the patient (without eliciting a gag reflex).
- Apply pressure in a medial and superior direction. If available, ice should be applied (extraorally) to increase pressure on the site and help constrict the punctured vessel.



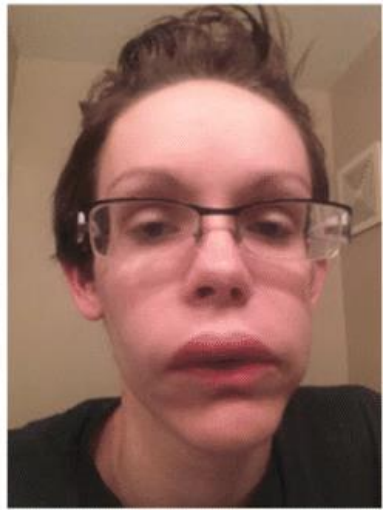
Hematoma

- Management
- Subsequent
- The patient may be discharged once bleeding stops.
- Note the hematoma on the patient's dental chart.
- Advise the patient about possible soreness and limitation of movement (trismus). If either of these develops, begin treatment as described for trismus.
- Discoloration will likely occur as a result of extravascular blood elements; it is gradually resorbed over 7 to 14 days



Edema

- Swelling of tissues is not a syndrome, but it is a clinical sign of the presence of some disorder.
- Causes
- 1 Hereditary angioedema is a condition characterized by the sudden onset of brawny non-pitting edema affecting the face, extremities, and mucosal surfaces of the intestine and respiratory tract, often without obvious precipitating factors.



Edema

- Causes
- 2 Trauma during injection
- 3 Infection
- 4 Allergy: Angioedema is a possible response to ester-type topical anesthetics in an allergic patient (localized tissue swelling occurs as a result of vasodilation secondary to histamine release).
- 5 Hemorrhage (effusion of blood into soft tissues produces swelling)
- 6 Injection of irritating solutions (alcohol- or cold sterilizing solution–containing cartridges)

Edema

- Problem
- Edema related to local anesthetic administration is seldom intense enough to produce significant problems such as airway obstruction.
- Most instances of local anesthetic–related edema result in pain and dysfunction of the region and embarrassment for the patient.
- Angioneurotic edema produced by topical anesthetic in an allergic individual, although exceedingly rare, can compromise the airway.
- Edema of the tongue, pharynx, or larynx may develop and represents a potentially life-threatening situation that requires vigorous management.)

Edema

- Prevention

1 Complete an adequate medical evaluation of the patient before drug administration.

2 Properly care for and handle the local anesthetic armamentarium

- 3 Use atraumatic injection technique.

Edema

- Management
- The management of edema is predicated on reduction of the swelling as quickly as possible and on the cause of the edema. When produced by traumatic injection or by introduction of irritating solutions,
- edema is usually of minimal degree and resolves in several days without formal therapy.
- In this and all situations in which edema is present, it may be necessary to prescribe analgesics for pain.
- After hemorrhage, edema resolves more slowly (over 7 to 14 days) as extravasated blood elements are resorbed into the vascular system. If signs of hemorrhage (e.g., bluish discoloration progressing to green, yellow, and other colors)
- Edema produced by infection does not resolve spontaneously but may, in fact, become progressively more intense if untreated. If signs and symptoms of infection (pain, mandibular dysfunction, edema, warmth) do not appear to resolve within 3 days, antibiotic therapy should be instituted as outlined previously.

Edema

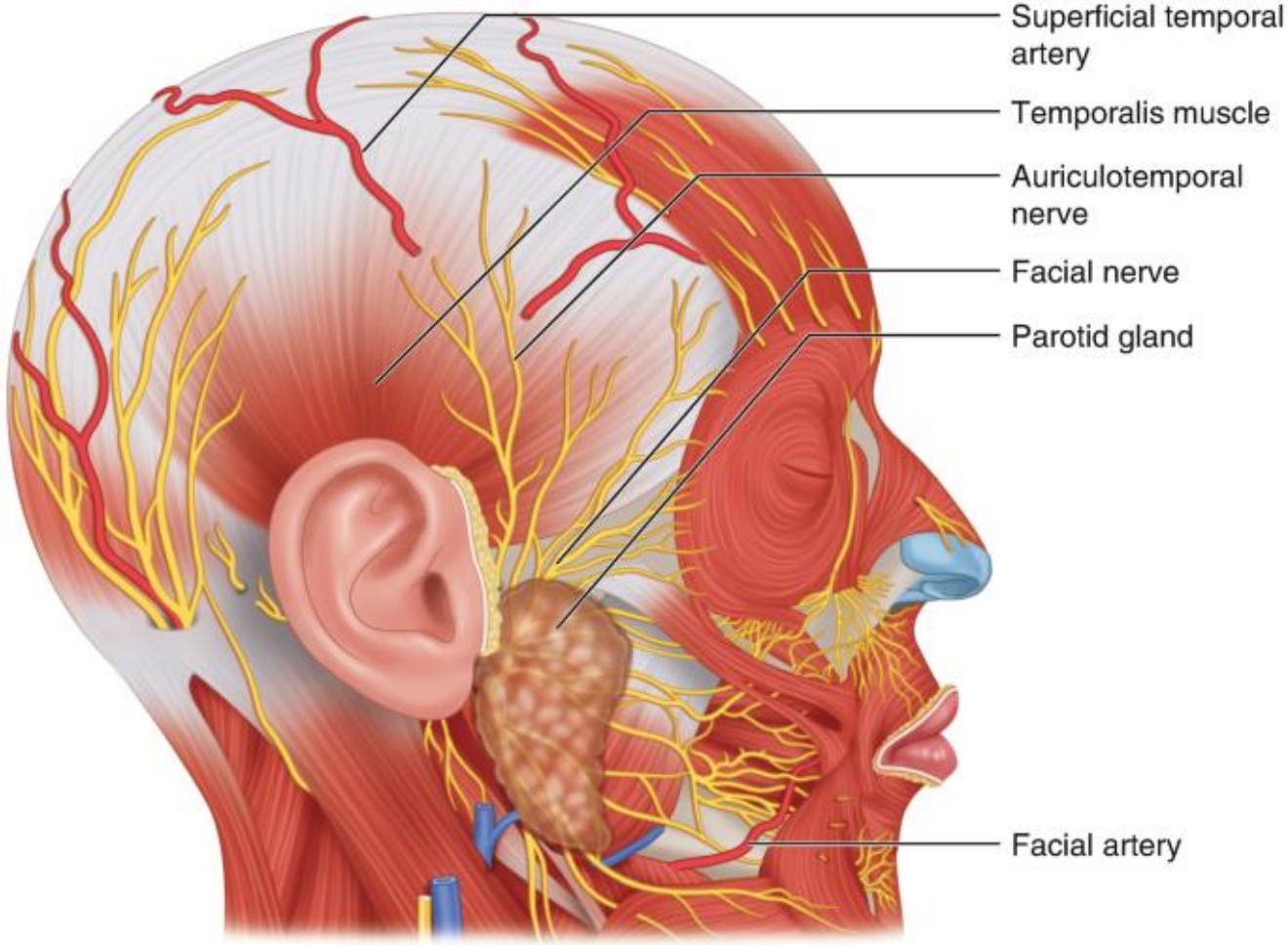
- Management
- Allergy-induced edema is potentially life threatening.
- Its degree and location are highly significant.
- If swelling develops in buccal soft tissues and there is absolutely no airway involvement, treatment consists of intramuscular and oral histamine blocker administration and consultation with an allergist to determine the precise cause of the edema.

Edema

- Management
- If edema occurs in any area where it compromises breathing, treatment consists of the following
- 1 P (position): if unconscious, the patient is placed supine.
- 2 A-B-C (airway, breathing, circulation): basic life support is administered, as needed.
- 3 D (definitive treatment): emergency medical services (e.g., 122) is summoned.
- 4 Epinephrine is administered: 0.3 mg (0.3 mL of a 1:1000 epinephrine solution) (adult), 0.15 mg (0.15 mL of a 1:1000 epinephrine solution) (child [15 to 30 kg]), intramuscularly (IM) or 3 mL of a 1:10,000 epinephrine solution intravenously (IV-adult), every 5 minutes until respiratory distress resolves.
- 5 Histamine blocker is administered IM or IV.
- 6 Corticosteroid is administered IM or IV.
- 7 Preparation is made for cricothyrotomy if total airway obstruction appears to be developing. This is extremely rare but is the reason for summoning emergency medical services early.
- 8 The patient's condition is thoroughly evaluated before his or her next appointment to determine the cause of the reaction.

Facial Nerve Paralysis

- Paralysis of some of its terminal branches occurs whenever an infraorbital nerve block is administered, or when maxillary canines are infiltrated.



