Is the ‘Mandibular Block’ Passe?

Stanley F. Malamed
Welcome to the Greater New York Dental Meeting

Greater New York Dental Meeting™
Executive Headquarters
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www.gnydm.com
Sponsored by New York County & Second District Dental Societies

All programs and exhibits are held at the Jacob K. Javits Convention Center (unless otherwise indicated)
11th Avenue between 34th and 39th Street, New York City

General Registration Hours
Friday, November 29 12:00 Noon - 4:30 P.M.
Saturday, November 30 8:00 A.M. - 4:30 P.M.
Sunday, December 1 - Tuesday, December 3 8:00 A.M. - 5:30 P.M.
Wednesday, December 4 8:00 A.M. - 4:30 P.M.

Exhibit Hall Hours
Sunday, December 1 - Tuesday, December 3 9:30 A.M. - 5:30 P.M.
Wednesday, December 4 9:30 A.M. - 5:00 P.M.

COURSE REGISTRATION
Pre-registration is required for all continuing education courses with the exception of the “Live” Dentistry and Affiliated Groups. Your seat will be held for 15 minutes after the start of the course; after that, those without tickets will be seated according to space availability. When the room is filled, no additional people will be admitted due to fire department regulations. If you have not pre-registered, please be prepared to select an alternate session to attend.

Tickets
Tickets are required for all courses excluding Live Dentistry. Tickets for all functions can be purchased at all general registration booths located in the Registration Area on the Upper Level in the Crystal Palace and online.

6 Days of Education Seminars, Hands-on Workshops & Essays
Friday - Wednesday
4 Days of Exhibits
Sunday - Wednesday

FREE “Live” Dentistry Hi-Tech 450 Seat Arena

SUNDAY
9:45 - 11:45
VOCO America, Inc.
Drs. Ron Kaminer & Marc Geissberger
Restorative

Phillips Sonicare
Dr. Gerard Kugel
Whitening

3Shape
Dr. Sundeep Rawal
Digital

MONDAY
9:45 - 11:45
Shofu
Dr. Ron Kaminer
Restorative

First Fit
Drs. Frederick E. Solomon
Cyrus Tahmasebi
Digital

Align I Invisalign I Itero
Drs. Karla Soto &
Christian Coachman
Restorative

TUESDAY
9:45 - 12:00
Millennium
Dr. Sundi D. thanik
Laser

2:00 - 4:15
Glidewell
Dr. Justin Chi
Digital

9:45 - 12:00
Apa / CareCredit
Drs. Michael Apa
Aesthetic

WEDNESDAY
2:00 - 4:15
Benco / Vatech
Dr. Aeklayya Panjali
Implant

Celebrity Luncheon Speaker
John Quiñones
Monday, December 2nd
12:00 - 2:00 - Ticket 4010
$125.00

3D Printing & Digital Dentistry Conference
Dental Laboratory Technicians Programs
Sleep Apnea Symposium
Oral Cancer Symposium

WORLD IMPLANT EXPO

5th Annual Global Orthodontic Conference
3rd Annual Pediatric Dentistry Summit
12th Annual INVISALIGN® - GNYDM EXPO
4 Days of Programming:
Sunday - Wednesday

Botox and Facial Fillers Seminar & Workshop
Over 1,700 Exhibit Booths

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Over 1,700 Exhibit Booths
Is the 'MANDIBULAR BLOCK' passé?
Local Anesthetics by EXPECTED duration of PULPAL anesthesia

Short-duration (~30 minutes)
- Mepivacaine 3%, Prilocaine 4%

Intermediate-duration (~60 minutes)
- Articaine 4%, Lidocaine 2%, Mepivacaine 2%, Prilocaine 4% (all with vasoconstrictor)

Long-duration (>90 minutes)
- Bupivacaine 0.5% (with vasoconstrictor)

When problems achieving clinically adequate pain control occur . . .

Where do they happen?

