

Intraosseous Injection as Primary Injection Technique for Delivery of Mandibular Anesthesia

Utilizing the TuttleNumbNow (TNN) Intraosseous Injection Technique

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Course Outline:

Lower molar anesthesia can be one of the most time consuming and frustrating occurrences, especially if it is difficult to get a patient numb. IO anesthesia, which was first published in 1910, is not widely used initially as a rejection of drilling on the cortical bone.

This course outlines the latest advancements in drill-free IO anesthesia and learn how you can “Set down the syringe and pick up the drill.” Learn how to penetrate the mandibular buccal plate without drills, ports, or sleeves, using just a 30 gauge needle.

TuttleNumbNow (TNN) was founded by Gregory K. Tuttle, DDS to introduce a one-step localized intra-osseous anesthesia method, where patients experience instant numbness, allowing dentists to improve efficiency, eliminate excess and lessen their risk.

TNN is a new primary injection for lower posterior teeth replacing the IA nerve block and supplemental PDL injections.

At this course, Dr. Tuttle reveals his lower molar anesthesia protocol which has been used in all 50 states and 26 countries since its founding in 2015. Dentists are increasingly adopting the TNN intraosseous injection technique for its quick, effective numbing, minimal pain, and optimal reversal time, all while using the lowest effective dose.

1. Introduction:

- **1.1** Brief on traditional intraosseous injections and their limitations
- **1.2** Select References of Literature Review
- **1.3** Introduction to the TNN technique and its innovative properties
- **1.4** Outline of the ten-shot protocol and decision matrix

2. Understanding the TNN Technique:

- **2.1** Concept and Rationale behind the bent needle and angulation changes
- **2.2** Product Technical Specifications
- **2.3** Safety precautions and considerations
- **2.4** Case selection criteria

3. Benefits of TNN in Patient Care:

- **3.1** Instant numbing: Importance in emergency scenarios
- **3.2** Cost efficiency: Reducing overheads with high patient turnover
- **3.3** Reduced risks: Minimizing complications and ensuring patient safety

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4. Hands-on Training:

- **4.1** Equipment introduction: Familiarizing with the TNN Needle Guide and standard syringe
- **4.2** Practice sessions: Using the bent needle, understanding angle changes, and ensuring proper technique
- **4.3** Real-time feedback: Ensuring the correct method is employed and addressing any challenges

5. Documentation & Protocol:

- **5.1** Introduction of coding matrix of TNN injections
- **5.2** Importance of standardized numbing protocol in patient care
- **5.3** Documentation procedure for injections, ensuring traceability and consistency

6. Q&A Session:

- **6.1** Addressing concerns, clarifying doubts, and sharing best practices
- **6.2** Course feedback outline handed out to participants.

7. Conclusion & Further Resources:

- **7.1** Providing additional resources, support channels, and continuous learning opportunities.

Learning Objectives:

- 1 Uncover exclusive troubleshooting tips and practical hints to obtain profound anesthesia.
- 2 Learn tools to solve one of the most troublesome aspects of dentistry, mandibular anesthesia.
- 3 Learn the exact steps to perform this anesthesia technique safely and effectively.
- 4 Be guided in optimal uses, cases, and best practices.

Literature Review:

1. Patients prefer IO injections over infiltrations and IA blocks

- *Dubber, H. Should clinicians use infiltration anaesthesia rather than the inferior dental block technique when treating adult patients for safety, effectiveness, and comfort?. BDJ Team 10, 28–31 (2023).*
<https://doi.org/10.1038/s41407-023-1862-x>
- *Mathison M, Pepper T. Local anesthesia techniques in dentistry and oral surgery. Treasure Island (FL): StatPearls Publishing, 2023.* <https://pubmed.ncbi.nlm.nih.gov/35593805/>
- *Lee CR, Yang HJ. Alternative techniques for failure of conventional inferior alveolar nerve block. J Dent Anesth Pain Med. 2019 Jun;19(3):125-134.*

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2. Intraosseous (IO) injections allow placement of local anesthetic solution directly into the cancellous bone adjacent to the tooth to be anesthetized

- Reader, Alfred, John Nusstein, and Melissa Drum. *Successful local anesthesia for restorative dentistry and endodontics*. Quintessence Publishing Company Incorporated, 2017.p.132
- http://www.stomaeduj.com/wp-content/uploads/2018/01/Book_rev_2_v5_1.pdf

3. Scalpel Designed Bevel Studies- a significant lower pain experienced

- M. Dau, I. Buttchereit, C. Ganz, B. Frerich, E.N. Anisimova, M. Daubländer, P.W. Kämmerer, *Influence of needle bevel design on injection pain and needle deformation in dental local infiltration anaesthesia – randomized clinical trial*, *International Journal of Oral and Maxillofacial Surgery*, Volume 46, Issue 11, 2017, Pages 1484-1489 ISSN 0901-5027
- <https://www.sciencedirect.com/science/article/abs/pii/S0901502717315217>

4. 50 years since new local anesthesia technique; Gow Gates as an alternative to the IA Nerve Block