Facial Nerve Paralysis

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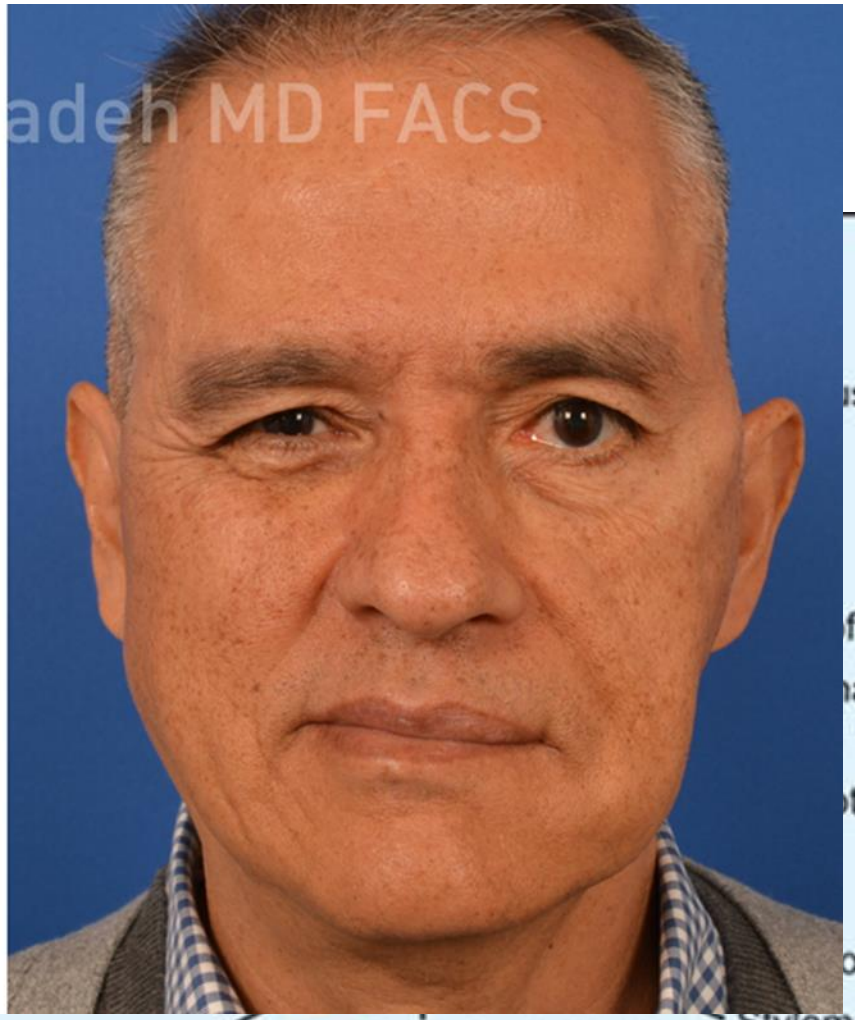
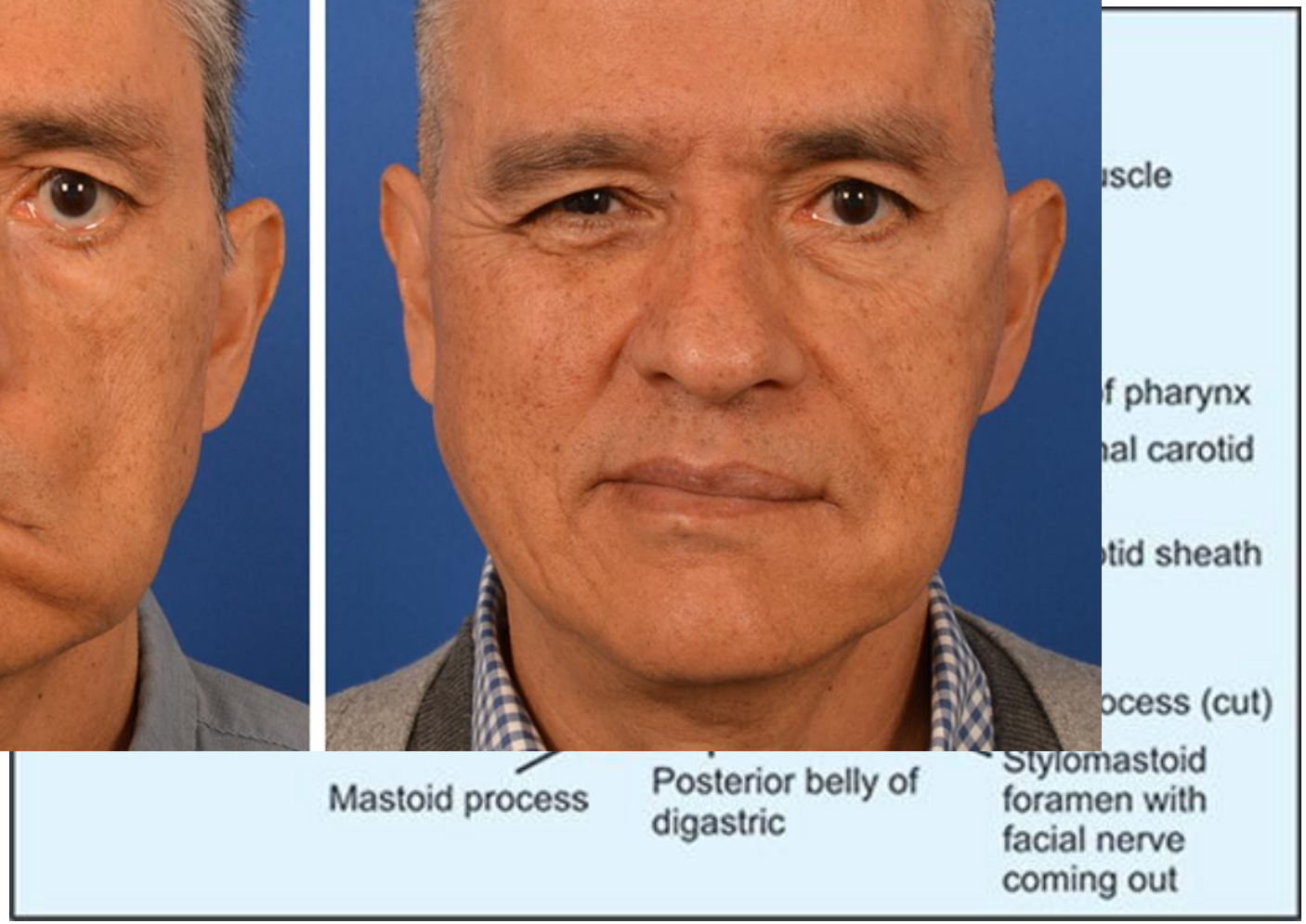
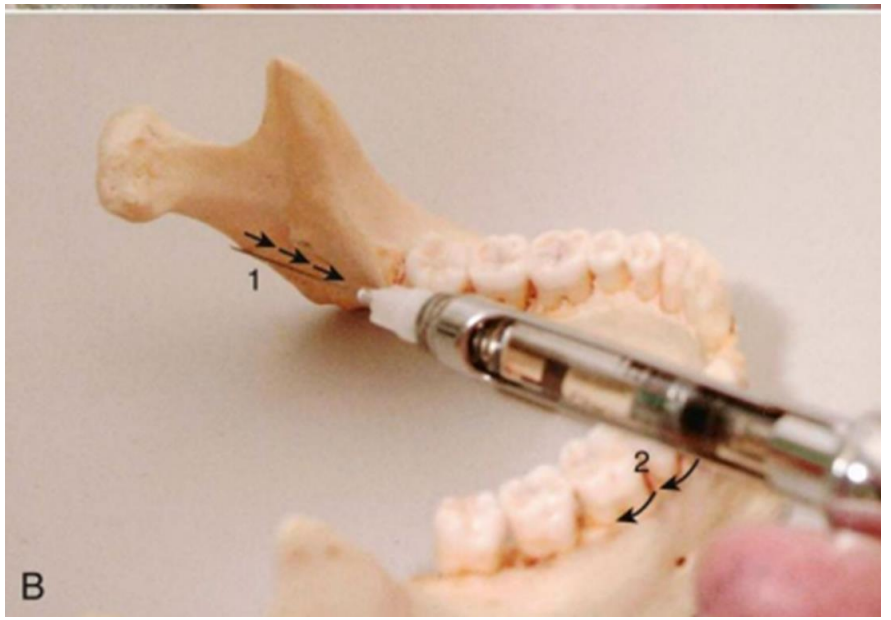
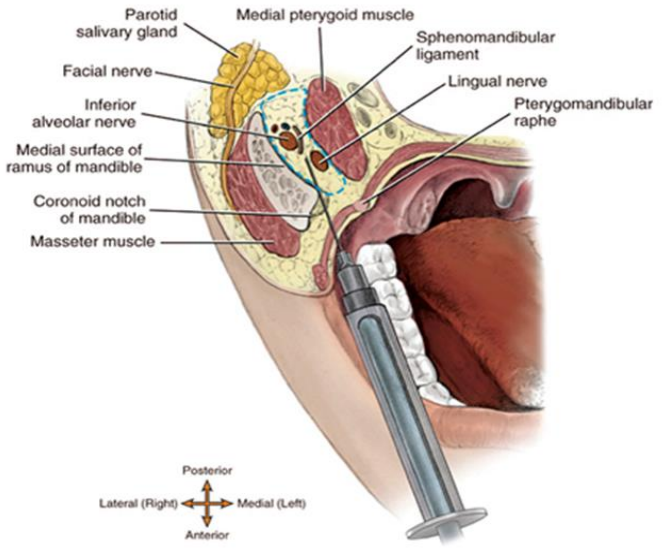




Facial Nerve Paralysis

- Cause
- Transient facial nerve paralysis is commonly caused by the introduction of local anesthetic into the capsule of the parotid gland, which is located at the posterior border of the mandibular ramus, clothed by the medial pterygoid and masseter muscles. Directing the needle posteriorly or inadvertently deflecting it in a posterior direction during an IANB, or
- Over-inserting during a Vazirani-Akinosi nerve block, may place the tip of the needle within the body of the parotid gland. If local anesthetic is deposited, transient paralysis can result.





