Sedation & Anesthesia in Dental Practice

LOCAL ANESTHESIA

"30+ YEARS OF HITS, MISSES AND NEAR MISSES"

The New Hampshire Dental Society
Concord, New Hampshire
November 9th, 2018

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Dentist / Dentist Anesthesiologist
Toronto, ON, Canada

DISCLOSURE

Mel Hawkins

is a Scientific Advisor/Consultant for dentist enquiries for two (2) *competing* local anesthetic manufacturing companies in the U.S.A.:

- **Septodont Inc., Lancaster, PA and**
- **Carestream Dental, Rochester, NY.**

No shares, stocks or ownership. No marketing or sales involvement.
Not employed by either. Reimbursed quarterly.

The New Hampshire Dental Society
November 9th, 2018

AGENDA

1. Anatomy, Technique of Blocks, Road Blocks, More Blocks
2. What can go wrong? and What to do about it?
3. A Few Tips and Tricks

PART

1

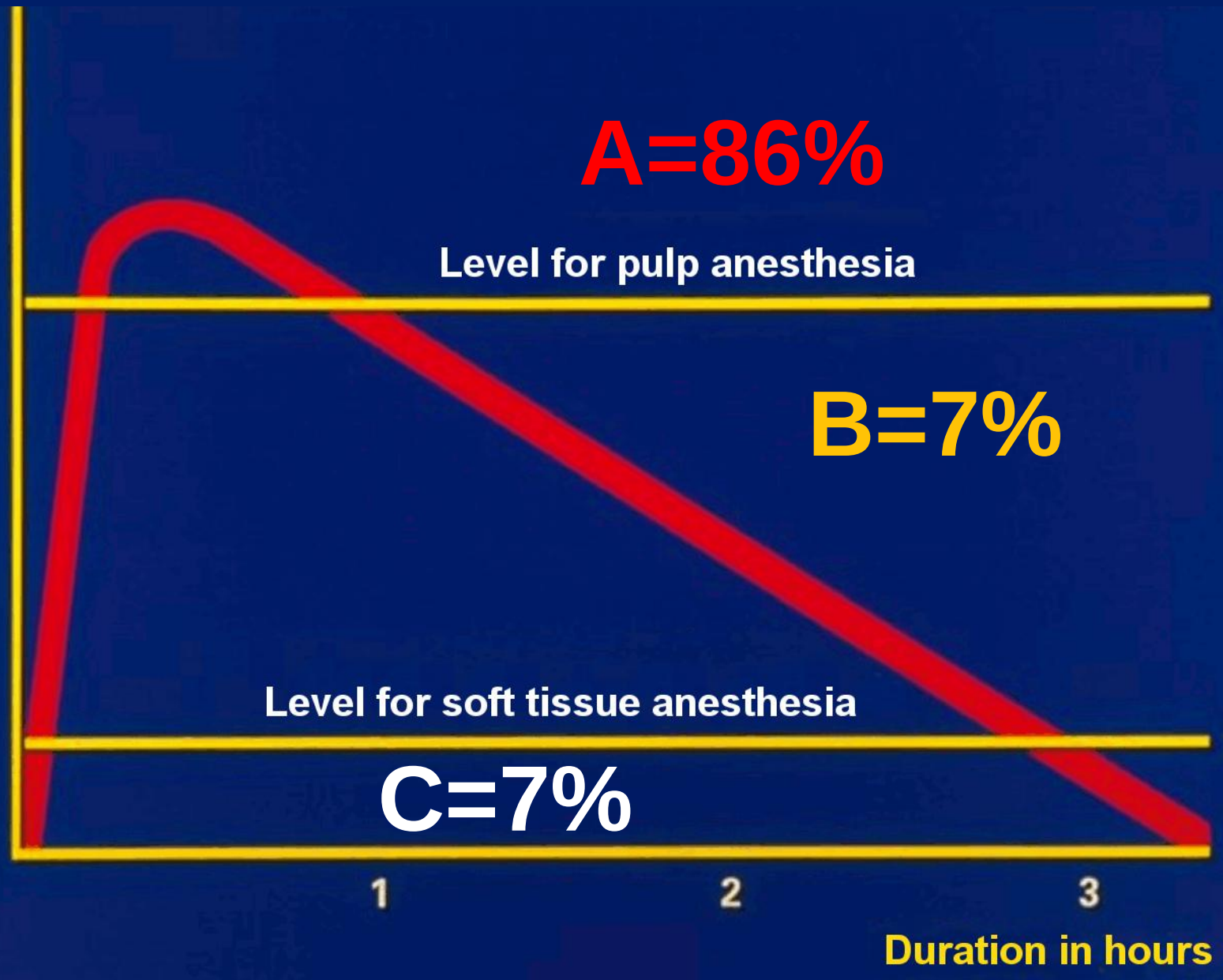
Anatomy and Technique

BLOCKS, ROAD BLOCKS and MORE BLOCKS

THE ELUSIVE

McDibular BLOCK

…millions and millions served . . .



Compiled various sources-Hawkins-2016

Relationship of:

Hybrid “mix and match” blocks

Gow-Gates “condylar neck”

Akinosi closed mouth

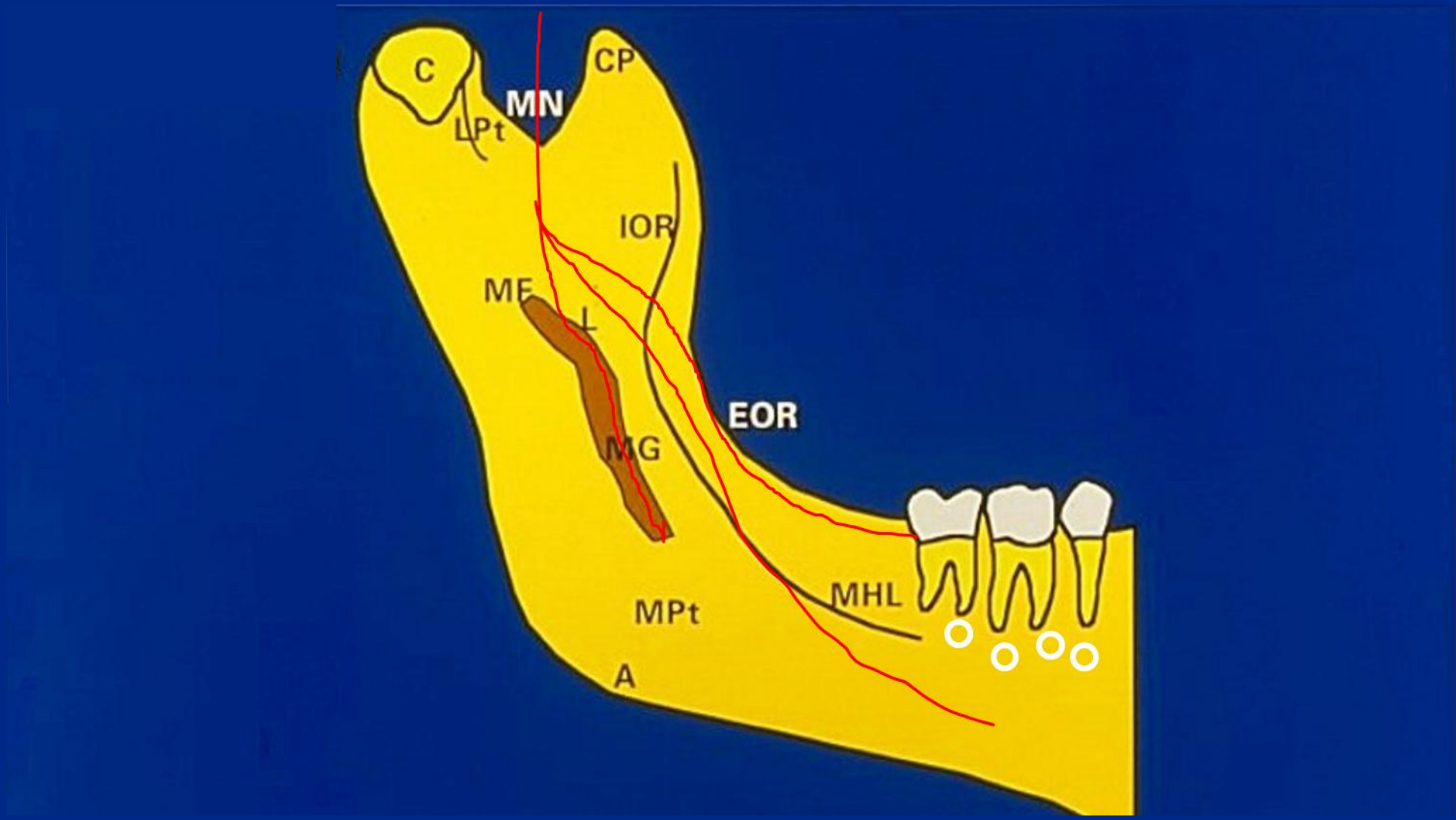
Conventional (inferior alveolar)

