ANESTHETIZING THE DENTAL PULP

by
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The practice of dentistry in general, and endodontics in particular, would be impossible without the use of local anesthesia. The interruption of nerve transmission allows us to make access, perform pulp extirpation, clean, shape, and fill the root canal system.

There are, however, instances in which the normal techniques do not suffice. A highly inflamed pulp or a thick bony cortical plate may necessitate utilizing more than one method of pain control. Residual sensation after anesthetic injection can result in an uncooperative patient, a frustrated dentist , and often an incomplete procedure.

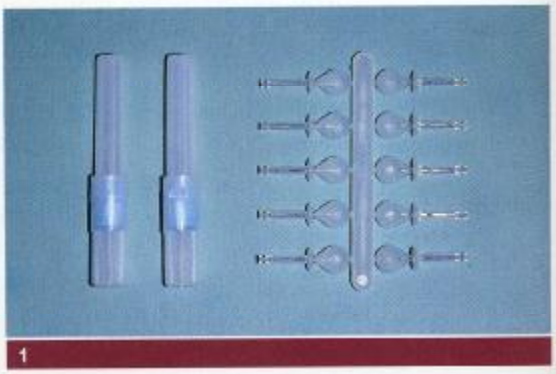

Figure 1. **Anestheze** intraosseous delivery system (DMIC)

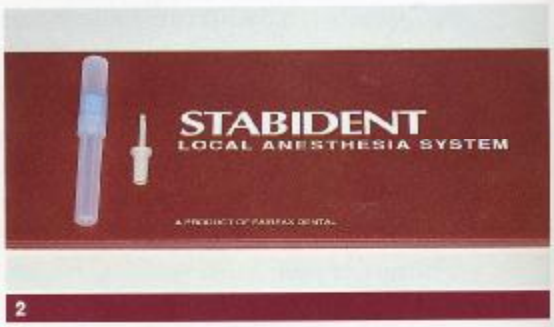

Figure 2. **Stabident** system (Fairfax Dental).

As dentists, we always search for better anesthetic techniques. We screen patients for high tolerance to local anesthetics. We give the usual array of primary and secondary injections. Yet after all our efforts, we often find we have a patient that has remaining dentinal or pulpal sensation that is of a magnitude that prevents treatment.

Intrapulpal Anesthesia

One of the most difficult situations for the dentist and the patient is usage of intrapulpal anesthesia. Usually this is necessitated when the pulp chamber is approached without major discomfort, but exposed pulpal tissues are seemingly unanesthetized.

The method of anesthesia that is most often utilized is a quick entry into the pulpal tissues and immediate high pressure injection of the anesthetic solution. The numbing action is thought to be due to pressure and the anesthetic effect of the solution.[1] The result is usually adequate anesthesia, but with severe pain to the patient and increased tension introduced into the procedure. It is truly an experience that the patient will not soon forget.

Slightly altering the technique offers a less painful and less stressful anesthesia. Instead of a stabbing motion, hold the needle tip 1/2-1 mm above the exposed tissue. Drip anesthetic onto the pulpal tissues and very slowly enter the tissue while at the same time injecting the solution. Continue to inject until the patient has no sensation that the injection is being made.

The proper usage of this technique makes intrapulpal anesthesia a more comfortable experience for the patient, and will be completely innocuous in most cases.

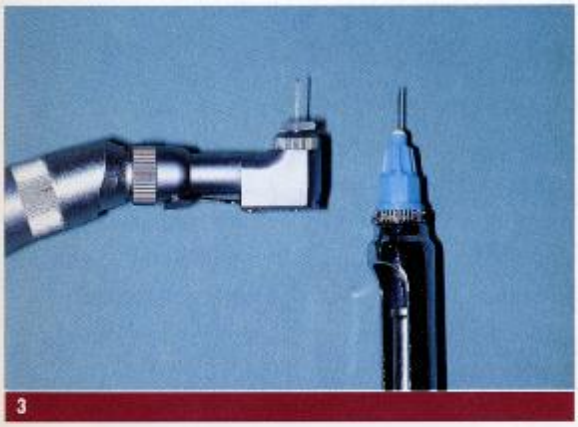

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Figure 3.
The trephine needle consists of a rigid needle attached to a latch contra-angle plastic hub. The injection needle consists of a complimentary needle with a plastic hub for attachment to an anesthetic syringe.

Figure 4.
Proper placement of the trephine needle allows for easy penetration of the interdental alveolar bone.

Intraosseous Injection Technique

The intraosseous injection often allows adequate anesthesia so that the pulp chamber can be entered. Previous techniques involved using a small high-speed bur to make an opening in the cortical plate. Anesthetic was then injected, under pressure.[1]

Recently, a new anesthetic technique has come into use that offers promise as supplementary anesthesia. Through the use of a small stainless steel boring needle, access to the intraosseous tissues is obtained and anesthesia given.

