Sedation & Anesthesia in Dental Practice

“Current Status of Pain Control in Dentistry”

2010 NATIONAL PRIMARY ORAL HEALTH CONFERENCE

Gaylord Palms Hotel, Orlando FL

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...a significant number of practitioners experience stress related to local anesthesia administration...
...almost 19% admitted that at least at some time INJECTING local anesthesia had bothered them enough that they had reconsidered dentistry as a career AND that 6% considered these feelings to be a SERIOUS PROBLEM

Simon et al, Quintessence International 1994
THE ELUSIVE MANDIBULAR BLOCK
A = 86%

B = 7%

C = 7%

Level for pulp anaesthesia

Level for soft tissue anaesthesia

Duration in hours
Anatomical Anomalies:

- Understanding the pterygomandibular triangle
- The concept of the “two inferior alveolar nerve” theory

Dr. Patricia Blanton, Baylor University, Dallas, Texas
Relationship of

Conventional (inferior alveolar)

Akinosi, closed mouth

Gow-Gates “condylar neck”

Hybrid, “mix and match” blocks
Tips and Tricks

12 Tips and Tricks of Putting It All Into Place
Reasons for Failure

Anatomical Variations:

- Hard tissue anatomy
- Connective tissue and Neurovascular anatomy
3 Major Factors:

- Internal Oblique Ridge
- Sphenomandibular fascial barrier
- Risks: Nerves, Arteries
Local Anesthesia:

Anatomical Influences:

The *maxillary* artery, passes through the high *pterygomandibular* triangle region.
Local Anesthesia:

The Question is:

What is the risk of an intra arterial injection?
INTERNAL MAXILLARY ARTERY CHARACTERISTICS:

- Thick smooth muscle wall
- Well innervated
- Constricts or arteriospasms, eliminates lumen
- Artery is mobile within the anatomical area
- Pulse pressure
Histology
Leonard M, Local Anesthesia Volume and Success Rates, JADA Vol. 126(833) 1995
Management of Pain and Anxiety in the Dental Office

Dionne, Phero, Becker

Hawkins, J.M. Local Anesthesia Cpt. 13
Philadelphia, PA, W.B. Saunders 2002
Local Anesthesia of the Oral Cavity

Jastak, Yagiela and Donaldson

Philadelphia, PA, W.B. Saunders 1998
An Intraoral Approach,

Utilizing

External Landmarks
ANATOMICAL CONSIDERATIONS
Clinical Technique
Onset: 5 - 15 minutes

Characteristic: posteriorÆforward

Duration: 3 - 4.5 hours pulpal
4 – 12 hours soft tissue

Post-op analgesia:

0.5% bupivacaine 1:200K epi
x 2 cartridges
Lingual Infiltration

Advantages:

- Thin cortical plate
- Lingual foramina
- Patient acceptance
- Lingual nerve blocked already
Lingual Infiltration

Disadvantages:

- Ballooning of tissue
- Avoiding submandibular salivary gland
- Vision
Lingual Infiltration

Patient selection criteria enhancement:

- Missing adjacent teeth
- Thinner alveolar anatomy
- Younger/older patients
- Root anatomy visible
- Vertical buccal shelf form
Lingual Infiltration

**Technique:**

- Apical to mucogingival junction
- Tissue expands
- Avoid submandibular gland
- Vision enhanced by position and tongue retraction
Lingual Infiltration Technique:

- Depth: 2-3 mm
- Time: 5 minutes
- Volume: 0.7 cc
EFFICACY OF LOCAL ANESTHESIA SOLUTIONS
25 years of 4% articaine administration

**Septocaine®, Zorcaine®, Astracaine®**, with epinephrine 1:100,000 and 1:200,000

*Ultracaine®, Septanest®*
Articaine

A statistically significant scientific study has just been published showing that 4% articaine 1:100K performed more efficaciously than 2% lidocaine 1:100K in controlled clinical administrations.

Kanaa, MD et al, J.Endod 32:296-298,2006
Sulfa, Bactrim ®

IS NOT

Sulfur, a nonmetallic element

IS NOT

Sulphite, an antioxidant for epinephrine
Metabolism,
Safety,
Toxicity,
and Children
Although classified as an amide local anesthetic, the articaine molecule is 90% inactivated by plasma cholinesterases and only 10% by hepatic enzymes.
Safety

- The authors **could not find** a single **mortality** linked to articaine, in any age group, in it’s 29 year history of dental administration in Europe, Canada and now the U.S.A.

Furthermore, since the product has been available in Germany and France since 1976 and has secured ~90% of the market for dental usage, the authors expected to find reports of post op sequellae such as lingual nerve and/or inferior alveolar nerve paresthesia or dysesthesia.

Paresthesia Facts with respect to:

4% Articaine (Septocaine®)
and
4% Prilocaine (Citanest®)
Local Anesthetics
Paresthesia Reports

A Retrospective Study from 1995 Reported:

Prilocaine (15x) and articaine (20x) showed greater frequency of paresthesia with mandibular block anesthesia (cf. lidocaine).

(Data on duration not provided)

Haas, DA, Lennon, D. A 21 Year Retrospective Study
Paresthesia Reports

The same study from 1995 reports an extremely low overall frequency of paresthesia with mandibular block anesthesia of:

14 in an estimated 11,000,000 injections

or

1 in 785,714

Haas, DA, Lennon, D.  A 21 Year Retrospective Study
Paresthesia Reports

“... it appears that informed consent is merited in performing mandibular block and lingual block injections with articaine and prilocaine...