Reasons for Failure

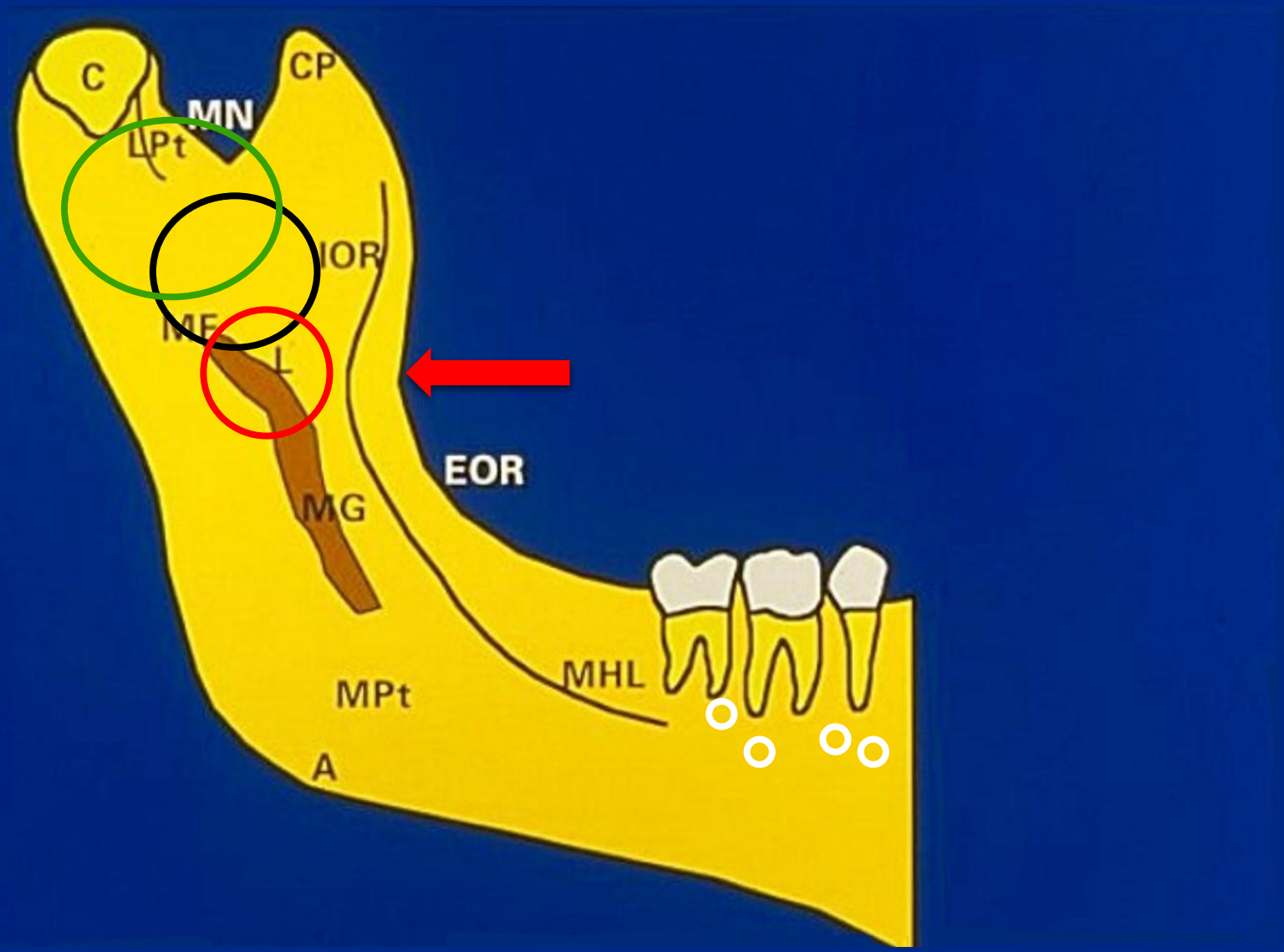
Anatomical variations

- Hard tissue anatomy
- Soft tissue anatomy
- Connective tissue
- Neurovascular anomalies

