



Pain-reducing techniques for delivery of dental anesthesia

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ABSTRACT

Dental anxiety is a major factor in the decision to delay dental procedures. "Dental fear is related to poorer oral health outcomes, and this might be explained by the less frequent dental visiting of many fearful people."¹ Fear of dental injections is frequently cited as the main source of dental anxiety. We, as practitioners, can take simple and easily implemented steps to reduce the fear and pain of dental injections. No special equipment or training is required. Following these techniques may result in more profound anesthesia, less pain on injection, and ultimately a reduction in dental anxiety. A calm and comfortable patient will often result in less stress for both patient and provider.

EDUCATIONAL OBJECTIVES

The objective of this article is to give the reader easy-to-follow techniques for delivery of dental anesthesia. Upon completion of this course, the dental provider should have a clear understanding of:

1. The proper use of topical anesthetic
2. The least painful method of injection
3. Effective use of psychological preparation of the patient to receive anesthesia



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INTRODUCTION

A typical day for a dental provider will inevitably contain a patient who has dental phobia. If a practitioner has been practicing long enough, an all-too-familiar pattern will emerge. It seems that the patients with the worst dental health are those who have the most anxiety. This is not likely a coincidence. Avoiding dental care is frequently a reaction for those who fear it. The consequence to the patient is often more decay, more periodontal disease, and, ironically, *more* need for dental care. "Anxiety has a direct influence on oral health; it should be detected and accounted for in a treatment concept integrating dental and cognitive behavioral therapeutic approaches."² The consequences to the dental provider should not be overlooked. A stressed-out patient can be less cooperative, less compliant, and can pose a challenge to the delivery of ideal dental care. "Patients with dental fear tended only to visit a dentist when necessary, avoiding regular visits."¹ Of all the reasons that patients state for fear of dental procedures, pain of dental injections is always a major factor. If the dental provider can reduce that pain, there will be immediate benefits to both provider and patient. A relaxed patient will achieve more profound anesthesia, better cooperation, and reduced fear of future dental visits. This can be accomplished easily and immediately. No special equipment is required. Only a little extra time and TLC are needed.

TOPICAL ANESTHETIC

Topical anesthetic is typically a gel solution of 20% benzocaine or lidocaine with flavoring agents. "Topical anesthetic products are in the form of sprays, solutions, gels, and ointments. There is a wide range of indications for topical anesthesia in dentistry, and a specific agent should be chosen in accordance with the purpose of its use."³ Topical anesthetic is underutilized in many dental practices. Often, dental providers will find it to be ineffective and abandon the use of it. While it does not provide complete pain relief of injections, it is just one method of making injections a little better. Topical anesthetic works very well on mucous membranes. Dental care providers have a considerable advantage in that our injections are mostly started on mucous membranes. In order for topical anesthetic to be effective, there are some important steps to take before placing it. First, the mucous membrane must be as dry as possible. Before placing the topical anesthetic, be sure to dry the injection site with an air/water syringe. This simple step will make a big difference. Applied to a wet site, topical anesthetic will simply dissolve away with minimal penetration into the tissue. The patient will likely complain of the taste and the throat going numb. Drying the site will keep the topical anesthetic right where it needs to be—on the site of the impending injection. A cotton-tip applicator is the ideal disposable tool for placing the topical on the injection site. Once it is placed on the dry site with the cotton-tip applicator, pressure should be applied to the site for thirty seconds. The pressure will allow the topical anesthetic to penetrate deeper into the mucous membrane, and give you the added benefit of reducing blood supply to the site of injection. This temporary reduction of blood supply will significantly reduce the pain of injection.

Topical anesthetic is effective in most areas of the mouth. How-

ever, due to the thickness of the epithelium on the palate, topical anesthetic is less reliable for palatal injections. For palatal injections, pressure applied with the edge of a mirror can provide significant pain reduction immediately prior to the injection. To accomplish this, apply pressure on the injection site until the tissue it noticeably blanched. Maintain the pressure for five seconds and start your injection while the tissue is still blanched. Release the pressure from the mirror slowly as you are giving the injection. This will give the tissue more space to accommodate the anesthetic solution.