Facial Nerve Paralysis

- Problem
- is cosmetic since unilateral paralysis (Loss of motor function) to the muscles of facial expression produced by local anesthetic deposition is normally transitory. It lasts no longer than several hours, depending on the local anesthetic formulation used, the volume injected, and proximity to the facial nerve.
- Usually, minimal or no sensory loss occurs. During this time, the patient has and is unable to use these muscles
- A secondary problem is that the patient is unable to voluntarily close involved eye. The protective lid reflex of the eye is abolished.

Facial Nerve Paralysis

- Management
- No treatment is known, other than waiting until the action of the drug resolves.
- 1-Reassure the patient. Explain that the situation is transient, will last for a few hours, and will resolve without residual effect. Mention that it is produced by the normal action of local anesthetic drugs on the facial nerve, which is a motor nerve to the muscles of facial expression.
- 2-Contact lenses should be removed until muscular movement returns.
- 3-An eye patch should be applied to the affected eye until muscle tone returns. If resistance is offered
- by the patient, advise the patient to manually close the affected eyelid periodically to keep the cornea lubricated.
- 4-Record the incident on the patient's chart.
- 5-Although no contraindication is known to reanesthetizing the patient to achieve mandibular anesthesia, it may be prudent to forego further dental care at this appointment.

Soft Tissue Injury

- Self-inflicted trauma to the lips and tongue is frequently caused by the patient inadvertently biting or chewing these tissues while still anesthetized

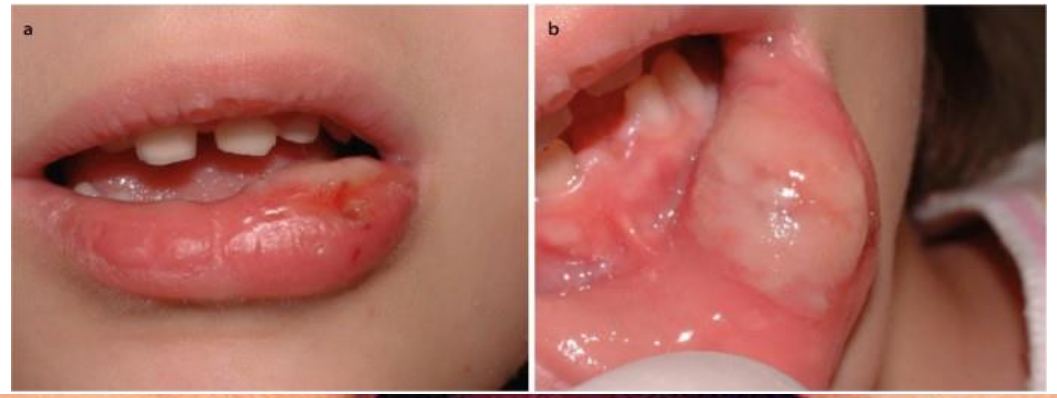
Soft Tissue Injury

- Cause
- Trauma occurs most frequently in younger children, in mentally or physically disabled children or adults, and in older-old patients; however, it can and does occur in patients of all ages. Dental patients receiving local anesthetic during their treatment usually are dismissed from the dental office with residual soft tissue numbness

The primary reason is the fact that soft tissue anesthesia lasts significantly longer than does pulpal anesthesia.

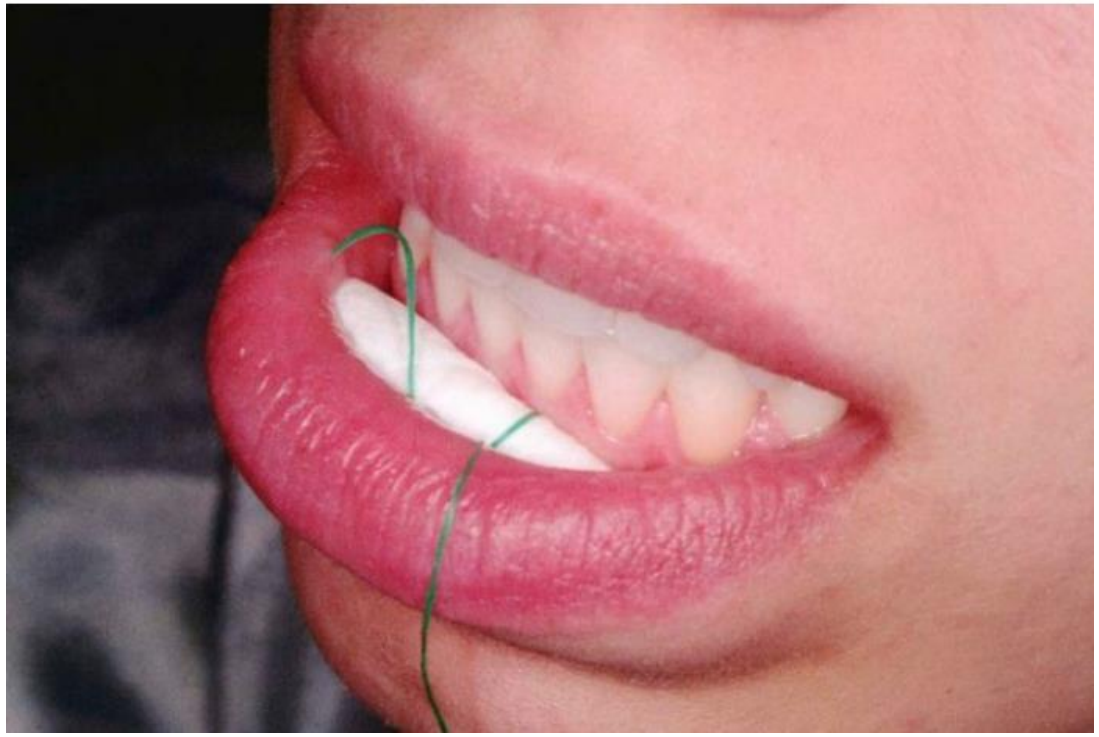
Soft Tissue Injury

- Problem
- Trauma to anesthetized tissues can lead to swelling and significant pain when the anesthetic effects resolve. A young child or a handicapped individual may have difficulty coping with the situation, and this may lead to behavioral problems.
- The possibility that infection will develop is remote in most instances.