Anatomy of the Mandible: Hard Tissue

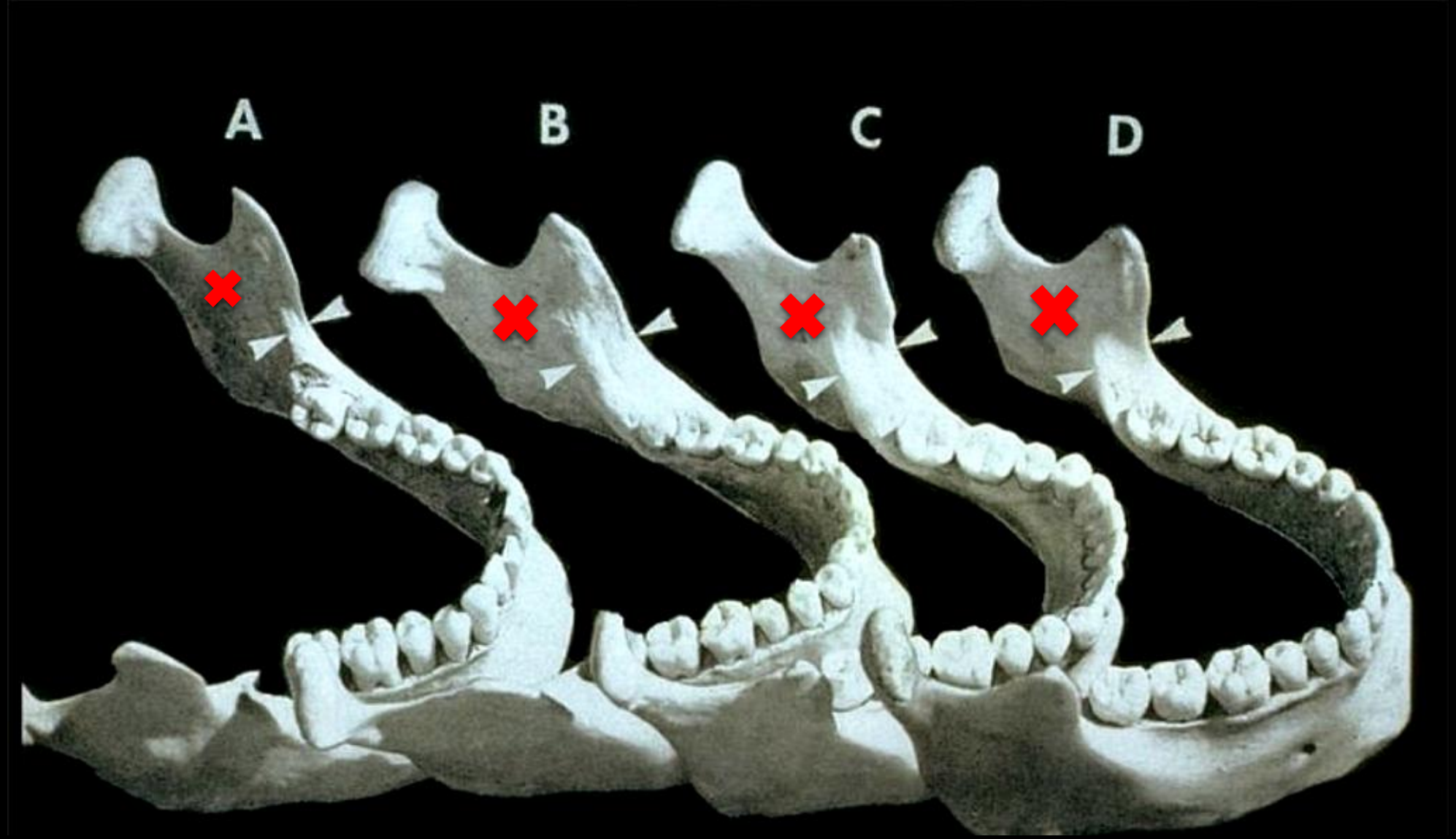


Anatomy of the Mandible: Hard Tissue

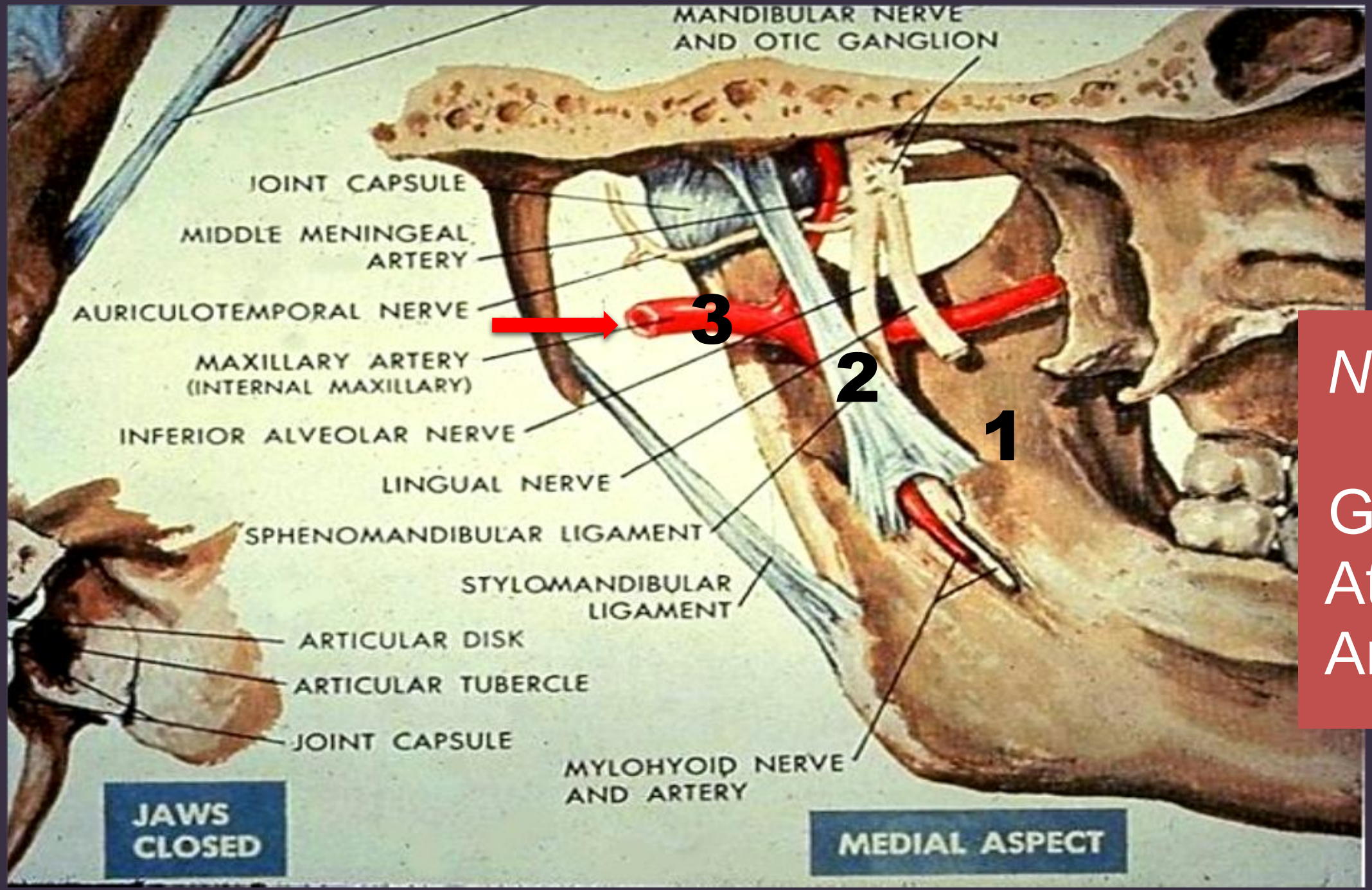


3 Major Factors:

- Internal oblique ridge / Ramus flare
- Sphenomandibular fascial barrier
- **Risks:** Nerves
  Arteries



The distance between the internal and external oblique line of the mandible varies. Adapted from Dr. N. B. Jorgensen

