

DEPARTMENT OF PEDODONTICS

LOCAL ANAESTHESIA

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FINAL YEAR BDS



DEFINITION

“Transient loss of sensation in a circumscribed area of the body caused by a depression of excitation in nerve endings or an inhibition of the conduction process in peripheral nerves.”



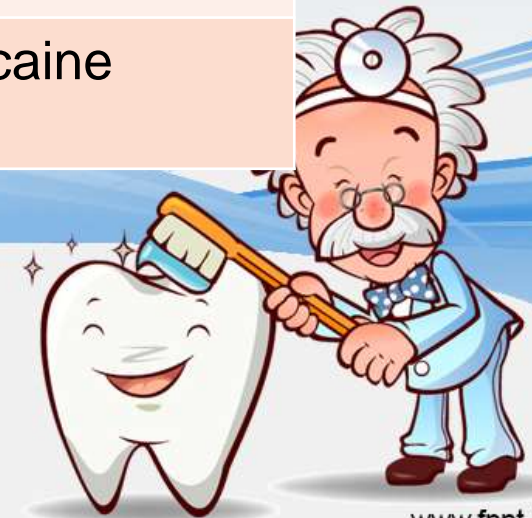
(MALAMED, 1980)



CLASSIFICATION

1. BASED ON COMPOSITION

BENZOIC ACID ESTERS	PARA AMINO BENZOIC ACID ESTERS
Cocaine	Procaine
Benzocaine	Propoxycaine
Butacaine	Chlorprocaine



AMIDE GROUP

Bupivacaine

Lidocaine

Mepivacaine

QUINOLONE

Centbucriidine



2. BASED ON MODE OF ADMINISTRATION

TOPICAL	INJECTABLE
Benzocaine	Procaine
Lignocaine	Lignocaine

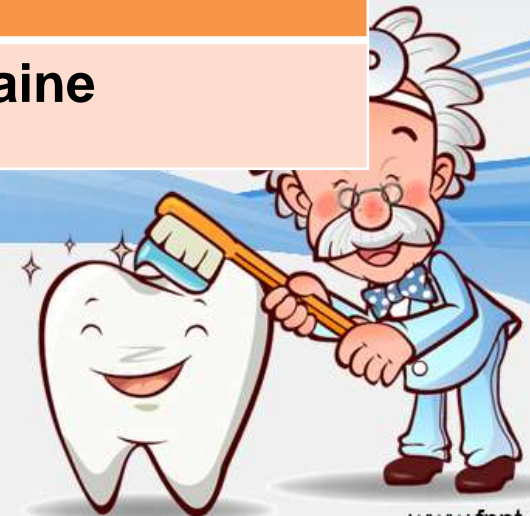


3. BASED ON ITS DURATION

SHORT ACTING	INTERMEDIATE ACTING	LONG ACTING
Procaine	Lidocaine	Bupivacaine

4. BASED ON ITS SOURCE

NATURAL	SYNTHETIC
Cocaine	Lidocaine



5. BASED ON ITS POTENCY

VERY POTENT	MODERATELY POTENT
Etidocaine	Lidocaine



CONSTITUENTS

1. Local anesthetic agent
2. Vasoconstrictors
3. Reducing agents
4. Preservatives
5. Fungicide
6. Vehicle



- **LOCAL ANAESTHETIC AGENT**

Lignocaine hydrochloride 2% is most commonly used local anesthetic agent.

2% lignocaine means 2 mg in 100 ml

USES- Conduction block

- **VASOCONSTRICTORS**

Adrenaline in the concentration of 1:50000 to 1:200000 is commonly used.

1:200000 means 1 gm in----- 200000 ml

USES

Delays absorption of LA from the site.

Provides blood less field.

Prolongs the actions.

Reduces the systemic toxicity.



- **REDUCING AGENT**

Sodium metabisulphite is used to prevent the oxidation of the vasoconstrictor.