Soft Tissue Injury

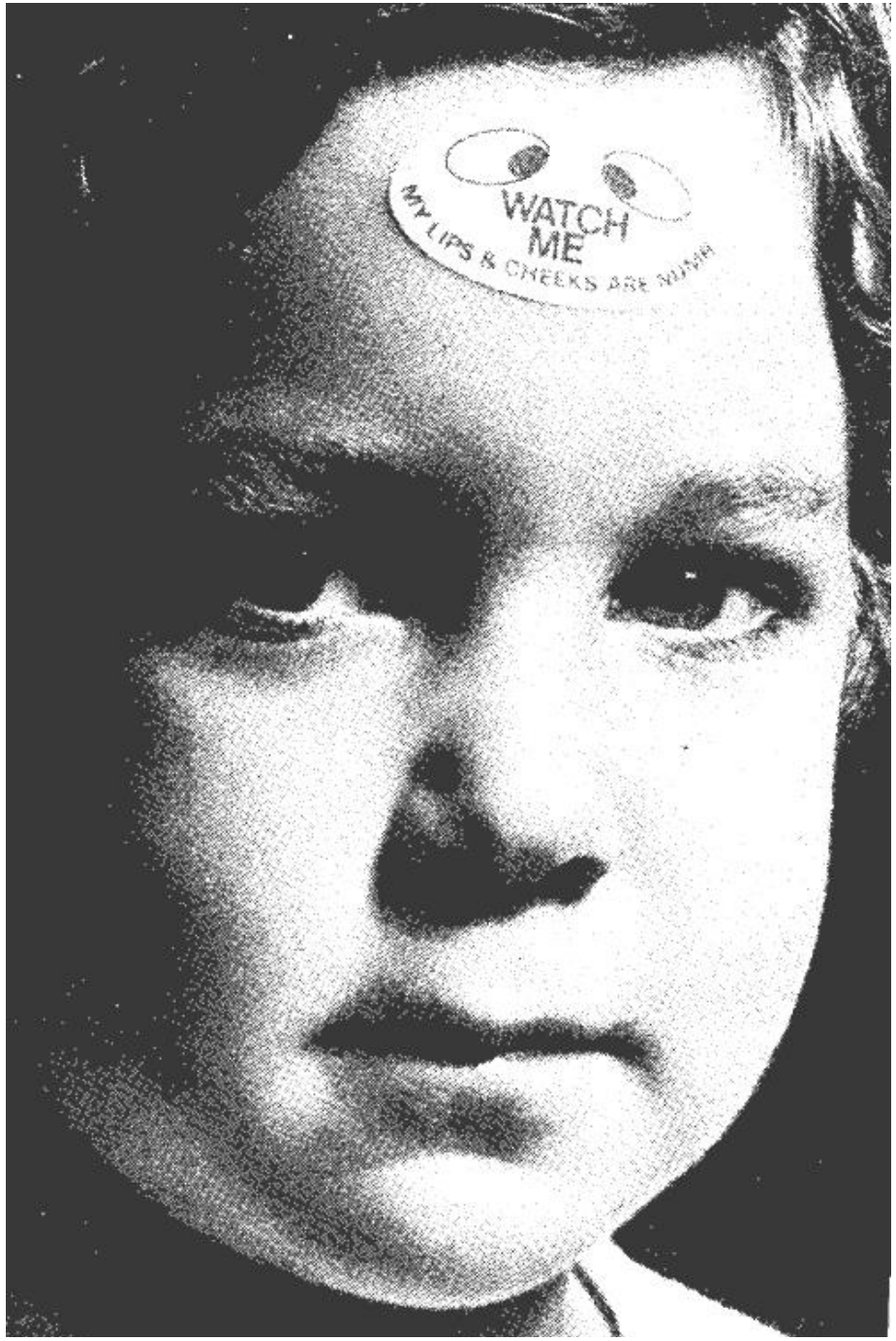
- Prevention
- A local anesthetic of appropriate duration should be selected if dental appointments are brief.
- A cotton roll can be placed between the lips and the teeth if they are still anesthetized at the time of discharge
- Warn the patient and the guardian against eating, drinking hot fluids, and biting on the lips or tongue to test for anesthesia.



The cotton roll is secured with dental floss wrapped around the teeth(to prevent inadvertent aspiration of the roll)

Soft Tissue Injury

- Prevention
- A self-adherent warning sticker may be used on children



Soft Tissue Injury

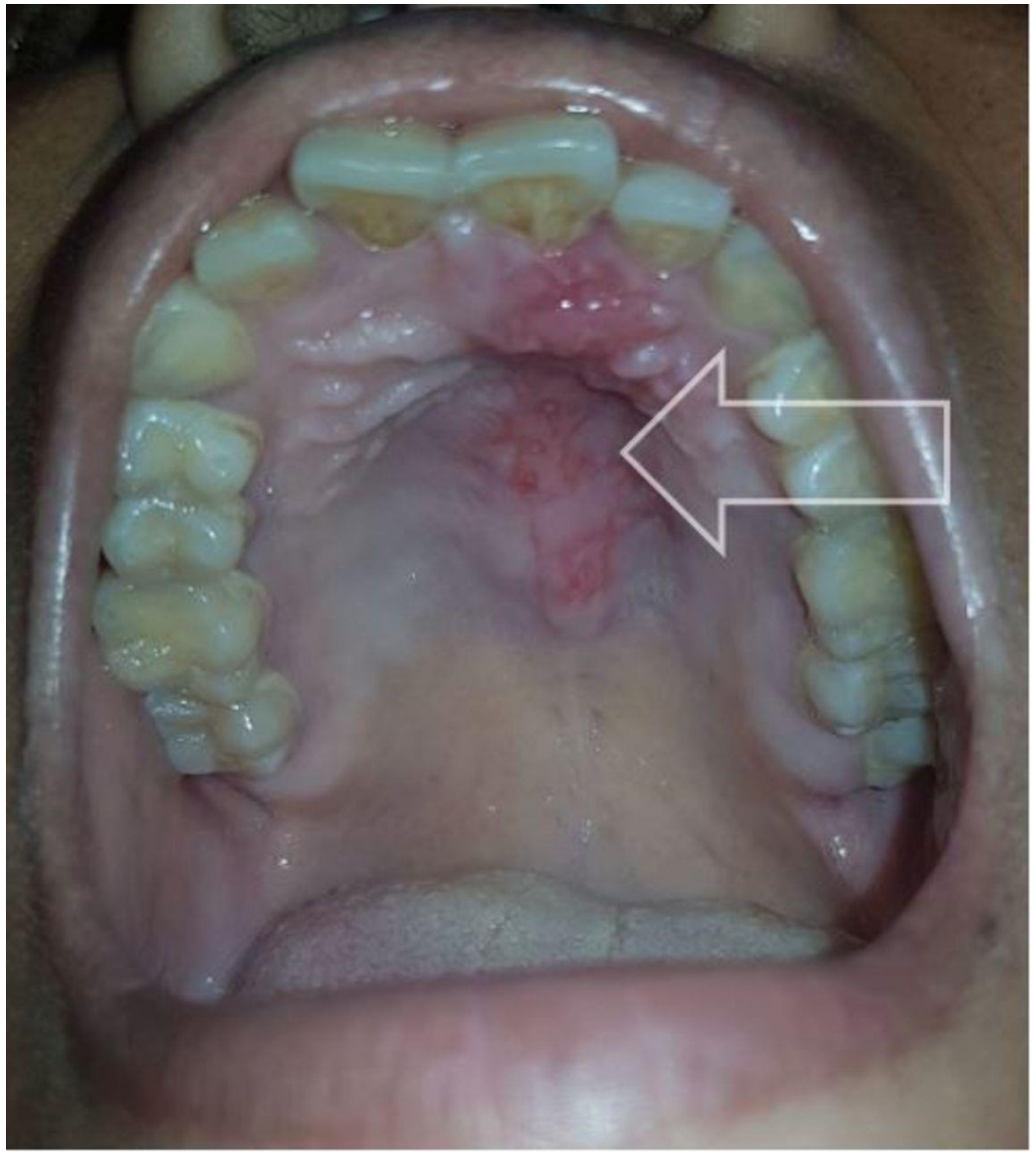
- Management
- Management of the patient with self-inflicted soft tissue injury secondary to lip or tongue biting or chewing is symptomatic:
- 1-Analgesics for pain, as necessary
- 2-Antibiotics, as necessary, in the unlikely situation that infection results.
- 3-Petroleum jelly or other lubricant to cover a lip lesion and minimize irritation.
- 4-Lukewarm saline rinses to aid in decreasing any swelling that may be present.

Sloughing of Tissues

- Prolonged irritation or ischemia of gingival soft tissues may lead to a number of unpleasant complications, including epithelial desquamation and sterile abscess.

Sloughing of Tissues

- Causes
- Epithelial Desquamation
- 1 Application of a topical anesthetic to the gingival tissues for a prolonged period
- 2 Heightened sensitivity of the tissues to either topical or injectable local anesthetic
- 3 Reaction in an area where a topical has been applied