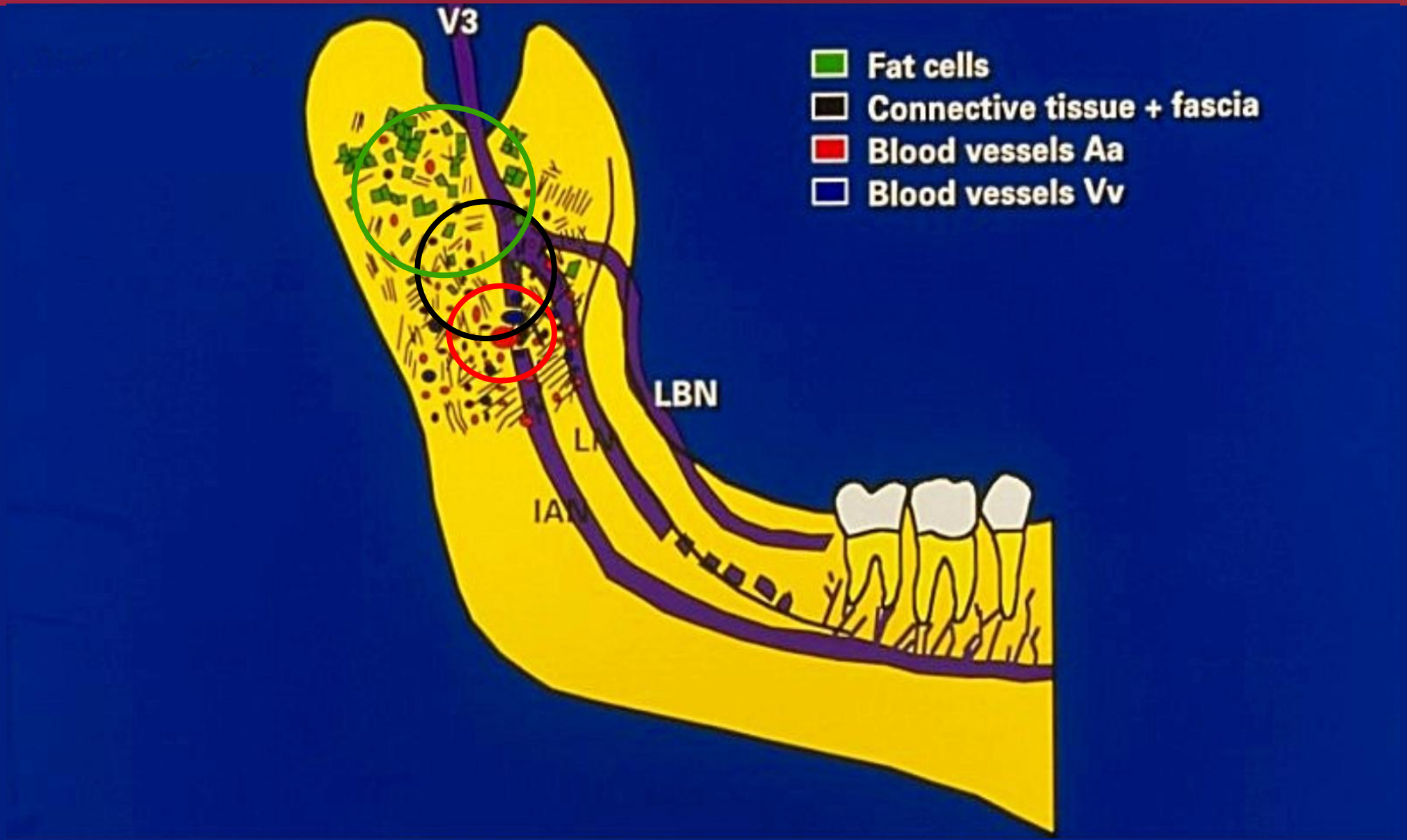


Netter

Grant's Atlas of Anatomy


Histology

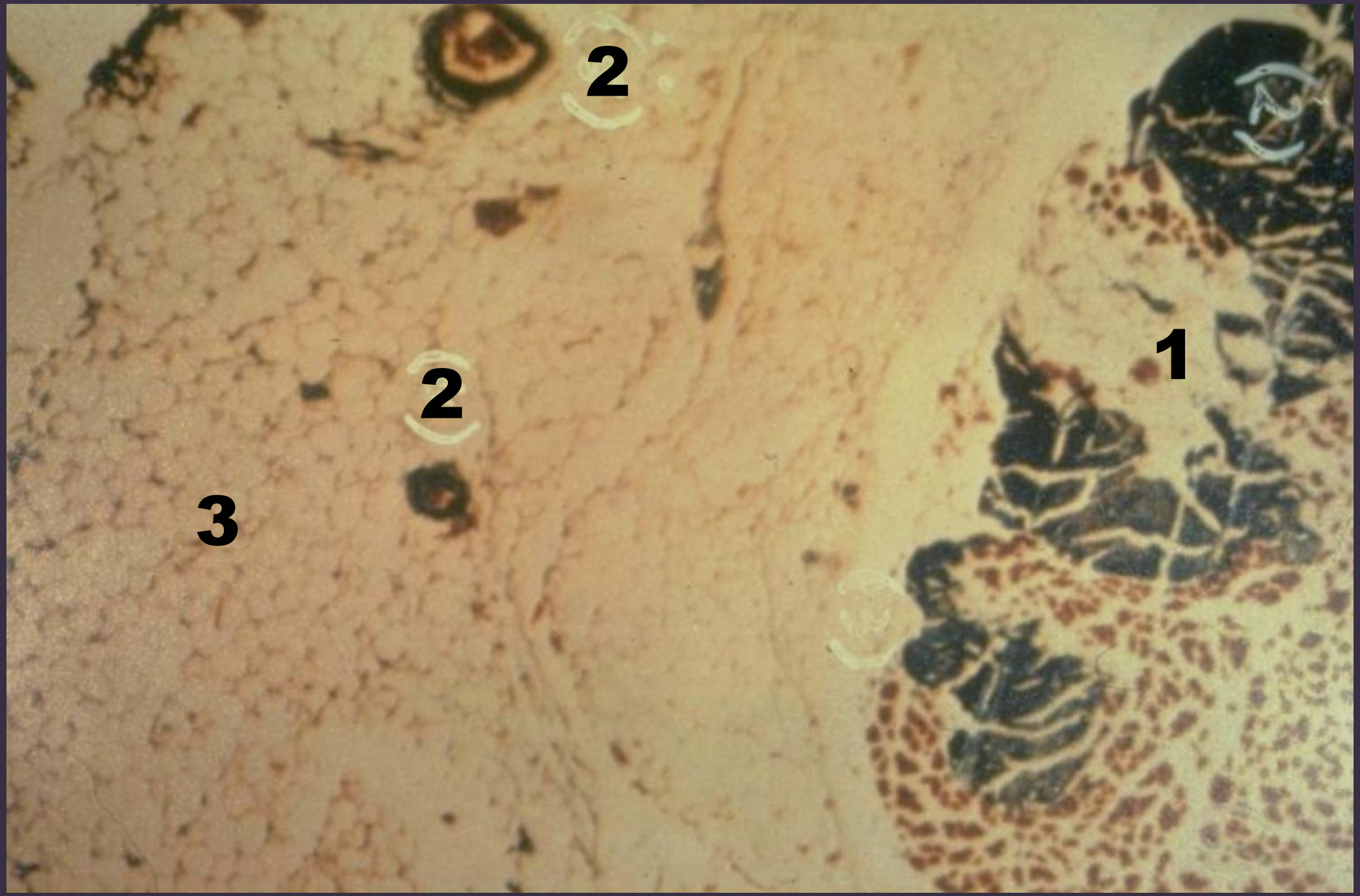
Pterygomandibular Triangle: Histology



Horizontal X-S,
Conventional
I.A.N.Block

Courtesy:
Dr. G. Gow-Gates,
Dr. J. Watson

University of
Sydney
Australia



Horizontal X-S, level of Gow-Gates Mandibular Block

Courtesy: Dr. George Gow-Gates, Dr. J. Watson

University of Sydney Australia

“Conventional” Inferior Alveolar Block

vs. a “mandibular block”

Conventional Advantages

- Intra-oral landmark for **113 years**
- Practitioner acceptance for **113 years**
- Fast onset if accurate and no neural aberrance, as in grade B and C anesthesia problems (14%)

Conventional Disadvantages

- Increased vascularity
- Anatomical variance
- Macroglossia
- Paresthesia mechanical - lingual claims *experience* X 2
- (Long) buccal nerve “block”

“Chin on the Chest” Syndrome

Open the Airway

Coronoid Notch

Definition:

Greatest indentation depth on the **anterior border** of the **ramus**

QUESTIONS?