- **PRESERVATIVES**

Methylparaben

It increases the shelf life of the anesthetic solution

Acts as a bacteriostatic agent

- **FUNGICIDE**

Thymol is used as fungicide

- **VEHICLE**

Modified ringer's solution or distilled water is used as vehicle.

It produces the volume of the solution and act as diluent.



MAXIMUM RECOMMENDED DOSES

- 4.4 mg/kg body weight with Adrenaline
- 7.5 mg/kg body weight without Adrenaline

DOSE CALCULATION

- $\% \text{ CONCENTRATION}(\text{mg/ml}) \times \text{ml/cartridge} = \text{total mg/cartridge}$

FOR EG: In a 10 kg child

if 1 kg =4.4mg

Then 10kg =44mg

20 mg =1ml (2% lignocaine)

Then 44mg =2.2 ml

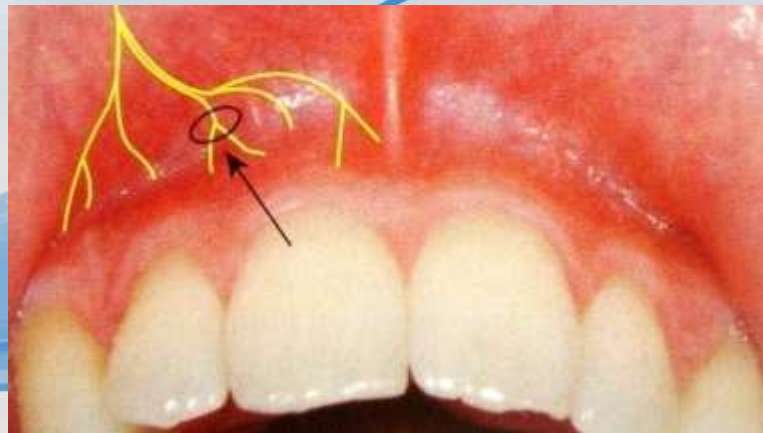
So in a child of 10 kg maximum recommended dose of LA is 2.2 ml.



TECHNIQUES OF ADMINISTRATION

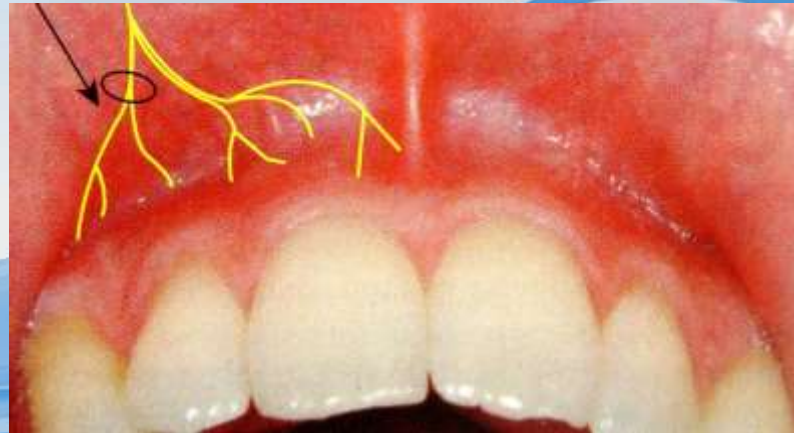
LOCAL INFILTRATION

- Small terminal nerve endings in the area of surgery are flooded with LA solution rendering them insensitive to pain. In this method, insertion is made through the same area in which the solution has been deposited.
- This technique is usually successful for treatment of mandibular deciduous canines, incisors and even in molars.



