

# Intrapulpal anesthesia

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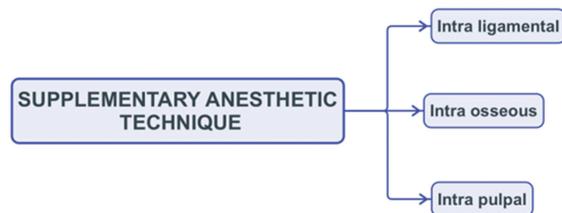
## ABSTRACT

The aim of this review is to provide information about newer anesthetic technique, This review is done to update current knowledge about intrapulpal anesthesia. During endodontic treatment, effective anesthesia of any vital pulpal tissue present in the pulp chamber or root canals is important for patient’s cooperation and to maintain the comfort level during treatment. Hence, the deposition of local anesthetic solution directly into the pulp chamber provides effective anesthesia for extirpation, instrumentation, and debridement of pulpal tissues. Profound pulpal anesthesia in endodontics is a doorway to successful root canal treatment. This article emphasizes on various anesthetic strategies which an endodontist can adopt in treating painful pulps.

**KEY WORDS:** Pulp, Anesthesia, Endodontics

## INTRODUCTION

Profound anesthesia is essential for vital pulp extirpation, as ineffective anesthesia may make treatment a traumatic experience for the patient and also create an embarrassing situation for the dentist. Anesthesia, which may be fully adequate for extraction of a tooth, may not be effective during endodontic treatment in the tooth having some inflammatory vital pulpal tissue.<sup>[1]</sup> Therefore, there are different supplementary techniques used in endodontic treatment as listed below, which helps to improve the working efficiency and patient comfort. This review gives a brief idea about intrapulpal anesthetic technique.



Root canal therapy in a vital pulp requires a high degree of local anesthesia. Due to direct manipulation of the myelinated A-delta and the unmyelinated

C-afferent sensory neurons during a pulpectomy, this procedure is capable of producing intense, sharp pain if performed under inadequate anesthesia.<sup>[2]</sup> Root canal therapy in an irreversibly inflamed tooth requires an even higher degree of anesthesia and is more prone to failure.<sup>[3]</sup> However, the belief by many clinicians that a mild amount of pain is possible in some teeth during the root canal procedure is based on two fundamental assumptions. The first is that complete local anesthesia of all teeth is not always possible due to various local and systemic factors such as low pH, the presence of inflammation, and patient apprehension. The second reason is a byproduct of the first; it follows that if all teeth cannot be treated painlessly, then some degree of pain is inevitable, if such procedures are performed.<sup>[4]</sup>

## INTRAPULPAL ANESTHESIA

If the intraligamentary injection also fails to provide adequate anesthesia, intraosseous anesthesia should be attempted first, before resorting to intrapulpal injections. As a rule, intrapulpal anesthesia is highly traumatic to the patient and should be avoided if possible.

The intrapulpal anesthesia, which is the direct injection of an anesthetic solution into the body of the pulp, has been found to be more effective when administered under strong pressure.<sup>[5]</sup> Therefore, the use of intrapulpal injection is highly recommended, to avoid and minimize the discomfort to the patients, during

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endodontic treatment in a tooth having vital pulpal tissues. Since patient experiences severe pain when the operator is still in dentin and approaching pulp, thus achieving pulpal entry for intrapulpal injection further accentuates pain; therefore, the patient should be informed beforehand to expect moderate to severe pain during the administration of intrapulpal injection.<sup>[6]</sup> This is most commonly used in mandibular anterior teeth.

### Nerves Anesthetized

Terminal nerve endings at the site of injection, nerves of the pulp chamber and within the canals of the involved tooth.

### Areas Anesthetized

The tissues within and around the injected tooth.

## TECHNIQUE

Anesthetize dentin to be removed by placing a cotton pellet saturated with an anesthetic agent to the pulpal floor, wait for 30 s and then pressing the pellet into the dentinal tubules for 2–3 min. Using a slow-speed drill, make a small perforation through the anaesthetized dentin into the pulp to allow for a snug fit of the anesthetic agent.

Use a 25-, 27-, or 30-gauge needle, depending on the size of the access opening (it may be necessary to bend the needle), and inject a small amount such as 0.2 ml of anesthetic into the pulp chamber slowly (at least 20 s) under pressure.<sup>[7]</sup>

## PH FACTOR

For the local anesthetic molecule to work effectively, it must cross the axonal membrane and block the cytoplasmic end of sodium channels in neurons. The presence of a more acidic environment, which is the hallmark of inflammation and infection, increases the concentration of the ionic form of the anesthetic, which is then incapable of crossing the axon membrane.<sup>[2]</sup> This reduces the effectiveness of the anesthetic molecules inside the axonal cytoplasm, where its action is required for proper anesthesia. The pH of an abscessed and severely inflamed area is highly acidic, reaching pH levels of upto 5.<sup>[4]</sup> Anesthetic solutions with a lower dissociation constant may be more effective in such situations. Similar to cases where inflammation is present, regional blocks would be the preferable method of local anesthesia in such teeth, rather than injection.

### Advantages

- It works well for profound anesthesia if given under back pressure.
- Immediate onset.
- Smaller doses are required (0.2 ml/root).
- Overcomes failed conventional anesthesia.<sup>[8]</sup>
- Lack of lip and tongue anesthesia.

- Minimal post-operative complications.

### Disadvantage

- The major drawback of the technique is that needle placement and injection are directly into a vital and very sensitive pulp.
- The injection may be moderate to severely painful.<sup>[7]</sup>
- Duration of pulpal anesthesia may be short (15–20 min).
- The pulp must be exposed to permit direct injection.<sup>[8]</sup>
- Difficult to enter some canals.
- Bitter taste due to leakage of anesthetic agent.

### Complication

- Discomfort during the injection of anesthetic.
- The patient may experience a brief period of pain as the injection of the anesthetic drug is started.<sup>[9]</sup>
- Almost immediately, the tissue is anesthetized and the pain ceases.<sup>[10]</sup>

## CONCLUSION

Some authors claim that efficacy depends on the anesthetic solution (Gurney 1967, Malamed 1998) a recent double-blind study has shown that intrapulpal anesthesia may be obtained just as effectively by injecting saline compared to a local anesthetic solution (VanGheluwe and Walton 1997). However, still, researchers are developing methods of reducing pain perception in endodontic treatment by means other than injecting local anesthetics. Failed local anesthesia is a feature of dental practice. Most practitioners will experience it less often than they achieve success. Hence, the use of different supplementary anesthetic technique will help to overcome such failures.

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