Akinosi Closed Mouth Mandibular Block

Vazirani 1960

Akinosi 1977

AKINOSI - Advantages

- Mouth closed - less threatening
- Macroglossia – bypasses tongue

↓ Trismus

↓ Positive aspiration

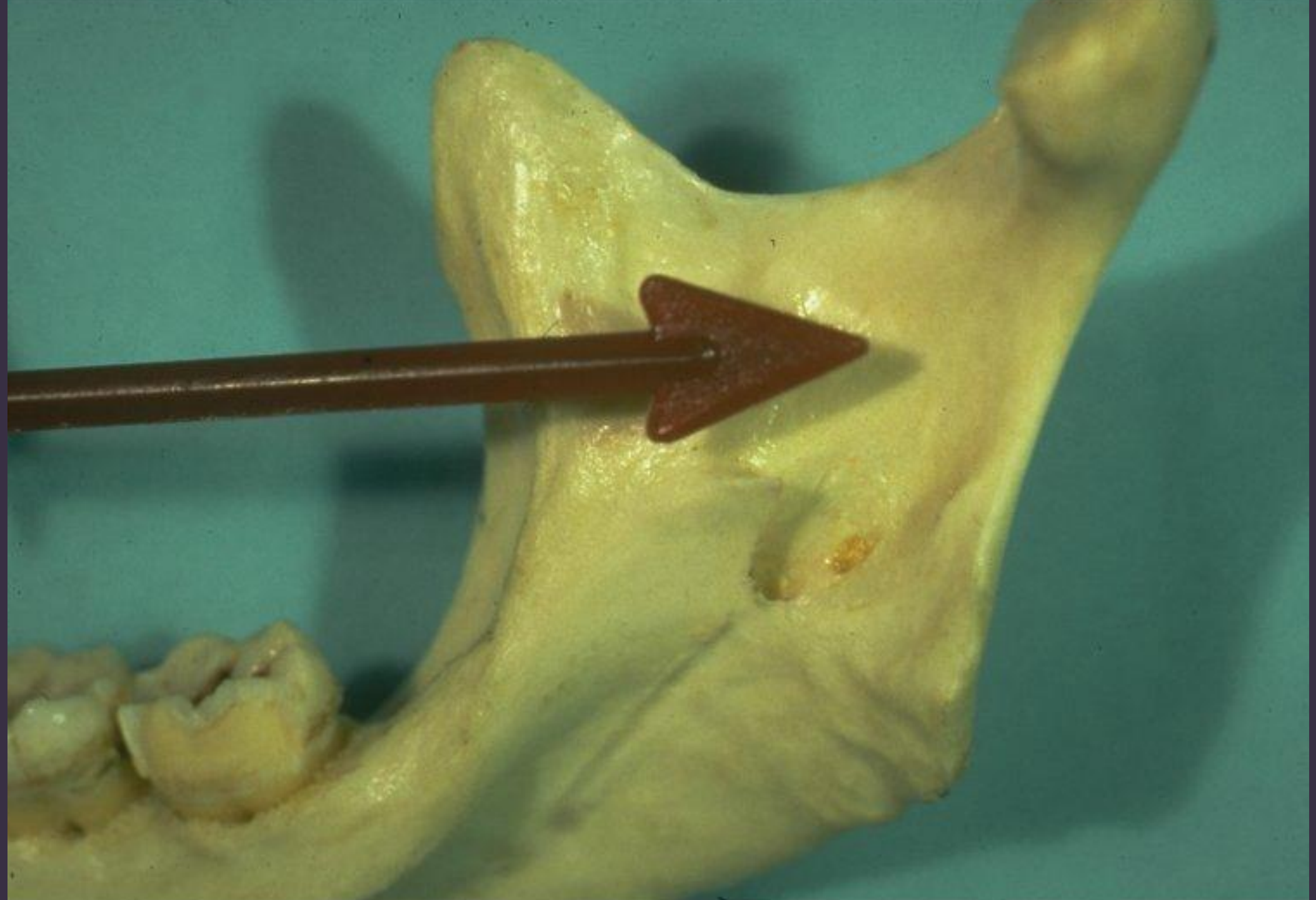
↓ Paresthesia

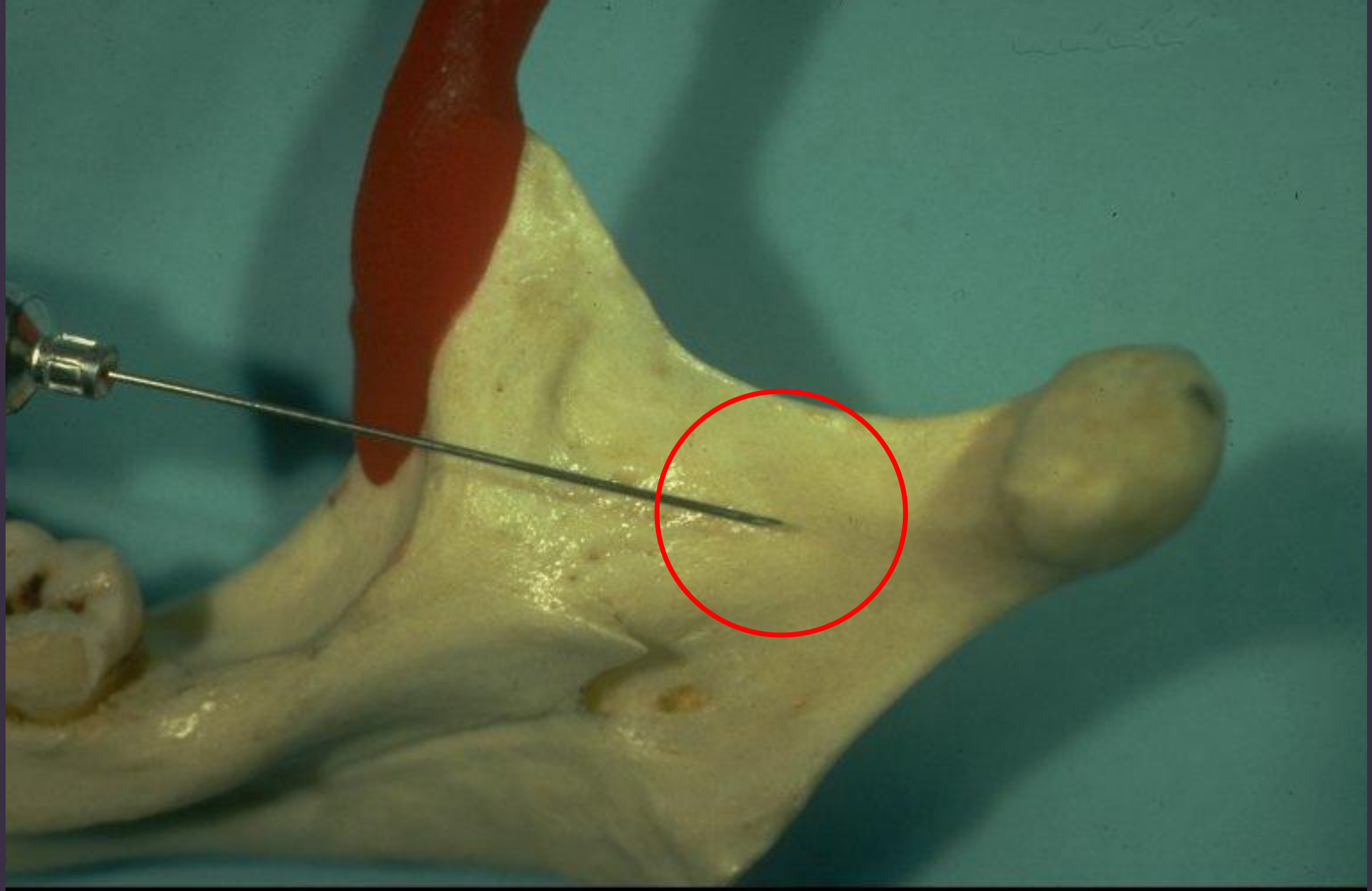
↑ % Long buccal nerve anesthesia

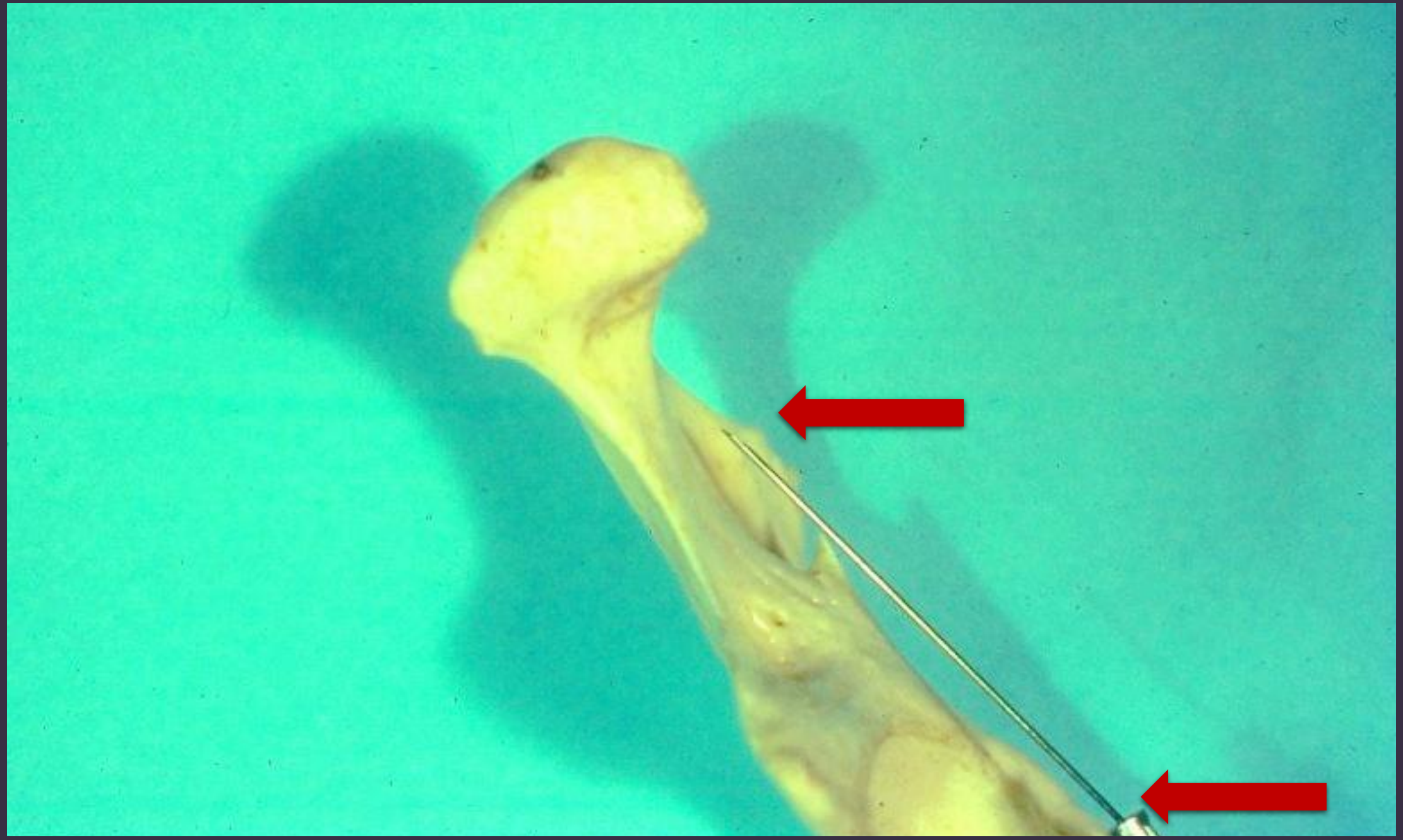
↓ PAIN

AKINOSI - Disadvantages

- Vision impaired
- Difficult to gauge depth in children
- Flaring ramus + heavy internal oblique ridge (I.O.R.)
- Zygomatic ridge over teeth #3, #14
- #1, #16 buccally extruded + prominent tuberosity = geometrically unfavorable



