Subject : Local anesthesia

Sheet num : 4

Done by : hiba mustafa

Corrected by : farah habashneh

Dr: shayyab

Today we will talk about basic steps in injection technique and some anatomical considerations which have clinical significance . We have to deal with the local anesthesia process as a processor ,so this mean that we have to aim for adequate technique which can be achieved by following the basic steps, technical and communicating skills . These steps can be started by following some important aspect in relation to the syringe system for example: selecting the appropriate diameter of the gauge of the needle, the most appropriate gauge is between **25** and **30** , if you select the gauge larger than this , this means that the diameter is smaller and this will apply an excessive force while injection , and if it was less than this , this means it will become wider and painful for the patient , also you always have to check the free flow of local anesthetic ( but the needle should be kept out of the patient sight ) , also you have to check the temperature of the carpule , it shouldn't be too hot or too cold , it should be at room temperature which is 25 c . After preparing the syringe system you have to place the patient in best position which is the **supine** position , semi supine upright position has risk of vasovagal attack , whereas placing the patient in the supine position will prevent severe hypoxemia (supine position means : that the heart is at the level of the brain or at the level of the feet ) and if the patient has a vasovagal attack we should elevate his feet above the level of the heart. It’s stated that for each degree of the brain above the level of the heart the cerebral blood pressure is decreased by about 2 mmHg , so for that reason when you place the patient in an upright or even a semi supine position that means that the gravity will retard the venous return , when we give anesthesia there will be pooling of blood in the skeletal muscles because of stress and if there is no effect of gravity the blood will return immediately to the heart and prevent the brain hypoxia . You have to dry the tissue and perform some optional steps like for example applying a topical antiseptic (which is an optional step) , you can choose peptadiene which doesn't contain antiseptic because antiseptics are irritant for the mucosa . You have to apply topical anesthetic to anesthetize just the surface mucosa just about **1mm** and this is a common mistake that people make when they think that when applying the topical anesthetic it will make anesthesia for bone and soft tissue , but actually it make anesthesia for the surface of the mucosa to make the insertion of the needle more comfortable . In order for this step to be successful you have to apply a cotton applicator stick which contain topical anesthesia at the surface mucosa continuously for about 1 min until you see the area whitish in color and during that you have to communicate with the patient by explaining to him your procedure in a positive words not negative ones because you statement will be important for the patient , if you select negative words it will stick in the patient head . You should have adequate control over your syringe and the best position is to place your palm beneath the syringe and with finger support . During administration of the needle you have to achieve adequate support which can be achieved by finger support or by obtaining the chest of the patient as support , but don't use the shoulder of the patient for support because any surprising movement it will injure you or the patient . Make the tissue tight because when tightening the tissue less pain will happen because we decrease the surface mucosa exposed to the needle. Again, we have to keep the syringe system out of the patient sight either below or behind the patient line of sight , also you have to watch the patient during the insertion of the needle for any feature that might indicate discomfort , Frawning for example is an indication of painful insertion so you have to slow down. In the initial step of the insertion of the needle you have to inject several doses of local anesthesia solution ( in your way to the target tissue) because this will anesthetize the tissue and make it more comfortable , also you have to slowly advance the needle toward the target tissue , if we inject it fast this will induce toxicity. Deposit several drops of local anesthetic before cutting the periosteum because touching the periosteum is very painful which is the target area actually , so when you advance the needle and touch the bone don't deposit directly you have to draw the needle slightly because I you inject in the periosteum it will be very painful because of the innervation . Before the deposition of the local anesthetic you have to aspirate and the aim of aspiration is to minimize the intravascular depletion , when you aspirate if the result is air bubbles that indicate negative aspiration and you can proceed , but when there is blood you have to change your position , where there is high risk of aspiration use large gauge needle. Again you have to slowly deposit and insert your needle over at least 1.2 min during that communicate with your patient because it's the most critical moment for the patient especially if it's and intravascular injection immediately he will have a syncope , we know that by observing the skin and the tongue of the patient which will have blanching (whitish in color) no blood supply and this is a sign of vasovagal syncope and after it tachycardia will happen , if the patient is medically fit we put him in a supine position and continue unless if the patient history is complicated .