Incisive NB aka Mental NB (incorrectly)

Needle: 27 gauge short
Insertion: MB fold at or anterior to mental foramen
Target: Mental nerve as it exits mental foramen
Volume: 0.6 mL
Aspiration: 5.7%
**Incisive NB**

aka Mental NB (incorrectly)

Apply finger pressure for 2 minutes

**VERY IMPORTANT**

**VAS = 0 - 2**

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**Tooth group**

<table>
<thead>
<tr>
<th></th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Very Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandibular Incisors</td>
<td>4</td>
<td>6</td>
<td>17</td>
<td>39</td>
<td>55</td>
</tr>
<tr>
<td>Mandibular Canines</td>
<td>4</td>
<td>10</td>
<td>23</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Mandibular Premolars</td>
<td>8</td>
<td>29</td>
<td>18</td>
<td>41</td>
<td>25</td>
</tr>
<tr>
<td>Mandibular Molars</td>
<td>20</td>
<td>47</td>
<td>32</td>
<td>21</td>
<td>1</td>
</tr>
</tbody>
</table>

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**IANB:** Lidocaine + epinephrine

Araticaine + epinephrine

- **% clinically effective pulpal anesthesia**
  - 25% at 4 minutes
  - 40% at 6 minutes
  - 60% at 10 minutes
  - 67% at 15 minutes
  - 95% at 45 minutes

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A dentist will administer approximately 30,000 IANBs in the course of a 20-year career.

30,000 IANBs with a 60% success rate

18,000 successful IANBs

12,000 missed IANBs

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**Mandibular anesthesia**

Bone is TOO thick

- **THE** problem with mandibular anesthesia, in the adult, is the density of the cortical plate of bone.

- It precludes the successful administration of supraperiosteal anesthesia.

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**Inferior Alveolar Nerve Block**

"Mandibular NB"

**Inferior Dental Block**

**Needle:** 25- or 27-gauge long

**Insertion:** soft tissue on medial border of mandibular ramus

**Target:** At nerve on lingual aspect of ramus prior to entering mandibular foramen

**Volume:** 1.5 - 1.8 mL

**Aspiration:** 10% - 15%
**Buccal NB**

**“Long” Buccal**

- **Needle:** 25- or 27-gauge long
- **Insertion:** mucosa membrane distal and buccal to last mandibular molar
- **Target:** buccal nerve passing over border of ramus
- **Volume:** 0.2 - 0.3 mL
- **Aspiration:** 0.7%

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**Inferior Alveolar Nerve Block**

**“Mandibular NB” Inferior Dental Block**

- The experienced dentist administered the IANB by ‘feel’
- Needle is advanced towards lingual aspect of body of mandible until bone is contacted.
- Dr. ‘feels’ or ‘senses’ that the needle has contacted bone at the appropriate depth (based on years of clinical experience)

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**The most common reason for missing the IANB is depositing local anesthetic solution too low. (BELOW the mandibular foramen)**

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**Following completion of IANB & Buccal NBs . . .**

**Seat patient comfortably upright**

**Speeds onset of anesthesia**

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- Gow-Gates Mandibular Nerve Block
- Vazirani - Akinosi (closed mouth) Mandibular Nerve Block
- Periodontal ligament injection (intraligamentary)
- Intraosseal (crestal) anesthesia
- Intraosseous anesthesia
- Articaine HCl via buccal infiltration
- Buffered local anesthetics

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**Is the Inferior Alveolar Nerve Block Passé?**
The GOW-GATES Mandibular Nerve Block

The GOW-GATES MANDIBULAR NERVE BLOCK is the only true mandibular (3rd division, V₃) nerve block.

Anesthesia
- Mandibular teeth to midline
- Buccal soft tissues to midline
- Anterior 2/3 of tongue and floor of oral cavity
- Lingual soft tissues and periosteum
- Body of mandible, inferior portion of ramus
- Skin over zygoma, posterior portion of cheek, and temporal region

Gow-Gates Mandibular Nerve Block

Needle: 25 gauge long
Insertion: At height of ML cusp of maxillary 2nd molar, just distal to 2nd molar
Target: Lateral aspect of condylar neck
Volume: 1.8 to 3.0 mL
Aspiration: < 2%
Akinosi-Vazirani Mandibular NB
Vazirani-Akinosi Mandibular NB

**Indications**

1. Limited mandibular opening - trismus
2. Inability to visualize landmarks for IANB (e.g. because of large tongue)
### Periodontal Ligament Injection (PDL)
- Intraligamental Injection (ILI)
- Intraseptal injection (crestal)
- Intraosseous Injection (IO)

### Indications
1. Mandibular molars
2. Patients in whom residual soft tissue anesthesia is undesirable
3. Where regional nerve block is contraindicated
4. Aid in diagnosing pulpal discomfort
5. Adjunct to partially successful nerve block