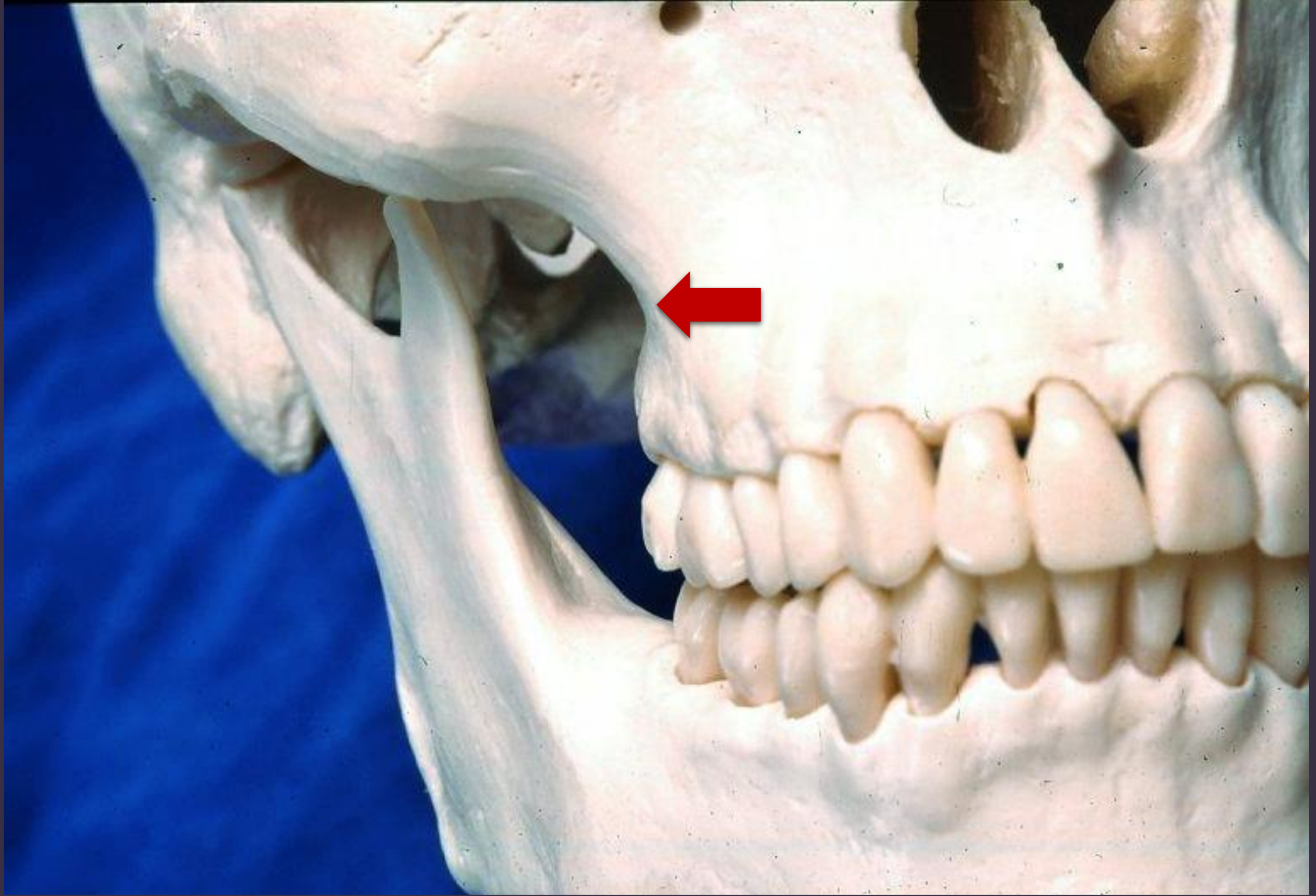




Ramus

Tuberosity

Hawkins JM,
Local Anesthetic Techniques and Adjuncts,
Chapter 13:
Pain & Anxiety in the Dental Office
WB Saunders
2002