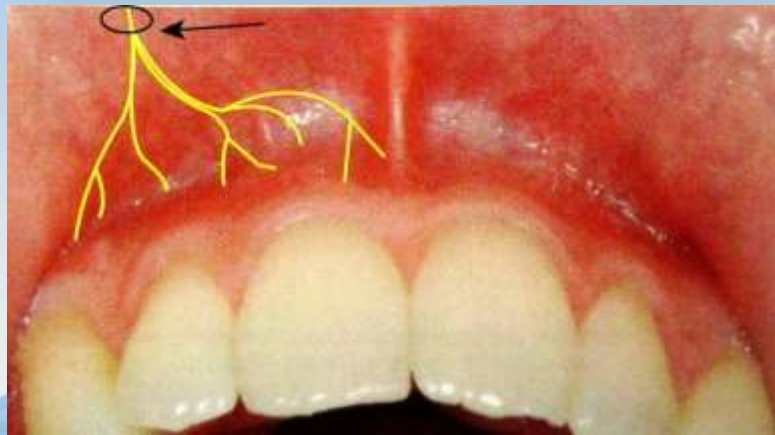
FIELD BLOCK

- Here the LA solution is deposited in proximity to the large terminal nerve branches so that the area to be anesthetized is circumscribed to prevent the central passage of afferent impulse
- Maxillary injections administered above the apex of the tooth can be termed field blocks



NERVE BLOCK

- Method of securing local analgesia in which suitable local anesthetic solution is deposited within close proximity to the main nerve trunk, thus preventing nerve impulses from travelling centrally beyond that point.



OTHER TECHNIQUES

- Intraligamentary
- Intraseptal
- Intrapapillary
- Intrapulpal





**The child should never see the injection needle
This creates anxiety and fear towards dental treatment**

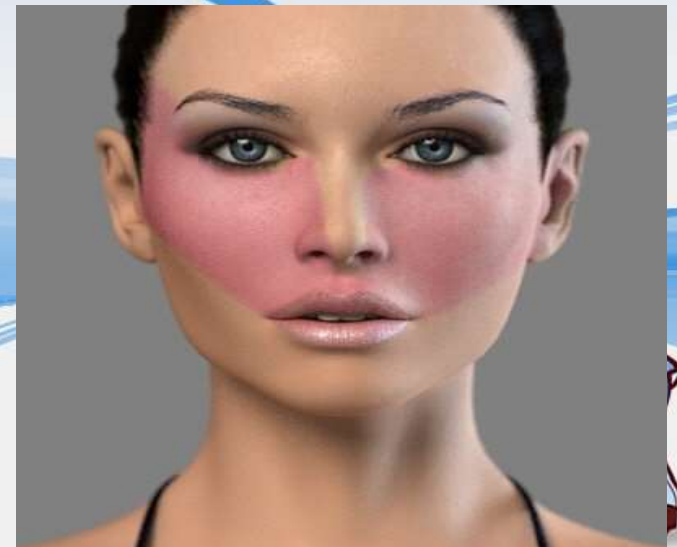
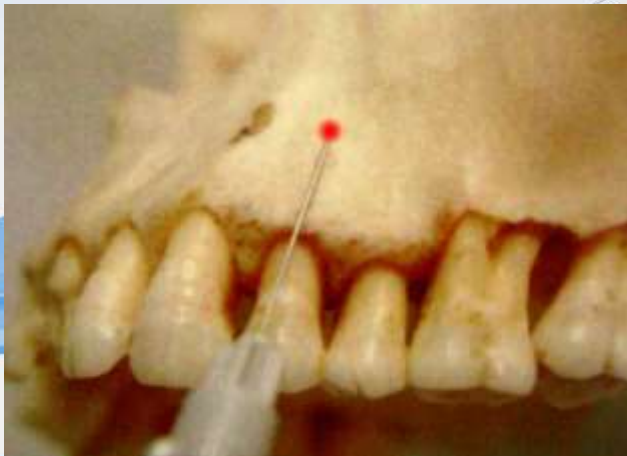


