

Ensuring Successful Anesthesia with a Local Anesthetic

Introduction

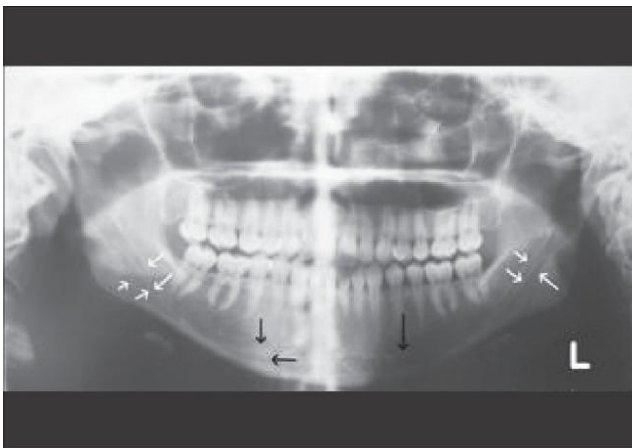
Infrequently, some patient may experience lack of efficacy with a local anesthetic.

In order to get the most out of a local anesthetic, consider that the following factors may result in a decreased anesthetic effect in a patient:

Background

- **Anatomical variation**

Bifid alveolar nerve and accessory innervations (such as mylohyoid nerve) may cause a failed inferior alveolar nerve block.³



The presence of retromolar foramen or accessory mental foramen may cause a failed mandibular block.¹

Contralateral innervation of the anterior teeth can lead to anesthetic failure in both the upper jaw and mandible.¹

- **Local infection/inflammation**

Low tissue pH, vasodilation and hyperalgesic nerves can reduce anesthetic effect.²

- **Technique**



Injections given too low, too high, too deep, too mesial, excessively superficial or intravascular injections can reduce anesthetic effect.¹

Injections given too quickly can also reduce anesthetic effect.^{1,2}

- **Not giving the anesthetic enough time to achieve complete anesthesia**

Wait at least 10-15 minutes before determining that the anesthetic was not effective.¹

- **Patients with alcoholism**

A combination of systemic acidosis and reduced circulatory resistance due to the vasodilative properties of alcohol can cause inadequate anesthesia.^{7,9}

- **Hypersensitivity due to fear**

Hormones associated with anxiety can prevent a local anesthetic from working as well in some people.⁸



Anxious patients are likely to have abnormal body PH that can affect the ability of the anesthetic radicals to penetrate the nerve cell.⁹

- **Patients with Ehlers-Danlos syndrome**

Rapid absorption of the anesthetic solution into the bloodstream due to the defective nature of the connective tissues in the surrounding blood vessels can cause inadequate anesthesia.^{4,8,9}

- **Patients with red hair**



Due to mutation in the melanocortin-1 receptor gene, patients with red hair have a lower response to anesthetics.⁵

- **Older patients with increased bone density**

This is seen especially in mandibular teeth when using periapical infiltration techniques.¹

- **Improper storage of anesthetic**

Storage over 37°C will lead to anesthetic failure.¹

The ideal storage for articaine products is 25°C .

It is important to remember that the dosage amount or placement of injection may need to be adjusted for successful anesthesia.

Conclusion

Local anesthesia fails in 10% of cases of inferior alveolar nerve block and 7% of all cases of local anesthesia in general practice. Possible causes of failure are infection, wrong selection of local anesthetic solution, technical mistakes, anatomical variations with accessory innervation and anxiety of the patient.

When an initial local anesthetic fails the best treatment is to repeat the injection; this will often lead to success. In the case of repeat block injections it is easier to palpate bony landmarks at the second attempt as the needle can be maneuvered in the tissue painlessly. If a second injection fails than the alternative approach should be “high” blocks, infiltrations to eliminate assessor supply or an intraosseous technique.¹⁰

References

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