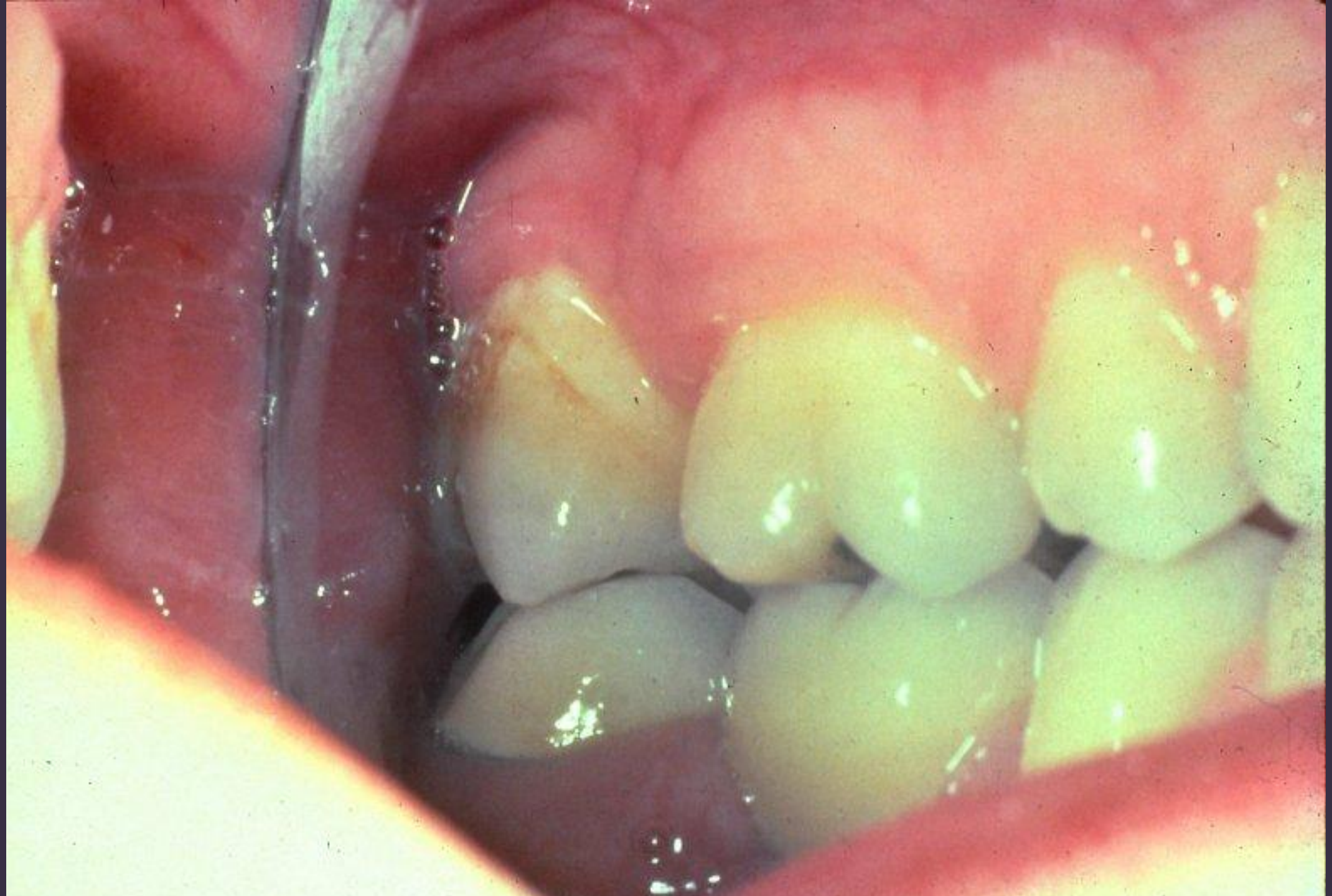


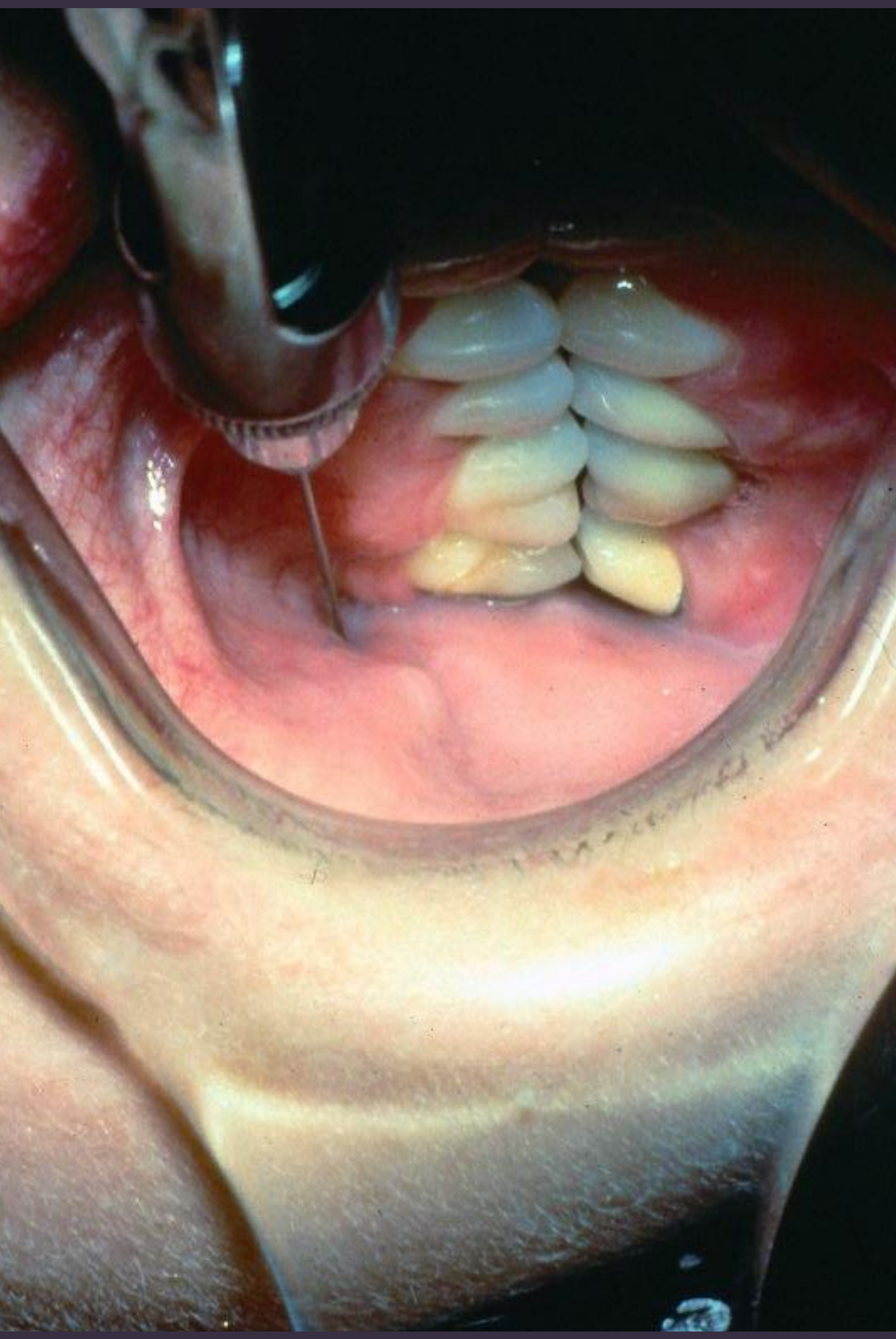
Hawkins JM, **Local Anesthetic Techniques and Adjuncts**, Chapter 13: *Pain & Anxiety in the Dental Office* WB Saunders 2002

Hawkins JM,
Local Anesthetic Techniques and Adjuncts,
Chapter 13:
Pain & Anxiety in the Dental Office
WB Saunders
2002

Clinical Technique

Identify *Maxillary Mucogingival Junction*





AKINOSI

What can go wrong?

Akinosi Summary

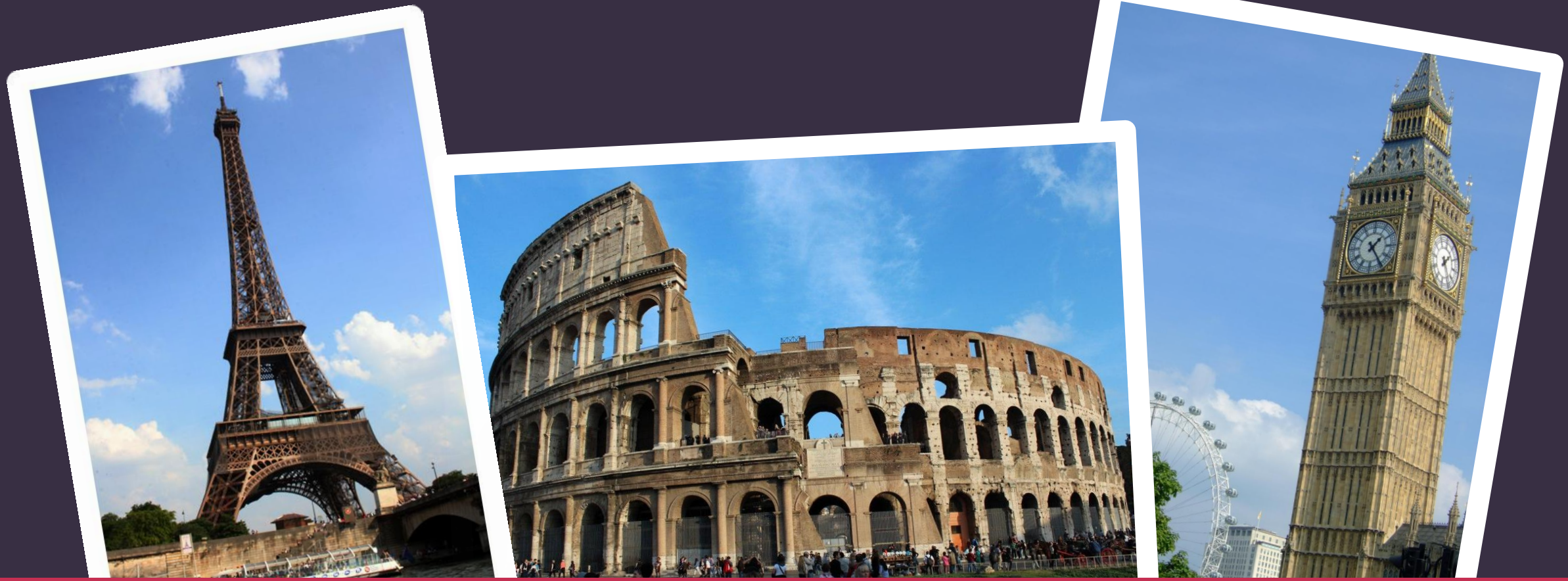
Onset	5 - 10 minutes – block 3 minutes - soft tissue
Characteristic	Varies. Generally anterior lip, tongue first. Depends on trifurcation location
Duration	1 - 1.5 hours pulpal Soft tissue-variable
Key Advantages	Children, apprehensive patient acceptance Fits “pre-injection” or “injectable topical” concepts

Mel Hawkins, DDS, BScD AN, Toronto, ON Canada

QUESTIONS?