Keep the syringe away from the Line of sight of the patient



Maxillary Injection

Techniques

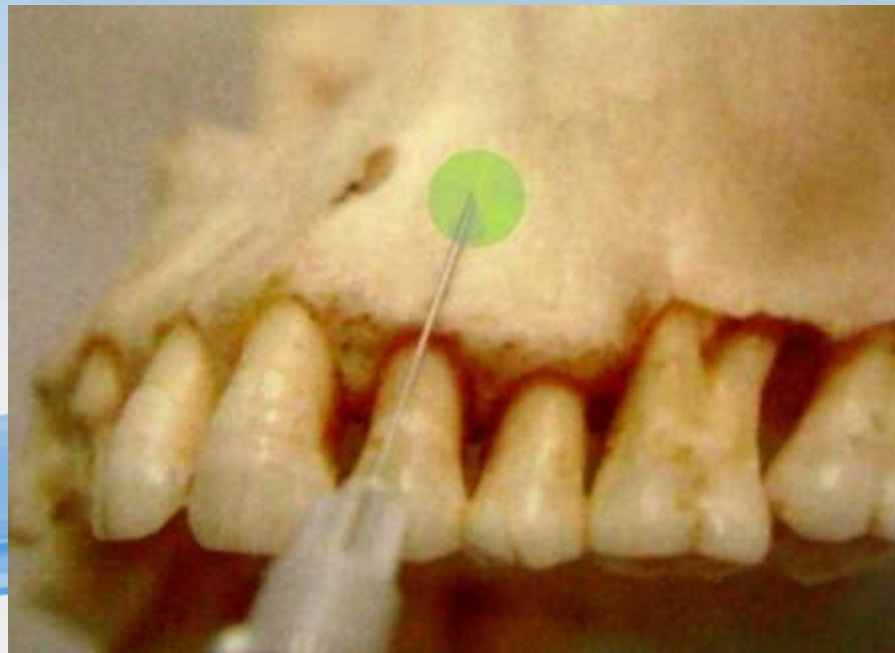


- Supraperiosteal (Local infiltration)
- Periodontal Ligament Injection
- Intraseptal Injection
- Intraosseous
- Posterior Superior Alveolar Nerve Block
- Middle Superior Alveolar Nerve Block
- Anterior Superior Alveolar Nerve Block
- Greater Palatine Nerve Block
- Nasopalatine Nerve Block
- Maxillary Nerve Block (Infraorbital Nerve Block)



SUPRAPERIOSTEAL INJECTION

- Most frequently used technique for obtaining pulpal anesthesia in maxillary teeth.
- Indicated whenever dental procedures are confined to only one or two teeth.