Other modes of topical anesthetic delivery include sprays, creams, and patches. It is advisable to try each method and evaluate which method gives you the best results. When used properly, topical anesthetic can be effective in reducing pain during a dental injection. "The use of topical anesthetic did reduce the pain of needle insertion with the maxillary anterior injections ($P = .0041$)."⁴ It also provides the added benefit of a psychological anticipation of less pain. Although studies conducted on the effectiveness of topical anesthetic are conflicted, you are denying your patient the placebo effect if you don't use it at all. Combining topical anesthetic with simple pain-reducing injection techniques will result in an improved dental experience for you and your patient.

PSYCHOLOGICAL PREPARATION

The pain associated with dental injections begins before the needle is even in the patient's mouth. Patients with high dental anxiety will anticipate pain, which in turn will exacerbate the intensity of the pain. "The high-AS group reported significantly more anticipatory fear and pain prior to the CPT, which appeared to aggravate subjective pain experiences."⁵ Tissue pressure as a result of the bolus of anesthetic solution can cause more pain than the penetration of the needle. Positive reinforcement during the injection procedure can be beneficial in reducing a patient's anxiety. "It is suggested [that] needle penetration is not the main reason of pain during injection. Inconsistent fluid pressure created by injected anesthetic solution on nerve fibers is more impressive in pain development."⁶

Before starting the injection procedure, talking to the patient will give the practitioner an estimation of the patient's level of anxiety. Positive reinforcement will reduce the patient's anxiety and let them know what to expect. Telling the patient "This is not going to be very painful," or "This will take a little bit longer than usual but will be almost painless," will reduce the patient's anticipation of pain. A simple distracting statement right before injection will also help keep the patient from dwelling on nothing but the slightest sensation of pain. Asking the patient to open as wide as possible just before injection is an excellent way to both distract the patient and create tension in the tissue at the injection site. Tissue tension on the injection site seems to reduce the pain of needle insertion significantly.

During the injection, it can be beneficial to the patient's morale to tell them that everything is going well and that the procedure is almost complete. Often, with the proper use of topical anesthetic, the patient will not even feel the insertion of the needle, and therefore, not know when the procedure has begun. By giving them the positive reinforcing message that they are already being injected

Box 1: Pharmacology of local anesthetics. A.L. Frankhuijzen.

	ONSET OF ACTION AFTER	DURATION OF ACTION	EFFECTIVENESS
Articaine	5 min.	1–3 hrs.	3
Bupivacaine	8 min.	3–7 hrs.	16
Lidocaine	5 min.	0.5–2 hrs.	4
Mepivacaine	3 min.	2–2.5 hrs.	2
Prilocaine	2 min.	0.5–1 hr.	1

and not experiencing pain, the anticipation of pain will be all but eliminated.

Once the injection is completed, it is important for the patient's peace of mind to let them know that it will take about five to ten minutes for the onset of anesthesia.

By knowing that the practitioner is going to wait until the anesthetic takes full effect, the patient's anxiety levels will be further reduced, thus allowing a more profound level of anesthesia to take effect.

INJECTION TECHNIQUES

Immediately after insertion of the needle tip, injecting a small amount of anesthetic will reduce the pain of further insertion of the needle. Advance the needle slowly while constantly injecting small amounts of anesthetic. About one quarter of a standard size carpule can be used to reduce the pain of advancing the needle. Once the needle is near the targeted area, injection of the remainder of the carpule can begin. It should take about a minute to inject a carpule of anesthetic. The slower, the better. Injecting very slowly allows the tissue to absorb the anesthetic without creating a large bolus of solution. This will result in less pressure on the innervation of the target site. Once the desired amount of anesthetic is injected, remove the needle following the same path as insertion. The tissue around the needle should be sufficiently anesthetized to allow for a painless ejection of the needle.

Palatal injections are often cited as the most painful of the dental injections. Since palatal injections are frequently given in conjunction with alveolar injections, it is often better to start with the alveolar injection and end with the palatal injection. Topical anesthetic does not absorb into the palatal tissue very well, but anesthetic injected in the buccal area can often lead to some numbing of the palate. Applying pressure to the injection site on the palate with finger pressure or a mirror head until the tissue blanches will result in a noticeably less painful experience for the patient.

