Pediatric dentistry lecture #12

Dr. Mahmoud Hamdan

Written by: Seema Salam Daradkeh & Joud Omari.

Corrected by: Joud Omari & Seema Daradkeh.

It is important to refer to the slides since the dr said it has all the information you need to know.

**Local Analgesia in pediatric dentistry**

The main problem in children’s dentistry is analgesia.

Most of the difficulties we face when dealing with children is due to the painful imagination of the procedures especially the injections.

Pain is the most important factor behind fear and anxiety in children.

* Fear: external due to sight, smell and sounds.
* Anxiety: internal threat, more difficult to control.
* Analgesia vs. anesthesia
* Anesthesia is the total loss of sensation.
* Analgesia is the effect of stabilization of the nerve ending, sodium channel depolarization (Na goes inside, K goes outside) the impulses stop. The effect of analgesia matches the effect of Anti histamines & anti epileptic drugs.
* Allergy from local analgesia is rarely due to the analgesic solution (ester or amide) but more due to the preservatives (bisulfate or metasulfate)
* Types of LA:

1. Amide types: more commonly used than ester, Lidocaine, mepivacaine, prilocaine, bupivacaine, and levo-bupivacaine. This type is less allergic, more potent than ester type.

Heat stable, long shelf life, slower onset and long duration

Contra indicated in malignant hyperpyrexia. A rare complication, in some families, an antidote (dilantin) is present but not readily available because its expiry date is quick.

1. Ester type: not used as much, procaine (the most common in its category), cocaine, benzocaine, and tetracaine.  
   Unstable in solution, fast acting, more allergic, less potent.

Contraindicated in choline esterase enzyme deficiency, since the ester is metabolized in the liver by choline esterase, when it’s deficient the ester will accumulate in the blood.

1. Non-ester, non-amide type: dyclonine it’s a ketone used when patients are allergic to both previously mentioned.

* Topical analgesia:

Most commonly used are: lidocaine and benzocaine. Tetracaine is also a topical analgesic but it’s not recommended for children.

Topical analgesics are commonly misused, the dose of topical analgesia should be added to the whole dose of the analgesia given, has many calculations that are not to be memorized, but you should know the general guidelines:

* The area of application should be dry.
* There’s no need to use a huge amount of the material. Only a lentil seed size, on the area of the needle prick.
* The taste of the topical analgesic isn’t tasty so children don’t like it.
* Should be left for at least 2 minutes.
* Doses:
* Only memorize the number: 3/14 ml/Kg
* This is a constant that is multiplied by the estimated weight of the patient.
* Then the number we get is multiplied by the patient’s actual weight.
* The resultant number is divided by the number (mg/cartridge) to get the safe dose (number of cartridges)
* For example: a patient weighs between 20-28, what’s the safe dose of lidocaine 2% you can administer:  
  28\*(3/14)= 6 ml/Kg  
  20\*6=120  
  1.8\*20=36 mg  
  120/36=3.3 cartridges.
* In children we don’t even need to reach the safe dose since we never need to use this amount a cartridge or 2 administered in the correct way are more than enough because we’ll never have to perform pulpotomy on 4 molars for example, or extract a whole arch.
* 1/3 cartridge is enough to anaesthetize a child if the technique is correct.
* Toxicity in anesthesia is irreversible, there’s no antidote but only caring for ABCs
* **Four mistakes are the most common made by dentists when attempting to anaesthetize a child or through the procedure:**

1. Waving the needle in front of the child. You have to hide it from the child’s range of sight.
2. Not getting firm control of the patient head and hands. This is why there should always be an assistant to help control the patient’s unpredicted movements.
3. The use of long needle. Or even a short needle, a short needle could be used only in IANB. Always use an ultra/very short needle.
4. The use of inappropriate doses for children.