### Intraseptal (Crestal) Anesthesia

**Application of Crestal Anesthesia for Treatment of Class I Caries in Posterior Mandibular Teeth**

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Crestal (N)</th>
<th>IANB (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st premolar</td>
<td>96 (16)</td>
<td>82 (17)</td>
</tr>
<tr>
<td>2nd premolar</td>
<td>98 (28)</td>
<td>83 (21)</td>
</tr>
<tr>
<td>1st molar</td>
<td>100 (52)</td>
<td>85 (45)</td>
</tr>
<tr>
<td>2nd molar</td>
<td>100 (40)</td>
<td>88 (36)</td>
</tr>
<tr>
<td>3rd molar</td>
<td>100 (19)</td>
<td>93 (15)</td>
</tr>
</tbody>
</table>
### Intraseptal (Crestal) Anesthesia

**Onset**
- Crestal: 7.00 ± 0.71
- IANB: 3.30 ± 0.67
- <0.001

**Duration**
- Crestal: 23.10 ± 2.13
- IANB: 32.10 ± 2.02
- <0.05

**Pain**
- Crestal: 1.54 ± 0.18
- IANB: 3.44 ± 0.22
- <0.001

**Volume**
- Crestal: 0.4 mL ± 2.07
- IANB: 1.99 mL

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**Intraosseous Anesthesia (IO)**

**X-Tip**

**Endodontics:**
- Study #1: 88% success on mandibular molars with SIP where 2 IANB had failed
- Study #2: 91% success on mandibular molars with SIP where 2 IANB had failed
Onset & Duration:

- Onset of anesthesia almost immediate
- Duration of pulpal anesthesia adequate to permit extirpation of pulpal tissues
- Duration of pulpal anesthesia may not be adequate for prolonged restorative procedures
  - Reinject as needed

Intraosseous Anesthesia (IO)

**ADVANTAGES**
- Relatively comfortable
- Single / multiple tooth anesthesia
- No lip / tongue

**DISADVANTAGES**
- Highly vascular region
- LA OD
- Vasopressor “shakes” or tremor
  - use 1:200k or plain
- Can’t locate hole with needle

ARTICAIN

Articaine hydrochloride 4% epinephrine 1:100 000
  - Registered in 71 countries, 24 countries in the EU and in 45 non-EU countries and in two non-EU countries by license import.

Articaine hydrochloride 4% epinephrine 1:200 000
  - Registered in 58 countries, 24 countries in the EU, 32 non-EU countries

Articaine hydrochloride 4% plain

The **SCIENCE** of Articaine HCl

Articaine has been compared to lidocaine, mepivacaine and prilocaine

Virtually ALL studies have demonstrated that articaine is **AS SAFE and AS EFFECTIVE** as the drug it which it was compared.
Efficacy of articaine: a new amide local anesthetic

CONCLUSIONS

For 4 percent articaine with epinephrine 1:100,000, time to onset of anesthesia and duration of anesthesia are appropriate for clinical use and are comparable to those observed for other commercially available local anesthetics. Articaine can be used effectively in both adults and children.

Safety of articaine: a new amide local anesthetic

CONCLUSIONS:

The incidence of complications (including paresthesia) was equal for both the tested local anesthetics, lidocaine & articaine.

The SCIENCE of Articaine HCl

- 1999 - Three identical randomized, double-blind, parallel group, active controlled, multicenter Phase 3 clinical trials
- Safety & efficacy of articaine HCl for USA Food & Drug Administration (FDA) approval
- Patients aged 4 - 79 years
- JADA 2000 . . . Efficacy of articaine HCl
- JADA 2001 . . . Safety of articaine HCl
- Pediatric Dentistry 2001 . . . Safety & efficacy in pediatric dentistry

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The **SCIENCE** of Articaine HCl

**WHY?**
Because local anesthetics are VERY EFFECTIVE drugs

Before Articaine HCl
**Pre-2000 (USA)**

- Lidocaine + epinephrine
- Mepivacaine + epinephrine
- Prilocaine + epinephrine

So, what, if any, are the **clinical advantages** of articaine HCl compared with the other amide LAs?

Articaine HCl
by
Mandibular Buccal Infiltration
in Adults

Results - 2007:

- **Mandibular 2nd Molar**
  - Articaine: 75%
  - Lidocaine: 45%
- **Mandibular 1st Molar**
  - Articaine: 87%
  - Lidocaine: 57%
- **Mandibular 2nd Premolar**
  - Articaine: 92%
  - Lidocaine: 67%
- **Mandibular 1st Premolar**
  - Articaine: 86%
  - Lidocaine: 61%

**SUCCESS** = 80/80 on 2 consecutive tests

Pulp test every 3 min.