THE GATING TECHNIQUE

The gating technique operates on the hypothesis that the brain cannot process the signals of pain and proprioception simultaneously. To utilize this technique, vibration of the needle should be applied in conjunction with injection of the anesthetic. There are many devices available on the market to aid in accomplishing this technique. While these devices are optimal for use in the gating

technique, simply shaking the patient's cheek with a mirror during the injection can mimic the effects of the gating technique. Since patients are often most apprehensive about the initial injection of the syringe, it may be beneficial to begin shaking the patient's cheek prior to initiating the injection. If the patient is unfamiliar with the gating technique, the added distraction of trying to comprehend your actions may be an additional welcome benefit. It is advisable to maintain the gating technique throughout the duration of the injection.

CONCLUSION

Managing dental anxiety is often the most challenging part of the clinician's day. By implementing these simple techniques, we can create a stress-free experience for our patients and ultimately for ourselves. Once a patient loses the fear of dental injections, future appointments will become more acceptable, resulting in greater case acceptance and fewer missed appointments. Use topical, inject slowly, praise often, and have a great experience.

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QUESTIONS

1. Dental anxiety is a major factor in the decision to . . .

- a. avoid local anesthetic
- b. delay dental procedures
- c. disregard vital signs
- d. none of the above

2. Which of the following was quoted as saying: "Anxiety has a direct influence on oral health . . . " ?

- a. Eitner et al.
- b. Eisner
- c. Einstein
- d. GV Black

3. Topical anesthetic is typically a gel solution containing . . .

- a. 20% benzocaine
- b. 80% lidocaine
- c. flavoring agents
- d. a and c

4. In many dental practices, topical anesthetic is often . . .

- a. underutilized
- b. overutilized
- c. not used as directed
- d. abandoned

5. Topical anesthetic works well on . . .

- a. enamel
- b. dentin
- c. hard tissue
- d. mucous membranes

6. For topical anesthetic to be effective, the mucous membrane must be . . .

- a. as dry as possible
- b. as wet as possible
- c. moistened with saliva
- d. coated with a lubricant

7. Once the topical anesthetic it is placed on the dry site with the cotton tip applicator, pressure should be applied to the site for . . .

- a. 30 seconds
- b. 3 minutes
- c. 2 minutes
- d. 10 seconds

8. Topical anesthetic is less reliable in thick epithelium such as is located in the . . .

- a. palate
- b. buccal vestibule
- c. frenum
- d. none of the above

9. Other modes of topical anesthetic delivery include . . .

- a. sprays
- b. creams
- c. patches
- d. all of the above

10. According to Ghaderi and Ahmadbeigi, what is created by injected anesthetic solution on nerve fibers?

- a. a loose bolus
- b. inconsistent fluid pressure
- c. high pressure systems
- d. b and c

11. Immediately after insertion of the needle tip, the pain of further insertion of the needle will reduce by injecting . . .

- a. a bolus of saline
- b. large amounts of lidocaine
- c. an i.v. drip
- d. a small amount of anesthetic

12. Which of the following operates on the hypothesis that the brain cannot process the signals of pain and proprioception simultaneously?

- a. Gow Gates
- b. The Gating Technique
- c. substance P
- d. a and c

13. Topical anesthetic can take the form of . . .

- a. gel
- b. cream
- c. spray
- d. all of the above

14. Prior to placing topical anesthetic:

- a. soak the area with water
- b. dry the area with air spray
- c. apply pressure to the tissue
- d. rinse the mouth with a chlorhexidine solution

15. Prior to giving a palatal injection you should . . .

- a. apply pressure to the site until the tissue is blanched
- b. position the patient in an upright position
- c. apply topical anesthetic for at least 15 minutes
- d. none of the above

16. Pain associated with dental injections . . .

- a. begins after half the carpule is injected
- b. begins before the needle is even placed
- c. is not the concern of the provider
- d. is not a factor in the delay of dental care

17. Topical anesthetic . . .

- a. is more effective than a placebo
- b. is less effective than a placebo
- c. is equally effective to a placebo
- d. varies in effective by flavoring agents

18. Once the injection is completed you should do the following:

- a. begin the procedure right away
- b. wait 8–10 minutes
- c. have the patient walk around the waiting room
- d. wait 20–30 minutes

19. Prior to injection, it can be beneficial to . . .

- a. talk to the patient
- b. reprimand the patient for poor oral hygiene
- c. play loud music
- d. remove all staff from the operatory

20. Drying the tissue prior to placement of topical anesthetic will do the following:

- a. activate the active ingredients
- b. spread it more efficiently
- c. concentrate it where it is placed
- d. none of the above

Pain-reducing techniques for delivery of dental anesthesia

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