Two systems are currently available, **Anesth-eze** by DMIO and **Stabident** by Fairfax Dental (Figures 1 and 2).

Technique

The technique is straightforward and, after several uses, becomes simple to accomplish. The necessary components are a slow-speed boring needle and an 8 mm 27 gauge needle for injection of the anesthetic. The trephine needle has a plastic sheath that is removed after placement on the contra-angle slow- speed handpiece (Figure 3).

The most advantageous site for placement of anesthetic is the interdental region away from root structures that may cause deflection or bending of the needle. Imagine a horizontal line along the gingival margins of the two adjacent teeth in the area to be anesthetized. Using the imagined horizontal plane as a reference, inject 2mm below the plate into the interdental area of the attached gingiva.[2] The angle of the trephine needle to the tissue is 35 degrees in the maxillary areas and 10 to 45 degrees in the mandibular.

After injection of the gingival tissues with block or infiltration local anesthesia, the trephine needle is rotated slowly with pressure, until the cortical plate is pierced and the boring needle is inserted to the plastic hub (Figure 4).

Exact angulation of the entry device, both horizontally and vertically, should be noted so that placement of the injection needle will be facilitated. A site both mesial and distal to the tooth in question should be utilized for maximum effectiveness.

The point of entry will be noticeable by a small bleeding point (Figure 5). The previously noted angle of the trephine needle will be reproduced with the anesthetic needle (Figure 6). Approximately 1/4 to 1/2 of a 1.8 ml carpule of anesthetic should be slowly injected. The patient should be informed of a

Figure 5.
A small bleeding point helps identify the trephined hole for re-entry.

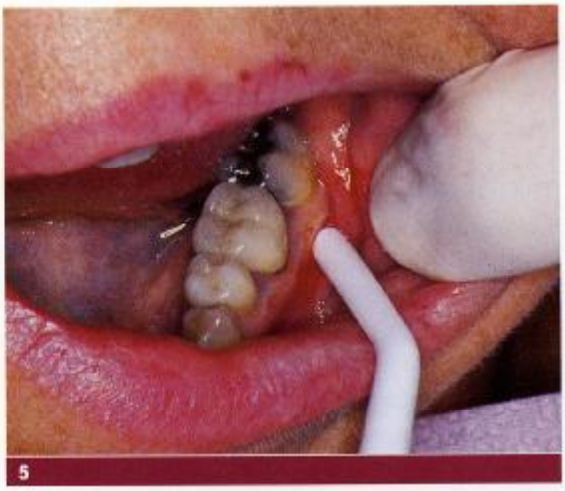
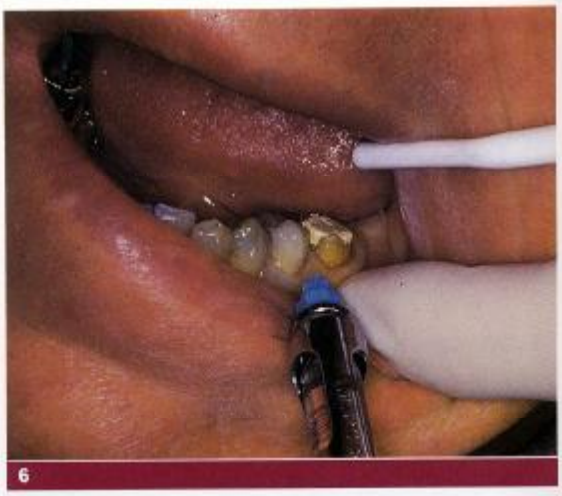


Figure 6.
Re-entry with the complimentary needle and injection of the local anesthetic solution.



probable transitory increase in heart rate. Proper medical history will indicate the type of anesthetic and use or disuse of epinephrine.

After use of the anesthetic needle it is extremely important to not recap or handle the needle, the stiffness and sharpness of the needle will allow penetration of the protective cap. If the needle is bent by the cap and is replaced eccentrically, puncture is almost assured. Proper disposal into the sharps container is of utmost necessity.

Anesthetic of the Future?

A local anesthetic currently available in Europe and Canada shows great promise in control of dental pain. Previously known as Carticaine, Ultracaine (articaine hydrochloride), the solution, is an amide compound with a thiophene ring added, the thiophene gives the anesthetic molecules greater protein binding and greater efficacy as an anesthetic agent. The thiophene ring also makes this solution unusable in patients with allergies to sulfur containing drugs.[1]

The clinical efficacy appears to be superior to the local available products. It exhibits rapid onset of action, deep anesthesia, adequate total duration action, rapid return of sensitivity, and a superior probability of inducing anesthesia with a small injection volume.[3]

The effectiveness reported by Canadian dentists suggests that this product will undoubtedly be popular in the United States once approved.

Variations in patient's emotional as well as physical status often makes our most predictable anesthetic techniques useless before our very eyes. Use your knowledge of alternate and supplemental techniques to increase the chances of success, and, consequently, the chance of creating a positive dental experience.

REFERENCES

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