Sloughing of Tissues

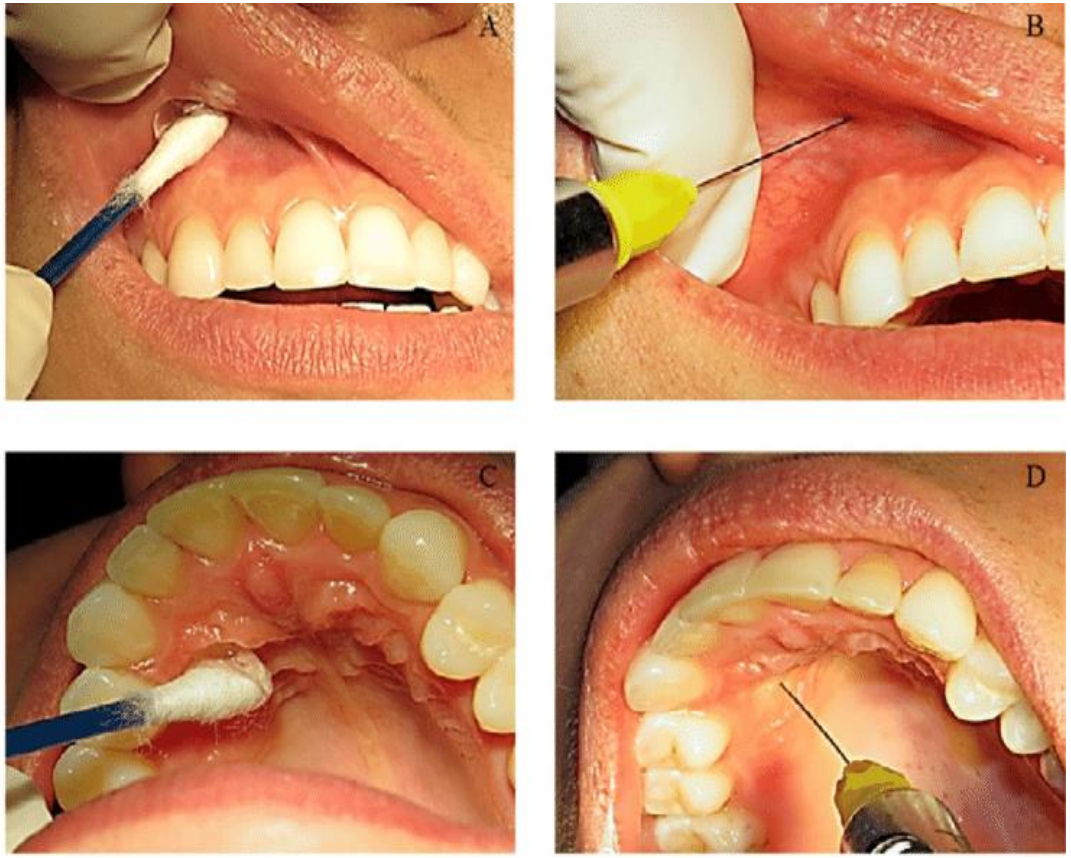
- Causes
- Sterile Abscess
- 1 Secondary to prolonged ischemia resulting from the use of a local anesthetic with vasoconstrictor (usually norepinephrine)
- 2 Usually develops on the hard palate

Sloughing of Tissues

- Problem
- Pain, at times severe, may be a consequence of epithelial desquamation or a sterile abscess.
- It is remotely possible that infection may develop in these areas.

Sloughing of Tissues

- Prevention
- Use topical anesthetics as recommended.
- Allow the solution to contact the mucous membranes for 1 to 2 minutes to maximize its effectiveness and minimize toxicity.
- When using vasoconstrictors for hemostasis, avoid to use overly concentrated solutions.
- Norepinephrine 1:30,000 is the agent most likely to produce ischemia of sufficient duration to cause tissue damage and a sterile abscess
- Epinephrine (1:50,000) also may produce this problem, if reinjection of the solution occurs whenever ischemia resolves, over along period of time (e.g., several hours).



Sloughing of Tissues

- Management
- Usually, no formal management is necessary for epithelial desquamation or sterile abscess.
- Be certain to reassure the patient of this fact.
- Management may be symptomatic.
- Epithelial desquamation resolves within a few days; the course of a sterile abscess may run 7 to 10 days. Record data on the patient's chart

Pain, analgesics such as aspirin or other NSAIDs

Topically applied ointment (Orabase) are recommended to minimize irritation to the area

Postanesthetic Intraoral Lesions

- Patients occasionally report that approximately 2 days after an intraoral injection of local anesthetic, ulcerations developed in their mouth, primarily around the site(s) of the injection(s).
- The primary initial symptom is pain, usually of a relatively intense nature.

Postanesthetic Intraoral Lesions

- Cause
- Recurrent aphthous stomatitis or herpes simplex can occur intraorally

after any trauma to the intraoral tissues.

after a local anesthetic injection

Postanesthetic Intraoral Lesions

- Cause
- Recurrent aphthous stomatitis (recurrent aphthous ulceration) is the most common oral mucosal disease known to human beings.
- Recurrent aphthous stomatitis is more frequently observed than herpes simplex,
- the ulcers are not preventable, and treatment remains symptomatic.

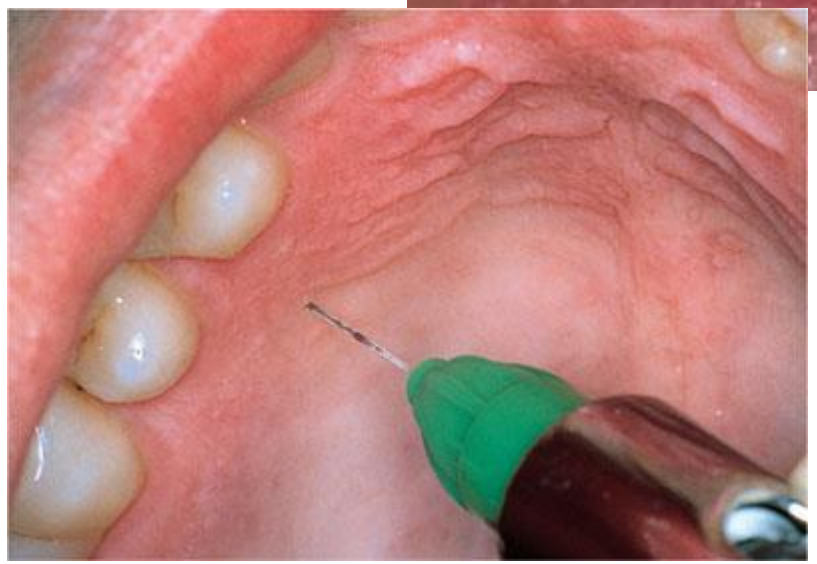
typically developing on gingival tissues that are not attached to underlying bone (e.g., movable tissue), such as the buccal vestibule

Postanesthetic Intraoral Lesions

- Cause
- Herpes simplex can develop intraorally, although more commonly it is observed extraorally. It is viral and becomes manifest as small bumps on tissues that are attached to underlying bone (e.g., fixed) such as the soft tissue of the hard palate

Postanesthetic Intraoral Lesions

- Cause
- Trauma to tissues by a needle, a local anesthetic solution, a cotton swab, or any other instrument (e.g., rubber dam clamp, handpiece) may activate the latent form of the disease process that was present in the tissues before injection.



Postanesthetic Intraoral Lesions

- Problem
- The patient describes acute sensitivity in the ulcerated area.
- Many consider that the tissue has become infected as a result of the local anesthetic injection they received; however, the risk of a secondary infection developing in this situation is minimal

Postanesthetic Intraoral Lesions

- Prevention
- Unfortunately, there is no means of preventing these intraoral lesions from developing in susceptible patients.
- Extraoral herpes simplex, on occasion, may be prevented or its clinical manifestations minimized if treated in its prodromal phase.
- Antiviral agents, such as acyclovir, applied qid (1*4) to the affected area effectively minimize the acute phase of this process.

The prodrome consists of a mild burning or itching sensation at the site where the virus is present (e.g., lip).

Postanesthetic Intraoral Lesions

- Management
- Primary management is symptomatic.
- No management is necessary if the pain is not severe
- Pain is the major initial symptom, developing approximately 2 days after injection.
- Reassure the patient that the situation is not caused by a bacterial infection secondary to the local anesthetic injection, but in fact is an exacerbation of a process that was present, in latent form, in the tissues before injection. (Body response to trauma)

Postanesthetic Intraoral Lesions

- Management
- However, if pain causes the patient to complain, treatment can be instituted, usually with varying degrees of success.
- The objective is to keep the ulcerated areas covered or anesthetized. Topical anesthetic solutions (e.g., viscous lidocaine) may be applied as needed to the painful areas.
- A mixture of equal amounts of diphenhydramine (Benadryl) and milk of magnesia rinsed in the mouth effectively coats the ulcerations and provides relief from pain.