*JADA 138(8):1104-1112, 2007*
Infiltration **buccal** fold by lateral incisor
- **94%** articaine; **70%** lidocaine

Infiltration **buccal & lingual** by lateral incisor
- **97%** articaine; **88%** lidocaine

**Advantages**

1. Profound pulpal anesthesia
2. 30 to 40 minute duration of pulpal anesthesia
3. Minimal accessory soft tissue anesthesia
   - Tongue

**Disadvantage**

Just like maxillary infiltration, I can’t think of any, unless it doesn’t work!
Articaine buccal infiltration as a **supplement** to IANB.

The local anesthetic **“ON SWITCH”**

Buffered Local Anesthetics
Alkalized Local Anesthetics

So the question is:

How long does it **REALLY** take for pulpal anesthesia to develop?

IANB: Lidocaine + epinephrine
Articaine + epinephrine

% clinically effective pulpal anesthesia
- 25% at 4 minutes
- 40% at 6 minutes
- 60% at 10 minutes
- 67% at 15 minutes
- 95% at 45 minutes
Can we speed the onset of anesthesia with Articaine?

NO

Can we speed the onset of anesthesia... by changing the pH of the LA solution?

Can we speed the onset of anesthesia by buffering the solution?

YES

pH of Local Anesthetics

- 'Plain' LA solution = ~6.5
- Articaine = 4.0 - 5.5
- Vasoconstrictor LA solution = 3.0 - 4.4
- Lemon juice = 3.3

Buffered LIDOCAINE + EPI 1:100
Buffered ARTICAINE + EPI 1:100
LIDOCAINE + EPI 1:100
ARTICAINE + EPI 1:100
The higher the pH of a local anesthetic solution:
1. more rapid the onset,
2. more comfortable the injection, and
3. more profound the degree of anesthesia.

<table>
<thead>
<tr>
<th>pH</th>
<th>Lidocaine pH/K</th>
<th>Articaine pH/K</th>
<th>Mepivacaine pH/K</th>
<th>Bupivacaine pH/K</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.4</td>
<td>24.03</td>
<td>28.47</td>
<td>38.69</td>
<td>16.83</td>
</tr>
<tr>
<td>6.5</td>
<td>3.83</td>
<td>4.77</td>
<td>7.36</td>
<td>2.45</td>
</tr>
<tr>
<td>3.5</td>
<td>0.004</td>
<td>0.005</td>
<td>0.008</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Three ways to buffer (as of December 2019):
1. The ‘medical way’ = DIY (do it yourself)
2. Anutra
3. Onset

Buffering Dental Local Anesthetics

Anutra Local Anesthetic Delivery System

Anutra Medical
www.anutramedical.com

Multidose LA vial Multidose NaBicarbonate
Plastic disposable syringe
Buffered Local Anesthetics

When buffering is done properly the following advantages can be expected from the increase in pH:

1. More comfortable injection for patient
   - pH of anesthetic 7.3 to 7.4
2. More rapid onset on pulpal anesthesia
3. More profound anesthesia
4. Less post-injection soreness
5. No effect on duration of action
6. No increase in LA blood level (safety)

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Buffering of LAs has a 2.29 greater likelihood of achieving successful anesthesia.

- Incisive (mental) nerve block
- Gow-Gates mandibular nerve block
- Akinosi-Vazirani nerve block
- PDL, Intraosseous, Intraseptal
- Articaine by mandibular infiltration
- Buffered local anesthetic

March 2019

This investigation revealed that buffered LAs are more effective than unbuffered LAs when used for mandibular or maxillary anesthesia in pulpally involved teeth. Buffering of LAs has a 2.29 greater likelihood of achieving successful anesthesia.
Recommendations for MANDIBULAR ANESTHESIA

Recommendation
Premolars and Canine and Incisors

No need for inferior alveolar nerve block

Recommendation
Premolars and Canine and Incisors

Incisive (mental) NB
- (Buffered) lidocaine, articaine, mepivacaine
- 0.6 - 0.9 mL

If ineffective:
- PDL or Intraseptal

Recommendation
Canine or Incisor

Infiltration of buffered articaine
- 0.6 - 0.9 mL buccal fold

Infiltration of buffered articaine
- 0.6 mL buccal fold and REPEAT if needed

Recommendation
Posterior teeth - option #1

IANB or GGMNB utilizing
- (Buffered) lidocaine, articaine, mepivacaine, followed by
- (Buffered) articaine buccal infiltration at apex of tooth
- 0.6 - 0.9 mL
Recommendation
Posterior teeth - option #2

(Buffered) articaine
- 0.6 - 0.9 mL in buccal fold
(as for maxillary infiltration)

So . . .
Is the “MANDIBULAR NERVE BLOCK” passé?

2019
YES!

The ‘MANDIBULAR BLOCK’ is passé!