**Trigeminal nerve :**

Themost important cranial nerve in oral surgery because it's the main sensory supply for the face and the oral cavity , so it's the largest cranial nerve with a small motor root and a large sensory root ( here the dr asked about the number and cranial nerves and answered by 24!) the small motor root is originated from the posterior cranial fossa from the area of medulla oblongata and runs forward anteriorly beside the sensory root but medial to it until reaching foramen ovale , now the sensory root is originating from ganglion in the middle cranial fossa and it divides into 3 main branches : the mandibular, maxillary,ophthalmic divisions, so that small motor root runs forward anteriorly and exist the cranium through foramen ovale over the greater wing of sphenoid bone along with the sensory divisions of the trigeminal nerve which is mandibular nerve and after they exist they enter in the infratemporal fossa , there they United together 1-2mm to form what is called trunk, from the trunk we have two main branches and the nerve to the medial pterygiod which gives off two main other branches: 1. a branch to [tensor veli palatini](https://en.wikipedia.org/wiki/Tensor_veli_palatini) and tensor tympani , and 2. a middle meningeal nerve( it's important and they always ask about it because we have another maningeal nerve which is a branch of the maxillay nerve) that gives innervation to dura mater from inside the cranium, it goes to the cranium through foramen spinosum along with the middle meningeal artrey which is a branch of maxillay artery, now after that this trunk is divided into 2 main divisions : anterior and posterior divisions.
**Anterior division** is mainly motor, anyhow it gives us the long buccal nerve or buccinator nerve, and they called it so because it just passes through buccinator muscle but it doesn't innerve it, this nerve gives off 3 main branches even it's a sensory nerve, the first one to the temporalis muscle, the second one to the masseter and the third one to the lateral pterygoid muscle, and these branches are mainly motor.
 \*note : buccal, lingual, and IA nerves are on the same level, and they are located in the area between medial pterygoid and the medial surface of the ramus **(pterygomandibular space)** so you can anesthetize them by using single one injection.

**posterior division** consists mainly of 3 main branches, supplying TMJ and periauricular area.

we care now mostly about IAN and lingual nerve. IAN goes downward directly to enter the mandibular foramen, medially to it we find sphenomandibular ligament that's why the injection medially could be the cause of the failure of the anesthesia cause it prevents its diffusion, before interring the mandibular foreman it gives off a small branch (mylohyoid nerve) in the mylohyoid groove which is motor and sensory [ mixed] motor to supply mylohyoid muscle and anterior belly of digastric muscle, and sensory to supply teeth ( centrlas ) it's responsible of the what's called escape pain.
 IAN runs in the mandibular canal gives off whats called dental plexus that supply last molars, and second premolars until reaching the mental foramen then it divides into 2 branches: mental nerve for soft tissue and incisive nerve for 1st premolas and anterior teeth.
 \*nerve supply for **2nd** premolars from **IAN** and for **1st** premolars from **incisive** nerve

Dental plexus gives us 3 branches: one branch to pulp, a branch to the interradicular area (PDL)in the mandible for bifurcated root and the surrounding alveolar bone , and a branch to the interdental area.

**Lingual nerve** is located anteriorly and medially to the IAN by about 1 cm, it runs forward anteriorly until reaching the medial surface of the mandible or lingual surface of the last molar. so our approach in wisdom molar extraction is to remove bone buccally and distaly to protect the lingual nerve ( lingual nerve is in the flap itself )

\* mandibular canal consists mainly of vessels, anteriorly the veins first then the arteries then the nerves.

if you inject the artery we are going to have electric shock pain followed by blanching of the face and you have to inform your pt. if this happens so that he won't be scared if he sees himself.

**Maxillary division ( purely sensory ):**

it gives off 4 main branches, to the cranium, pterygopalatine fossa, infraorbital canal, and the face.

in cranium it gives the middle meningeal nerve but here this nerve is from the maxillary division which supplies the post. half of dura mater not the trunk that supplies the ant. half of dura mater. Middle meningeal nerve exits the skull through foramen rotundum to reach pterygopalatine fossa and here it gives 3 branches , the zygomatic , it supplies the skin over the zygomatic arch and the zygomatic complex, it also carries secretomotor fibers to the lacrimal gland , Superior post. alveolar nerve that supplies the last 3 molars teeth ( pulp, PDL, alveolar bone, and buccal gingive ) so we have to anesthetizenasopalatine nerve as well in order to anesthetize the palatine bone.