Postanesthetic Intraoral Lesions

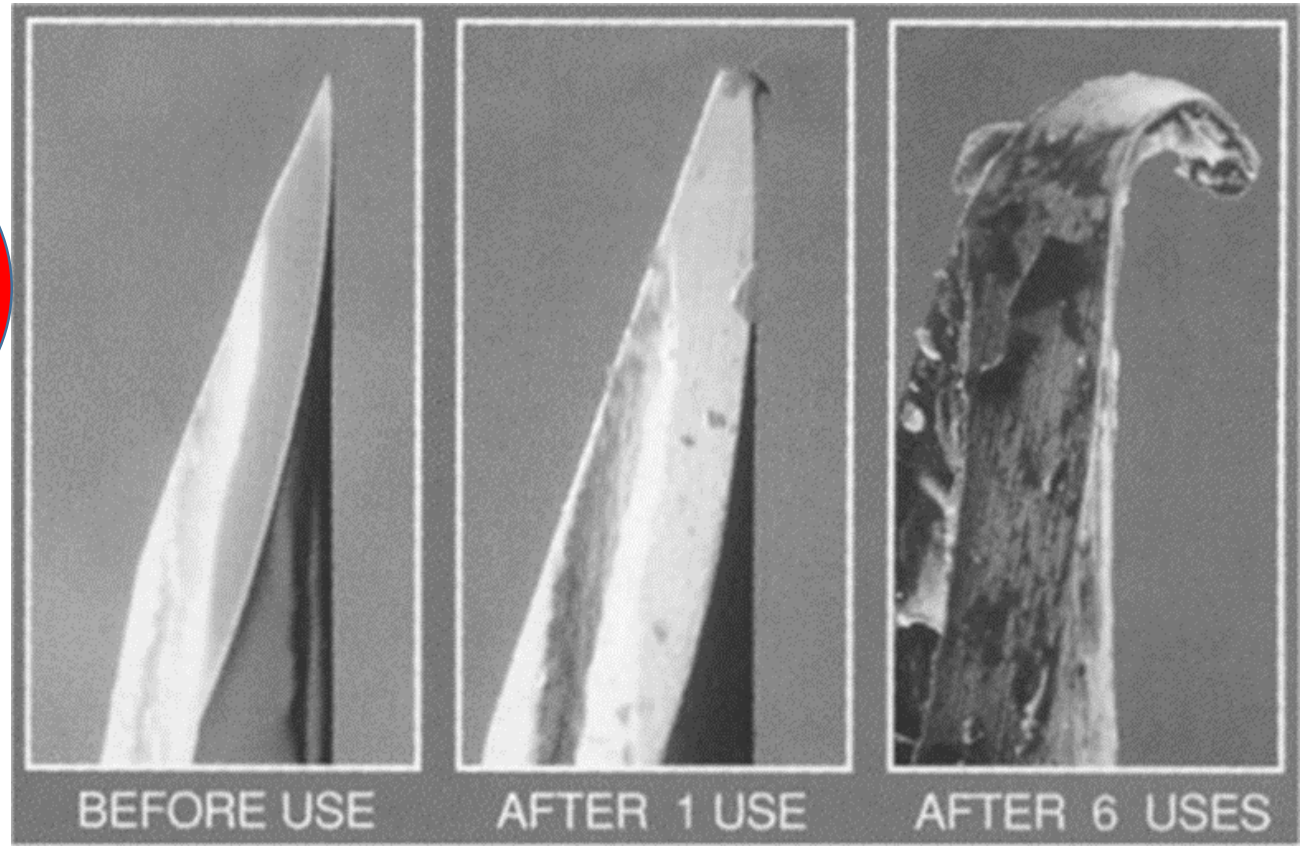
- Management
- Orabase, a protective paste, without Kenalog can provide a degree of pain relief.
- Kenalog, a corticosteroid, is not recommended because its anti-inflammatory actions increase the risk of viral or bacterial involvement.
- A tannic acid preparation (Zilactin) can be applied topically to the lesions extraorally or intraorally (dry the tissues first).
- The ulcerations usually last 7 to 10 days with or without treatment. Maintain records on the patient's chart.

Pain on Injection

- Pain on injection of a local anesthetic can best be prevented through careful adherence to the basic protocol of atraumatic injection.

Pain on Injection

- Causes

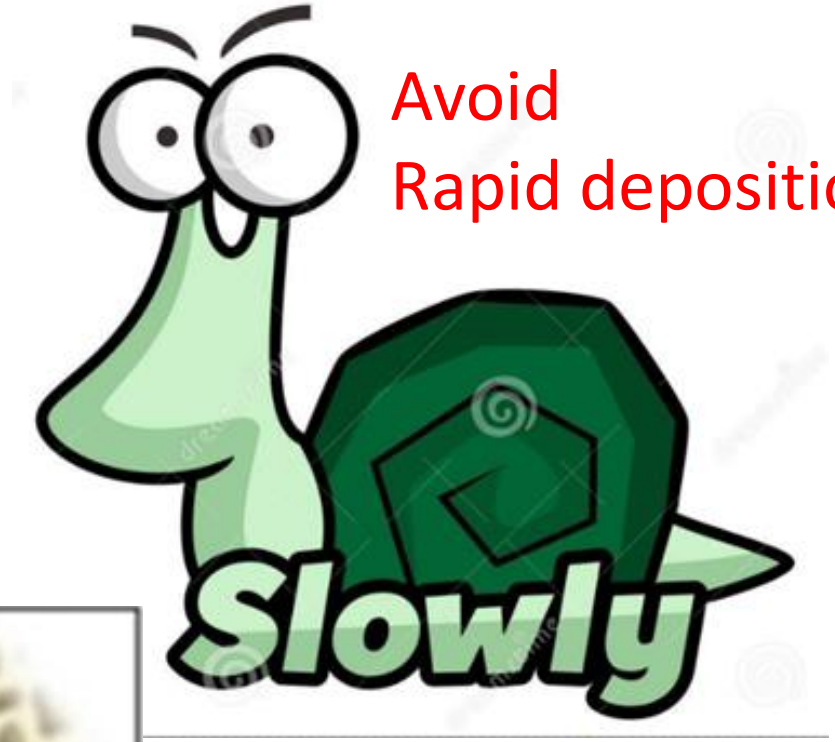


2 A needle can become dull from multiple injections.

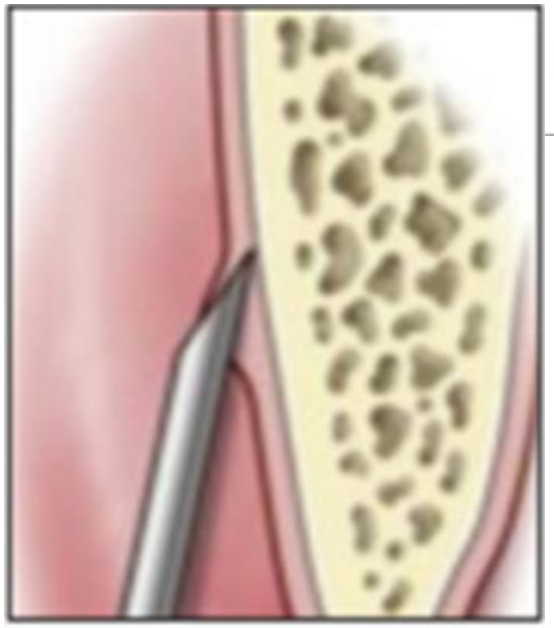
1 Careless injection technique and a callous attitude (“Palatal injections always hurt” or “This will hurt a little”) all too often become self-fulfilling prophecies.

Pain on Injection

- Causes
- 3 Rapid deposition of the local anesthetic solution may cause tissue damage.
- 4 Needles with barbs (from impaling bone) may produce pain as they are withdrawn from tissue.



Avoid
Rapid deposition



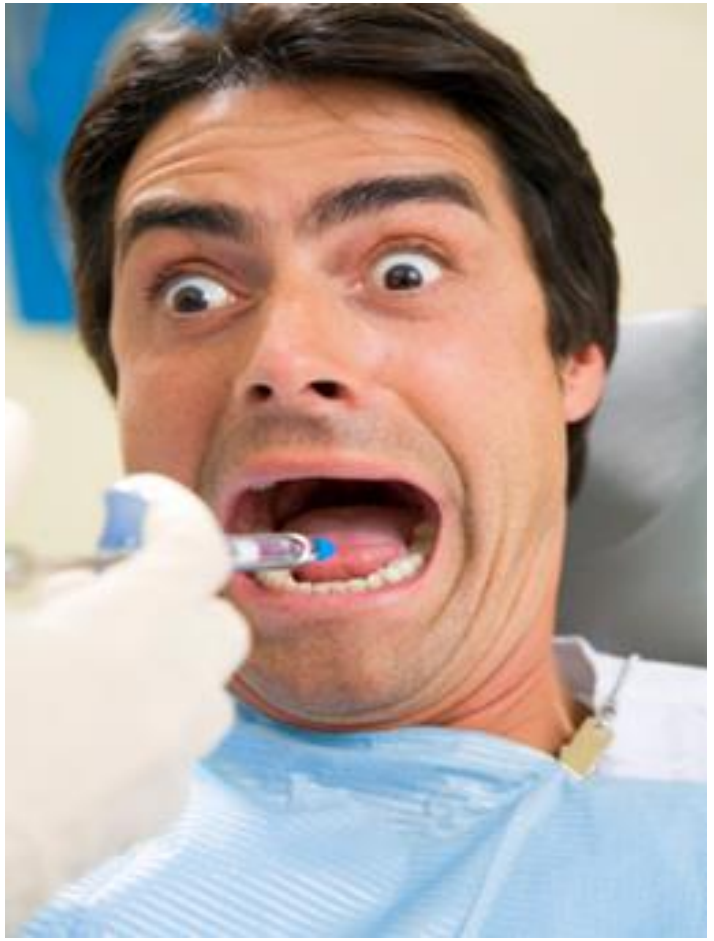
Pain on Injection

- Problem
- Pain on injection
- increases patient anxiety and may
- lead to sudden unexpected movement,