* How to administer:

1. Good retraction, to lower the number of nerve endings touched by the needle (less pain), and to lower the stress against the needle
2. Infiltration in the upper and lower arch except for lower 2nd primary molar
3. Don’t go very deep in the sulcus and touch bone from the first time because it’s very painful. Give few drops once in the tissue then give another injection that could touch the bone without any pain.
4. Slow injection, while monitoring the patient’s vital signs, and a better distribution of the solution in the tissue.
5. Any ballooning during anesthesia is a failure of anesthesia

* Problems that might prove harmful to the patient:

1. Bubbles in the cartridge due to a loose stopper
2. Extended stopper
3. Burning sensation upon injection, because of keeping the cartridge in the syringe for a long time, the solution will go into the needle which is lined with lithium and after injecting the patient it will cause many complications as burning.
4. Rust in the cap, or expired cartridge.
5. Leakage during injection from around the hub.
6. Broken cartridge

* Methods of administration in pediatric dentistry:

1. Jet injection:

* Looks just like a handpiece, has force and a trigger.
* Used as topical anesthesia, you apply it to the mucosa and you just press the trigger.
* It doesn’t have a needle; it just pushes the solution into mucosa using pressure.
* Has a pin grip.

1. CAT technique: like intraseptal technique.

* At the crest of the interseptal bone between two teeth at 45 degrees angle.
* It is very painful.
* Infiltration should be given before we use this technique.

1. Intraligamental technique:

* This technique is used when we have tried infiltration and the patient is still in pain and not anesthetized.
* It has a special needle for its administration, but if we don’t have that needle we can bend the needle that we have 90 degrees and we insert it between the cementum of the root and the periosteum (interseptal bone); inside the periodontal pocket.
* Site: at the distobuccal corner of the tooth in upper and lower teeth.
* To insure success we should have: back flow (high force is needed to administer the LA solution), and blanching of the tissues.
* Has a special type of syringe in which the barrel is covered so that if the needle breaks due to high force the pieces of glass don’t go into the patient’s mouth.

1. Infiltration:

* All the maxillary primary teeth are anesthetized using this technique.
* The injection should always be distal to the tooth to be anesthetized.
* It should be a slow injection.
* The problem with this technique is when it’s given in the palate since the needle touches bone once we enter the mucosa so it’s very painful. This can be avoided by giving the injection in the sulcus palatally; inside the free gingival until there is blanching of the free gingival.

1. Interseptal bone technique:

* Given in the buccal triangle of the interseptal bone (more towards the base of the triangle), parallel to the occlusal plane.

1. Mandibular block (IANB):

* A short needle should be used.
* Few drops of anesthesia should be given before we continue our injection and wait 2 minutes.
* In children anyone will touch bone but the needle should be directed downwards because the angle of the ramus is obtuse and the mandibular foramen is located more inferiorly.
* In adults: we either have early bone touch so we direct the needle more downwards to correct it, or we don’t have any bone touch and we direct the needle more upwards to correct it.

1. Intrapulpal:

* Very painful injection.
* Once the pulp is exposed you apply topical anesthesia and give this injection; Topical anesthesia reduces the amount of pain.
* It’s a very effective technique.

1. Intrapapillary:

* Given to avoid palatal infiltration.
* We enter 2-3 mm inside the triangle and inject we see blanching on the palatal side.
* It’s a soft tissue injection.
* Notes:
* The larger the gauge the smaller the diameter of the needle.
* There is an arrow on the hub of the needle, on the opposite side of this arrow the bevel of the needle is located. When an injection is given this arrow should not be seen.

This way we avoid ballooning of the soft tissues and the LA solution is going towards the periosteum.

So the bevel should be parallel with the periosteum.

* Never start your procedure with the child if you’re not sure that he is anesthetized.
* Complications:

1. Cheek and lip biting:

* The patient keeps biting his cheek or lip since he can’t feel a thing and they become enlarged so the parents would think that it was something we did, thus they must be warned about this.
* There is a drug called oraverse that can be used it causes vasodilatation thus reducing the effect of the LA. (Not that much used)
* Injections that don’t cause this problem are intraligamental, intraseptal and CAT technique.
* We must tell the parents to watch the child until the effect of the LA wears off. We shouldn’t address the child about this since we might induce this behavior.
* We can use a cotton roll and place it between teeth and the soft tissues thus preventing the biting.
* We see check biting more in the lower lips.

1. Intravascular injection:

* The most important thing about injections especially IANB in children is aspiration.
* Arterial course: external carotid gives maxillary artery which gives the inferior alveolar artery, the infraorbital artery and the greater palatine artery. And it anastomosis with the ophthalmic artery and the lateral lacrimal artery.
* If you inject inside the artery:

1. Ipsilateral and downward movement of the eye. (drop of the eyelid laterally).
2. Diplopia.
3. Blanching: in the palate and infraorbital area.