- Isen, David. "FEATURES-PRODUCT PROFILE-A New Method for Intraosseus Injection: The X-Tip." *Oral Health* 90.7 (2000): 44-46.
- <https://www.oralhealthgroup.com/features/product-profile-a-new-method-for-intraosseus-injection-the-x-tip/>

5. Articaine vs. Lidocaine

- Zain M, Khattak S U R, Sikandar H, Shah S A, Fayyaz. *Comparison of anesthetic efficacy of 4% articaine primary buccal infiltration versus 2% lidocaine inferior alveolar nerve block in symptomatic mandibular first molar teeth*. *J Coll Physicians Surg Pak* 2016; 26: 4-8.
- Managutti A, Prakasam M, Puthanakar N, Menat S, Shah D, Patel H. *Comparative analysis of local anesthesia with 2 different concentrations of adrenaline: a randomized and single blind study*. *J Int Oral Health* 2015; 7: 24-27.

6. Needle Gauge Length- optimal length for effective care

- Webb, Laura J. "Orabloc®."
- <https://www.orabloc.com/wp-content/uploads/Tip-Selecting-the-right-needle.pdf>

7. Needle Bending Study- fatigue life evaluation with needle guide

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- Tuttle JJ, Davidson AD, Tuttle GK. Bending 30-gauge needles using a needle guide: fatigue life evaluation. *J Dent Anesth Pain Med.* 2023 Oct;23(5):281-285.
- <https://jdapm.org/DOIx.php?id=10.17245/jdapm.2023.23.5.281>

8. For a “hot tooth” with symptomatic irreversible pulpitis (SIP), an IAN is only 64% effective

- Reader, Successful Local Anesthesia: What Endodontists Need to Know, 2017
- Reader A, Nusstein J, Drum M. Successful Local Anesthesia for Restorative Dentistry and Endodontics, Quintessence Publishing Co, Inc. Hanover Park, IL. 2011, p 34, 133, 134, 135, 138, 139, 140, 159.
- <https://www.aae.org/specialty/successful-local-anesthesia-what-endodontists-need-to-know/>

9. The IAN not only falls short statistically in dental local anesthesia, but also among all local anesthetic blocks in medicine- Advantageous to find an alternative simple technique

- Thangavelu, K., R. Kannan, and N. Senthil Kumar. "Inferior alveolar nerve block: Alternative technique." *Anesthesia, essays and researches* 6.1 (2012): 53.
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4173425/>

10. Gap between Theory and Practice

- *Exploring Dentists’ Personal Knowledge in Practice in the Delivery of Mandibular Anesthesia: A Qualitative Study.* Sina Moshiri. University of Toronto 2022
- https://tspace.library.utoronto.ca/bitstream/1807/123224/4/Moshiri_Sina_202206_MSc_expandedabstract.pdf

TNN TECHNIQUE-10 STEPS

1. **Prepare the Needle & Syringe:** Prepare a 30g Septoject Evolution short (25mm) needle by placing a TNN Needle guide and bending the needle at a 90° angle according to insert instructions.
2. **Select Precise Injection Site:** Distal to the tooth to be anesthetized in attached gingiva at the base of the papilla coronal to the mucogingival line. Apply topical on buccal papillae and vestibule. Papilla and supracrestal bone must be free of periodontal disease (pocketing and bone loss).
3. **Imperceptible Penetration:** Perpendicular to the ridge, penetrate to the depth of the bevel and expel one drop of anesthetic and wait 5 seconds with almost no pressure. If the patient felt it, you didn’t do it right. There should be no movement of the plunger or stopper at this stage.

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4. **Advance the Needle to Resistance:** This is to bump the periosteum by pushing (light pressure) on the bend with your finger, thumb, or knuckle. Pushing too hard to try to penetrate at this point is a common mistake and will dull or ruin the needle tip.
5. **Clear the Tip:** Clear the tip from debris and bone contact by backing up the needle and extruding a drop of anesthetic. The needle remains in tissue to not lose tip location. If the needle was stuck and difficult to back up, change to a new needle.
6. **Bump the Bone 4 Times, adding 10 degrees Each Time:** The initial penetration has the needle perpendicular to the buccal plate. Now, while maintaining exact tip location, you are going to change the angulation of the elbow of the bent needle towards the apex of the tooth, 10 degrees four times in the same direction as you chip and spray your way into bone with a pecking motion. Minimal anesthetic and minimal pressure is applied at this point to clear the tip from clogging.
7. **Needle Penetrates Bone:** You will often, but not always, feel a little crunch or see a spot of blood as you penetrate the buccal plate into the cancellous bone.
8. **Advance and Infuse (Inject):** Incrementally advance the needle as follows: Spend five seconds for every mm of depth gained extruding anesthetic in a low pressure, low volume sustained infusion. Advance to the lingual plate and increase to moderate pressure. Be careful and visually confirm you did not penetrate both buccal and lingual plates. Total depth averages 9mm and total volume is 1/2 cartridge or less.
9. **Remove, Test, Recap:** Remove the needle by pinching the TNN Needle Guide or at the bend with your thumb and index finger to pull the needle out. Test for pulpal anesthesia. Recap using safe recap.
10. **“Set Down the Syringe, Pick up the Drill”:** Now you can “set down the syringe and pick up the drill or scalpel or curette with confidence.

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