1-increasing the risk of needle breakage,

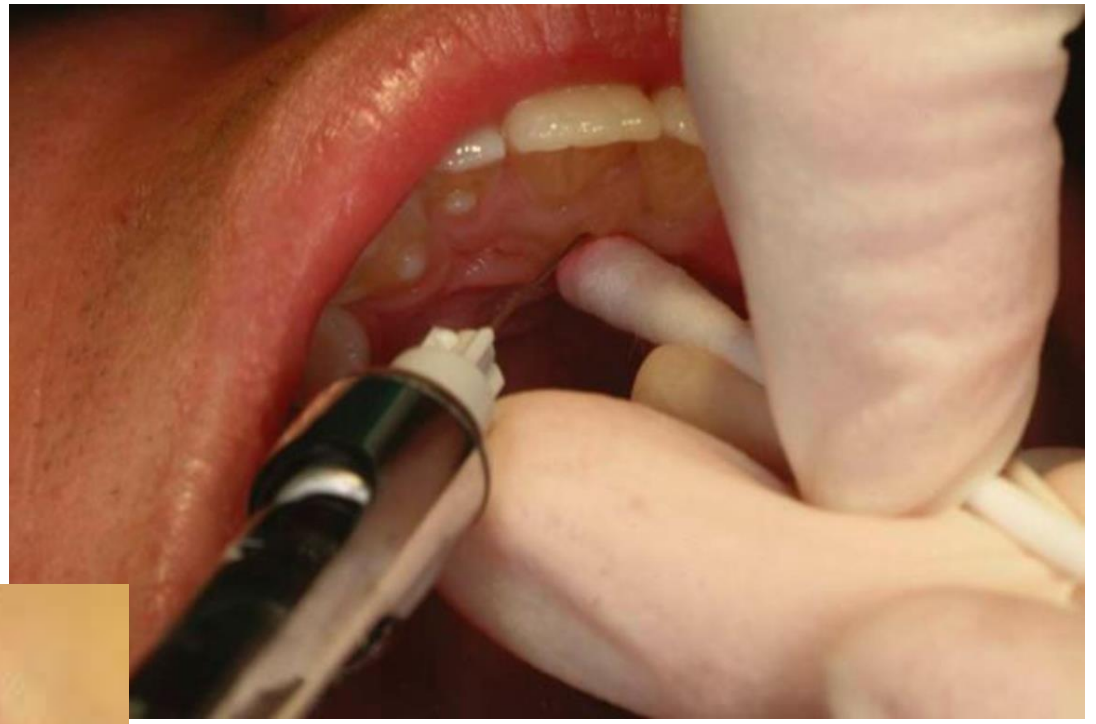
2-traumatic soft tissue injury to the patient,

3-or needle-stick injury to the administrator.

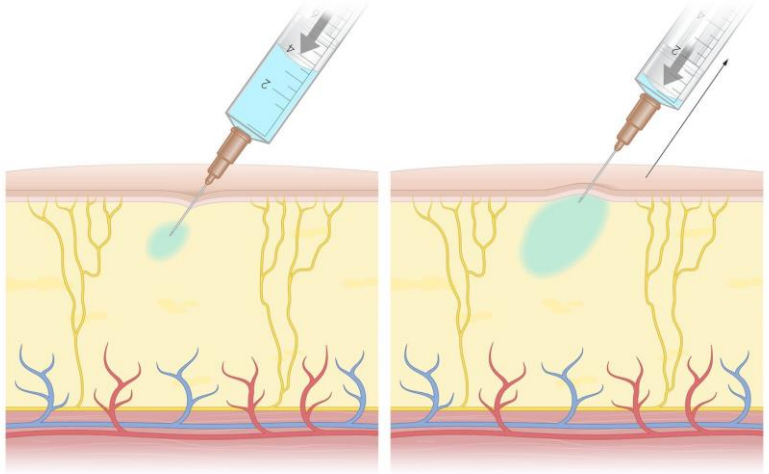


Pain on Injection

- Prevention
- 2 Use sharp needles.
- 4 Use sterile local anesthetic solutions.



1 Adhere to proper techniques of injection, both anatomic and psychological.



5 Inject local anesthetics slowly.

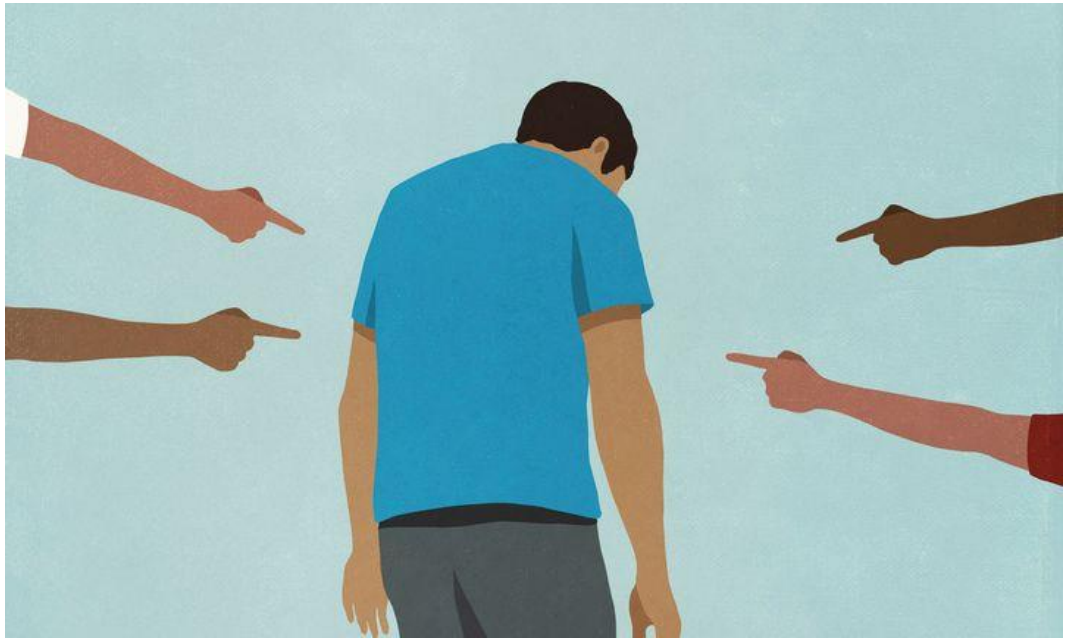
3 Use topical anesthetic properly before injection.

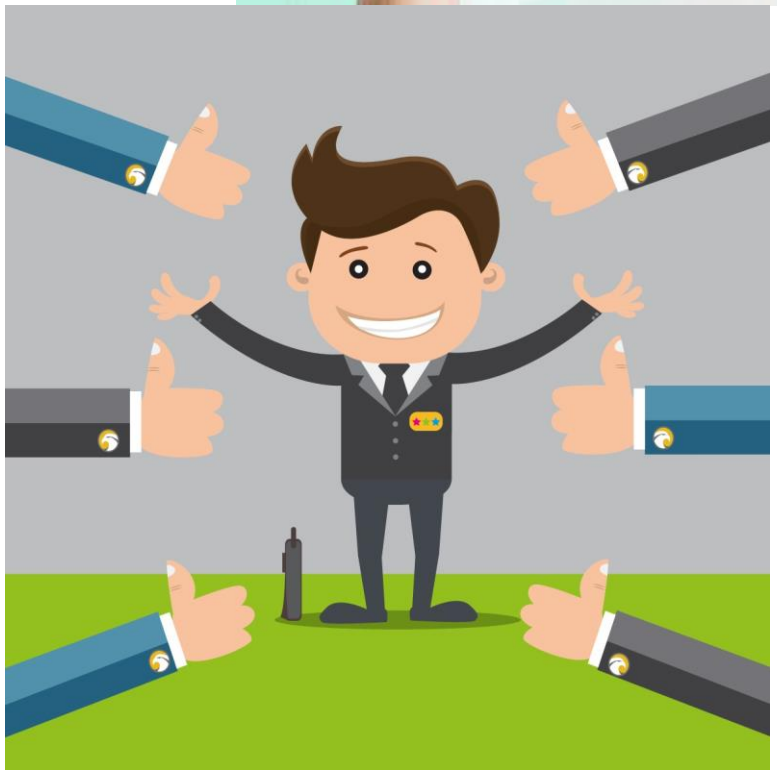
Pain on Injection

- Prevention
- 6 Make certain that the temperature of the solution is correct. A solution that is too hot or too cold may be more uncomfortable than one at room temperature.
- 7 Buffered local anesthetics, at a pH of approximately 7.4, have been demonstrated to be more comfortable on administration.