...does the risk of paresthesia warrant use of articaine and prilocaine for lingual nerve, inferior alveolar nerve and other mandibular block injections?”

Data Assessment

Factors:

- Neural
- Research and reporting
- Advanced or higher mandibular techniques
Is there a proven “cause and effect” of dental paresthesia with respect to 4% solutions?

Using dissecting microscope:

.02 ml of 4% articaine injected into rat sciatic n.
.01 ml of 4% articaine injected into cat lingual n.

After 30 days, animals sacrificed:

average axonal x-section areas were unchanged when compared to uninjected (control) side.

Hoffmeister, Dutsch Zahnartzl, 46,828-830, 1991
Is there a proven “cause and effect” of dental paresthesia with respect to 4% solutions?

There is no evidence based data to conclude that 4% prilocaine or 4% articaine is directly or scientifically causitive of dental paresthesia and/or hypesthesia.

Hawkins JM, Articaine: Truths, Myths and Potentials, Academy of Dental Therapeutics and Stomatology. 9 2003
Clinical (unpubl. data)

**Hands-on instruction, 1982-present:**

In approximately 2500 Dentist participation course, directly supervised injections (Akinosi, Gow-Gates) and in

**Private practice, 1976, 4 day week, 42 weeks/yr:**

Administering over an estimated 12,000 high “hybrid” blocks using primarily 4% prilocaine from 1976-1982 and primarily 4% articaine from 1982, no paresthesias have been reported by the participants or experienced by the patients who have been treated in private practice.

Hawkins JM, Instructor and Private Practitioner, Unpublished data, anecdotal, 1976 - present
CONVENTIONAL MANDIBULAR ANESTHESIA

12 TIPS & TRICKS

Or

TRIALS & “DAMAGE CONTROL”
The Current Status of Pain Control in Dentistry

WHAT’S NEW?
OraVerse™

Phentolamine Mesylate Injection

“Reversing” Local Anesthesia
Phentolamine mesylate reverses **SOFT TISSUE ANESTHESIA ONLY**

Phentolamine mesylate is **NOT** a **LOCAL ANESTHETIC** reversal agent
Adults and Adolescents: **60 Minute Efficacy Data**

Time to Recovery of Normal Lip Sensation

**Mandible**

- Phentolamine mesylate accelerates the return to normal sensation by 85 min, 54.8%; p<0.000
- 41% phentolamine mesylate patients fully recovered in 60 minutes
  7% for control patients
Adults and Adolescents: **60 Minute Efficacy Data**

**Maxilla**

- Phentolamine mesylate accelerates return to normal sensation by 83 min. 62.3%; *p*<0.0001
- 59% phentolamine mesylate patients fully recovered in 60 minutes, 12% for control patients
Post-surgery:

Bupivacaine HCl + NSAID are indicated

Following PDL (ILI) or Intraosseous (IO)
Local Anesthesia “Reversal” Agent

- OraVerse is indicated for reversal of soft-tissue anesthesia, i.e., anesthesia of the lip and tongue, and the associated functional deficits.

- OraVerse is not recommended for use in children less than 6 years of age or weighing less than 15 kg (33 lbs).
Administration and Dosage

- Standard dental cartridge with distinctive green label

- Administered by injection with standard dental syringe

- Utilizes same injection site and identical administration technique to that used for the local anesthetic

- 1:1 ratio to local anesthetic (1/2, 1 or 2 cartridges)
ONSET™

The Current Status of Pain Control in Dentistry
Increasing the effectiveness of local anesthetics
The Current Status of Pain Control in Dentistry

- Increasing the comfort of LA injections
Staff who are . . . KIND, PROFESSIONAL, CARING, WARM, HELPFUL
A dentist who:

DOES NOT HURT

AND

Can give a PAINLESS INJECTION
How to make the administration of local anesthesia PAINLESS
How to make the administration of local anesthesia PAINLESS

- Topical anesthetic
- Stretching of the soft tissues
- Gentle needle insertion
- SLOW administration of the anesthetic solution
How to make the administration of local anesthesia PAINLESS

pH of LA solution:
- LA with vasopressor  pH 3.5~4.9
- LA ‘plain’  pH 5.5~6.5

Administer small volume of ‘PLAIN’ drug before administration of LA + vasopressor
Na Bicarbonate - NaHCO₃

Used in medicine (ophthalmology, dermatology, plastics, urology) to increase both COMFORT & SPEED of ONSET of LAs

Decreasing the pain of local anesthesia: a prospective, double-blind comparison of buffered, premixed 1% lidocaine with epinephrine versus 1% lidocaine freshly mixed with epinephrine.

Burns CA, Ferris G, Feng C, Cooper JZ, Brown MD

Onset™ System Components

System assembled and ready to buffer anesthetic cartridge

Reusable dosing pen

Transfer needle
Minutes to Profound Numbness

Standard Anesthetic

Average: 5 minutes 17 seconds

Failed Anesthetic

Onset™ System

Average: 1 minute 26 seconds

Time to Pulpal Anesthesia (minutes)

Number of Participants at each 20 second time interval

© 2008 Monterey Devices – Proprietary and Confidential
The future of local anesthetic:  

The future of local anesthetic: Onset System™
The Current Status of Pain Control in Dentistry
ACCUSPRAY®

Flumist® nasal delivery of local anesthesia

No needle for teeth #3 – #14

Pulpal Anesthesia!
World’s First Intranasal Dental Anesthetic currently in research and development

Utilizing the BD ACCUSPRAY® technology currently delivered with the Flumist® nasal product

The goal is to produce a regional block enabling operative dental procedures on number 3 through 14.
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