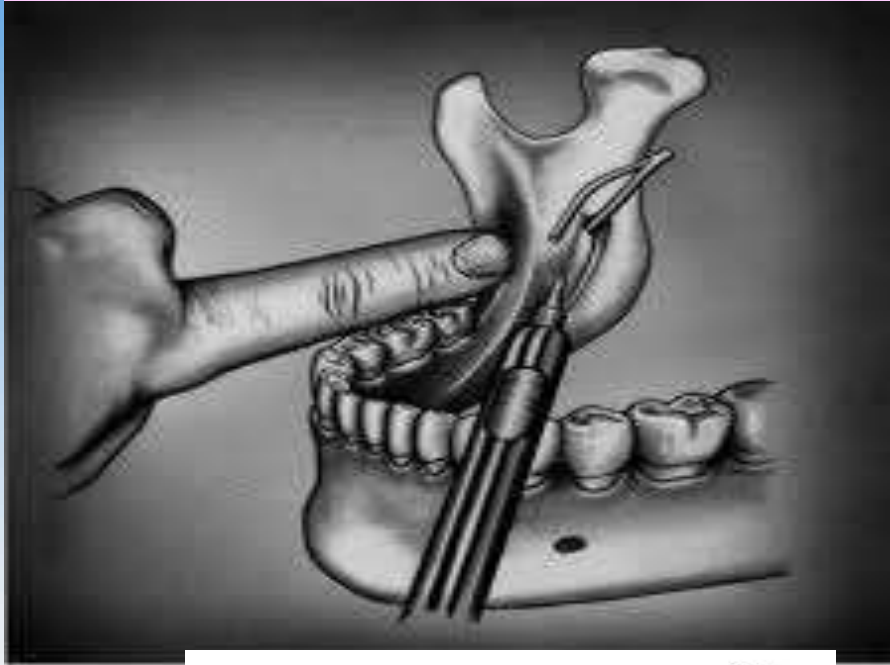


PROCEDURE

- Prepare the tissue at the injection site.
- Orient the needle so that bevel faces the bone.
- Lift the lip, pulling the tissue taut.
- Hold the needle parallel to the long axis of the tooth.
- Insert the needle into the height of the mucobuccal fold over the target tooth.
- Advance the needle until its bevel is at or above the apical region of the tooth.
- Aspirate 2 times.
- If negative, deposit approximate **0.6 ml** of LA over 20 seconds.
- Slowly withdraw the syringe.
- Make the needle safe.
- Wait for 3 to 5 minutes before starting the dental procedure.



Mandibular Injection Techniques



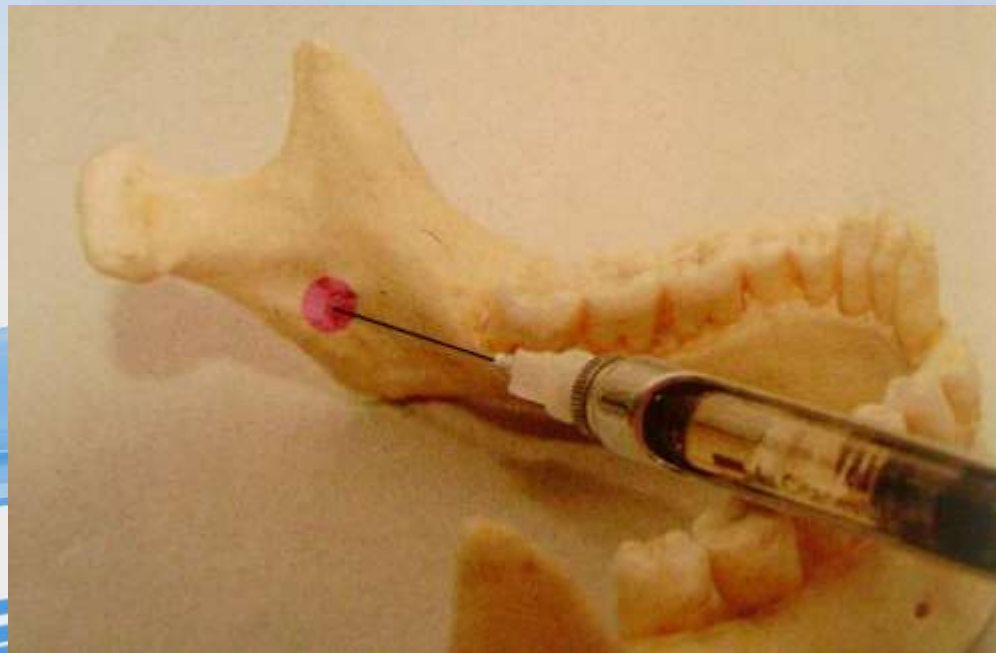
INFERIOR ALVEOLAR NERVE BLOCK

- Needle Used – **25 Gauge**
- Nerves Anesthetized –
Inferior Alveolar Nerve
Lingual Nerve
- Site Of Injection –
Region where the IAN enters the mandible through the
Mandibular Foramen
- Amount of solution deposited – **1 to 1.8 ml**



TECHNIQUE

- 25 gauge needle is used
- Area of insertion – Mucous membrane on the medial side of the mandibular ramus near the mandibular foramen.
- Target area – Inferior alveolar nerve as it passes downward towards the mandibular foramen but before it enters the foramen.



PROCEDURE

- With the left thumb, palpate the coronoid notch.
- With the same finger, pull the buccal soft tissue laterally to gain visibility and make the tissue taut.
- The needle insertion point lies three fourths the anteroposterior distance from the coronoid notch to the deepest portion of pterygomandibular raphae.
- Prepare the tissue of injection site



- Place the barrel of the syringe in the corner of the mouth on the contralateral side.
- Penetrate the tissue with the needle and slowly advance till bony resistance is felt.
- Average depth of penetration is **20 – 25 mm**
- When bone is contacted, withdraw 1 mm to prevent subperiosteal injection.
- Aspirate.
- If negative, slowly deposit **1.5 ml** of anesthetic over a period of **1 minute**.
- Slowly withdraw the syringe till half of its length remains in the tissue.