Pain on Injection

- Management
- No management is necessary.
- However, steps should be taken to prevent the recurrence of pain associated with the injection of local anesthetics.





Burning on Injection

- Causes
- is not uncommon. Several potential causes are known.
- The primary cause of a mild burning sensation is the pH of the solution being deposited into the soft tissues. The pH of “plain” local anesthetics is higher that with vasopressor included) is approximately 6.5,
- Rapid injection of local anesthetic, especially in the denser, more adherent tissues of the palate, produces a burning sensation.
- Contamination of local anesthetic cartridges can result when they are stored in alcohol or other sterilizing solutions, leading to diffusion of these solutions into the cartridge.
- Solutions warmed to normal body temperature usually are considered “too hot” by the patient.

Burning on Injection

- Problem
- Although usually transient, the sensation of burning on injection of a local anesthetic indicates that tissue irritation is occurring.
- If this is caused by the pH of the solution, it rapidly disappears as the anesthetic action develops. Usually no residual sensitivity is noted when the anesthetic action terminates.
- When a burning sensation occurs as a result of rapid injection, a contaminated solution, or an overly warm solution, the likelihood that tissue may be damaged is greater, and subsequent complications such as postanesthetic trismus, edema, or possible paresthesia are reported.

Burning on Injection

- Prevention
- By buffering the local anesthetic solution to a pH of approximately 7.4 immediately before injection, it is possible to eliminate the burning sensation that some patients experience during injection of a local anesthetic solution containing a vasopressor.
- Slowing the speed of injection also helps. The ideal rate of injectable drug administration is 1 mL/min. Do not exceed the recommended rate of 1.8 mL/min.
- The cartridge of anesthetic should be stored at room temperature in the container (blister-pack or tin) in which it was shipped, or in a suitable container without alcohol or other sterilizing agents.

Burning on Injection

- Management
- Because most instances of burning on injection are transient and do not lead to prolonged tissue involvement,
- formal treatment usually is not indicated.
- In those few situations in which postinjection discomfort, edema, or paresthesia becomes evident, management of the specific problem is indicated

Injecting Local Anesthetic Solution Into an Area of Infection

- local anesthetics are less effective when injected into infected tissues.
- However, if deposited under pressure, as in the periodontal ligament injection, the force of their administration might transport bacteria into adjacent, healthy tissues, thereby spreading infection

Injecting Local Anesthetic Solution Into an Area of Infection

- Problem Contamination of needles or solutions may cause a low-grade infection when the needle or solution is placed in deeper tissue. This may lead to trismus if it is not recognized and if proper treatment is not initiated.

Injecting Local Anesthetic Solution Into an Area of Infection

- Prevention
- 1 Use sterile disposable needles.
- 2 Properly care for and handle needles. Take precautions to avoid contamination of the needle through contact with nonsterile surfaces; avoid multiple injections with the same needle, if possible.
- 3 Properly care for and handle dental cartridges of local anesthetic.

a Use a cartridge only once (one patient).

b Store cartridges aseptically in their original container, covered at all times.

c Cleanse the diaphragm with a sterile disposable alcohol wipe immediately before use.

Injecting Local Anesthetic Solution Into an Area of Infection

- Prevention
- 4 Properly prepare the tissues before penetration. Dry them and apply topical antiseptic (optional).

Injecting Local Anesthetic Solution Into an Area of Infection

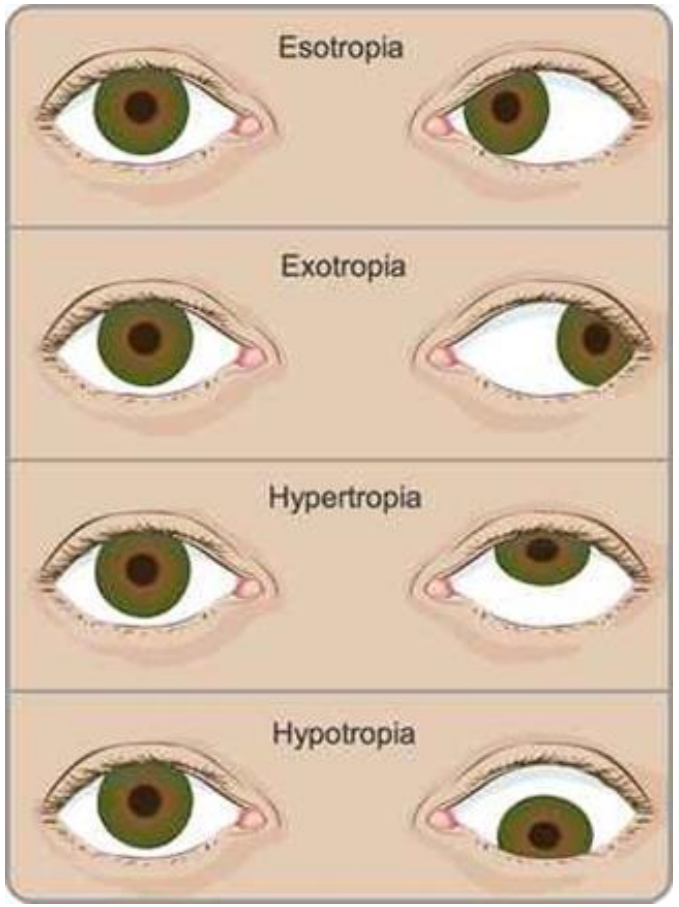
- Management
- Low-grade infection, which is rare, is seldom recognized immediately.
- The patient usually reports postinjection pain and dysfunction 1 or more days after dental care.
- Overt signs and symptoms of infection occur rarely.

Injecting Local Anesthetic Solution Into an Area of Infection

- Management
- Trismus produced by factors other than infection normally responds with resolution or improvement within several days.
- If signs and symptoms of trismus do not begin to respond to conservative therapy within 3 days, the possibility of a low-grade infection should be entertained and the patient started on a 7- to 10-day course of antibiotics.
- Amoxiclline 500mg 1*3 (21-30 tabs) 1000mg as initiating dose
- Azithromycin can be used in case of penicillin sensitivity

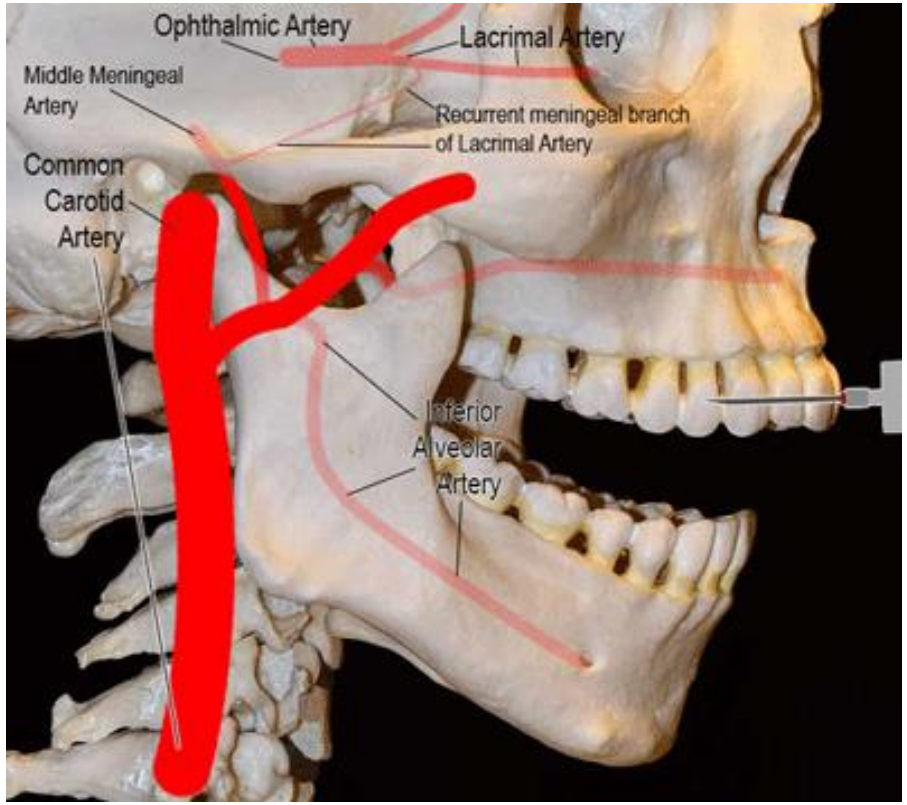
Visual Disturbances

- On very rare occasions, patients may complain of unilateral or bilateral disturbance of vision.
- This may take the form of squints or double vision and even transient blindness has been reported.



Visual Disturbances

- An adequate explanation of these phenomena is difficult to find but it seems possible that vascular spasm or accidental intra-arterial injection is the most likely cause.
- In such cases an unusual vascular distribution can be assumed and the patient reassured that normal vision will be restored within about 30 minutes.



Home message

☑ Prevent

☐ Cure