

The art of administering local anaesthetic

Introduction

I am frequently asked about local anaesthetics and the best way to deliver adequate anaesthesia. Administering local anaesthetic with minimal patient discomfort is an art. It is particularly important for endodontic patients as they may already be in discomfort. A good experience is one of the few opportunities we have to gain the referred patient's confidence and trust.

I do not use topical gel or pre-heated anaesthetic and have no 'gadget' other than the local anaesthetic cartridge, needle and syringe.

Background

In general terms, patients feel discomfort from the needle penetrating the tissue and then again as the deeper tissue is displaced by the local anaesthetic during delivery. Topical anaesthetic is only beneficial for initial needle penetration but even this can be negated with the technique described below although some may argue there is also a placebo effect of topical gel. Topical anaesthetic provides only superficial anaesthesia and therefore has little impact on discomfort felt during tissue displacement such as when giving an inferior alveolar nerve block.

Warmed local anaesthetic solution cools by the time it leaves the needle so this too has little impact on easing discomfort.

Here's my technique:

Step 1

Prior to treatment I take a careful medical history and specifically ask about the patient's experience of having local anaesthetic in the past. I already have a diagnosis and recent periapical radiograph of the tooth or teeth to be treated and can go straight on to discuss the procedure and gain consent.

The discussion even at this stage should not be underestimated as this is another opportunity to receive and give information to manage the patient's expectations.

Step 2

I check and document the local anaesthetic agent, batch and expiry and ensure the cartridge is loaded correctly. I also check the syringe and cartridge to see if they are self aspirating or not. Out of view of the patient, I squeeze a drop from the needle to ensure the needle hasn't buckled under the cartridge, make sure it is patent and that the plunger is moving freely.

Step 3

I have the injection site in mind and orientate the needle bevel away from the tissue to be injected, I do this out of sight of the patient then stretch the tissue around the injection to

keep it taut. I advance the needle to the mucosa but just prior to penetrating the tissue, I squeeze a drop or two of anaesthetic on the mucosa and wait 2-3 seconds. It is useful for the nurse to be aspirating at this point so the patient doesn't taste the local anaesthetic, their narrow aspirator on the tissue also acts to distract the patient.

Step 4

From a very shallow angle and with the very tip of the bevel first, I advance the needle very slowly and deliberately through the mucosa and place a another drop or two here. I repeat the process of placing a few drops before slowly advancing deeper. With self aspirating cartridges or syringes, this method automatically aspirates at each location. By waiting 2-3 seconds before advancing, the needle penetrates deeper in to already anaesthetised tissue causing in minimal if any discomfort.

If anaesthetising several teeth or if supplemental anaesthesia is required, I use an already anaesthetised site and advance the needle laterally using the same technique.

For palatal injections (infiltrations and blocks), I look carefully at the injection site over root tip in question mindful of the palatal blood vessels running antero-posteriorly. At the site, I press gently at first and then more firmly with the side of a mirror and simultaneously introduce the needle with the tip of the bevel first having made sure it is correctly orientated. If the nurse positions a narrow aspirator tip correctly it can act not only to distract from the pin prick but avoids the foul tasting anaesthetic from reaching the patient's taste buds. I use very gentle pressure on the syringe, sometimes as little as only the weight of my thumb to slowly deposit the desired volume of local anaesthetic. I stop when the mucosa blanches as minimal volume is required palatally.

The slow delivery of local anaesthetic has the following advantages:

1. There is less tissue displacement of the anaesthetic agent during delivery
2. By the time administration of the first cartridge is complete, significant anaesthesia has already been achieved.
3. I always anaesthetise both sides. For upper teeth, I always give a very slow buccal infiltration first, this results in the palatal tissues already having a degree of anaesthesia by the time the palatal injection is due. Most-times, discomfort from the palatal injection is minimal or non-existent.

Step 5

I then wait. Waiting is critical as the local anaesthetic needs time to act.

Inflamed tissue is acidic so the local anaesthetic dissociates to more ion form than neutral base. It is the neutral base that diffuses in to the nerve tissue blocking conduction by becoming ionised within the nerve fibre. In inflamed cases, I therefore wait longer. If supplemental anaesthesia is required, I use stronger concentration local anaesthetic (see table) in an effort to deliver more neutral base.

Whilst waiting I either chat further with the patient or stay quiet and allow time for the nurse to chat with them. I am amazed how relaxed a good nurse can make patients feel and whilst they build up a rapport, I do other things such as reviewing radiographs, writing notes or even writing letters to referring dentists. The nurse and I always keep a close eye on the patient to ensure they feel no ill-effects from the local anaesthetic.

There is no set waiting time but when ready, I again take time to reassure the patient about the rubber dam and remind them that they have complete control throughout the procedure if they need to stop or pause.

Summary table

Steps	Procedure
1	Chit chat, MH & consent
2	Check LA type, batch, expiry, cartridge type, loaded correctly, needle patent and bevel in correct orientation
3	Divert attention from needle with taut tissue, suction and mirror. Place a drop of LA on mucosa surface
4	SLOW administration - initially just weight of thumb then react to resistance
5	Withdraw needle and WAIT

Local anaesthetics

2% lidocaine with 1:80,000 epinephrine

I use this in most cases. It has a higher concentration of epinephrine so provides not only good duration anaesthesia but also good haemostasis for surgery.

3% Mepivacaine (3% Scandonest plain) or 3% Octapressin (3% Citanest plain)

Has a higher concentration of local anaesthetic and so this can be used to supplement nerve blocks. With no epinephrine the half-life is shorter which means a shorter time in which one can benefit from the additional anaesthesia and the profound anaesthesia does not last as long.

4% Articaine with 1:200,000 epinephrine

The key advantage of articaine is better bone penetration due to its small molecular size. I never find buccal infiltration alone provides adequate anaesthesia. The higher local anaesthetic concentration is useful for supplemental anaesthesia but appears to have no advantage when bone penetration is not a relevant such as in nerve blocks. Adverse reactions such as paraesthesia have been reported when used for nerve blocks although evidence for this is mixed.

0.75% Bupivacaine

Mentioned for completeness only, bupivacaine is a longer acting local anaesthetic used sometimes to manage pain and is available with or without epinephrine. It does not come in dental cartridges so is not generally used.