- Re-aspirate.
- If negative, deposit a portion of remaining anesthetic (**.1 ml**) to anesthetize **lingual nerve**.
- Withdraw the syringe slowly and make the needle safe.
- After about 20 seconds, return the patient to upright or semi-upright position.
- Wait for 3 to 5 minutes before commencing the dental procedure.



TOPICAL ANESTHESIA

- It is the method of obtaining anesthesia by the application of suitable agent to an area of either the **skin** or **mucous membrane** through which it penetrates to **anesthetize superficial nerve endings**.
- It is commonly used to obtain anesthesia of the mucosa **prior to injection**.



PROCEDURE

- Dry the area of application (mucous membrane).
- Spray an appropriate quantity of the solution into a small cotton roll.
- Place the cotton role on the site of injection in the sulcus.
- Wait for 1 minute before inserting the needle to allow the topical anesthetic to act.



Complications Of LA (Pediatric Patient)

NUMB FEELING

- Invites the possibility of an unnecessary **emotional upset** of the child.

How to Avoid ?

- The dentist should **explain beforehand** to the child that he/she will experience the numbness after the administration of LA.



LIP BITING



How to avoid ?

- Warning should be given immediately following injection procedure. Warning should be repeated before the child leaves the dental chair.
- Parents should also be warned about this possible complication if not attended properly.



Complication due to Injection of LOCAL ANESTHETIC SOLUTION

- **3 TYPES –**

- 1. Method of deposition of the drug**
- 2. Drug dosage dependent reactions**
- 3. Hypersensitivity reactions**



Method Of Deposition Of Drug

Vasovagal Syncope

- Due to peripheral pooling of blood and reduction in cerebral blood flow
- Rarely encountered in children due to constant movement of extremities coupled with crying out loud which prevents the peripheral pooling of blood



Broken Needle

- Due to sudden movement during administration of the LA solution

Failure To Achieve Anesthesia

- This may be due to
 1. Improper Technique of administration
 2. Normal anatomic Variation



FACIAL NERVE PARALYSIS



- Encountered during IANB
- Due to injection of LA solution into parotid gland
- Facial Nerve gets temporarily paralyzed
- Effects wears off over a period of time during which the eye needs to be protected



TRISMUS

- Due to trauma to muscles or blood vessels of infra temporal fossa.
- Intramuscular or supramuscular injection of LA.
- Hemorrhage.
- Hematoma and scar formation.

How to Avoid ?

- Avoid repeated injections or multiple insertions into the same area.
- Use only minimum effective volume of LA.



Drug Dose Dependent Reactions

- At Low levels - \uparrow Heart rate and Cardiac Output
- At High levels - \downarrow Cardiac Output & Circulatory Failure
- Methemoglobinemia – Caused by Benzocaine & Prilocain

How To Avoid ?

- Use Of Aspiration Technique
- Keeping the amount of agent administered below toxic limit.



CAUSES OF TOXICITY

- Use of excessive dose of LA.
- Inadvertent intravascular injection.
- Slow detoxification or biotransformation.
- Slow elimination or redistribution.
- Majority of the toxic reactions to LA are **immediate, mild and transient**.
- They can be avoided by **closely monitoring** during the injection, **injecting slowly** and **withdrawing the needle** at the first signs of an adverse response.



Manifestation Of Toxicity

Concentration of LA
in Plasma



- Cardiac Depression
- Coma
- Convulsions
- Unconsciousness
- Muscular twitching
- Visual and auditory disturbances, light headedness, numbness of tongue



Hypersensitivity (rare)

Manifests as

- Urticaria
- Facial edema
- Breathlessness

Methyl paraben (protein) is the main allergent
It has been replaced in recent times



THANK YOU