Gow-Gates Mandibular Block

Condylar Neck or High Ramus Block



Utilizing External Landmarks

An Intraoral Approach

Gow-Gates: Advantages

Perceptible end point with:

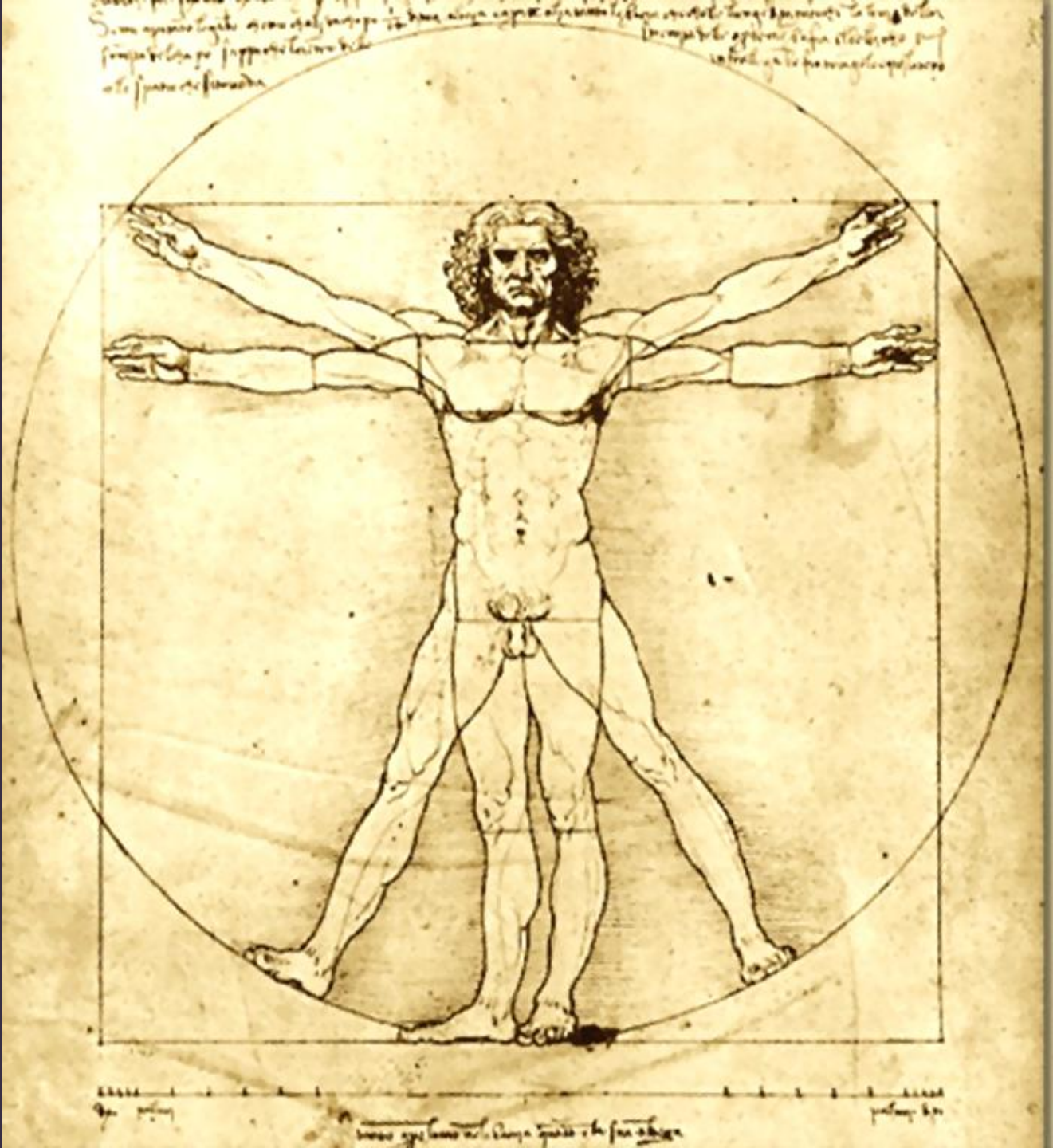
Vascularity
Risk of nerve damage

Good buccal nerve anesthesia? YES!

Duration of anesthesia
Good vision

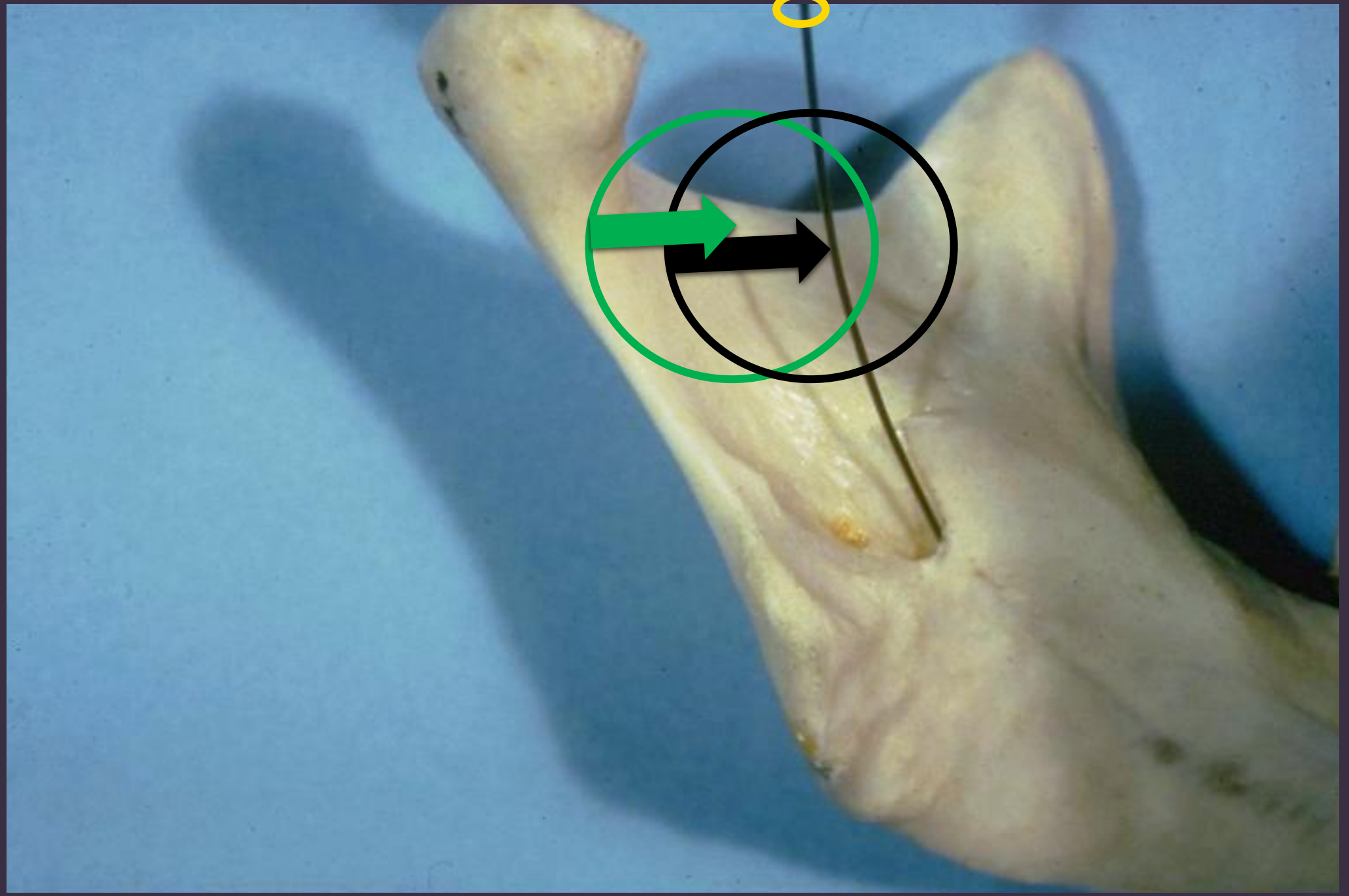
Gow-Gates: Disadvantages

- Mouth must be **wide open**
- Extra-oral landmarks
- Post-injection, **stay open 2 minutes**
- **Hemostasis** needs to be added

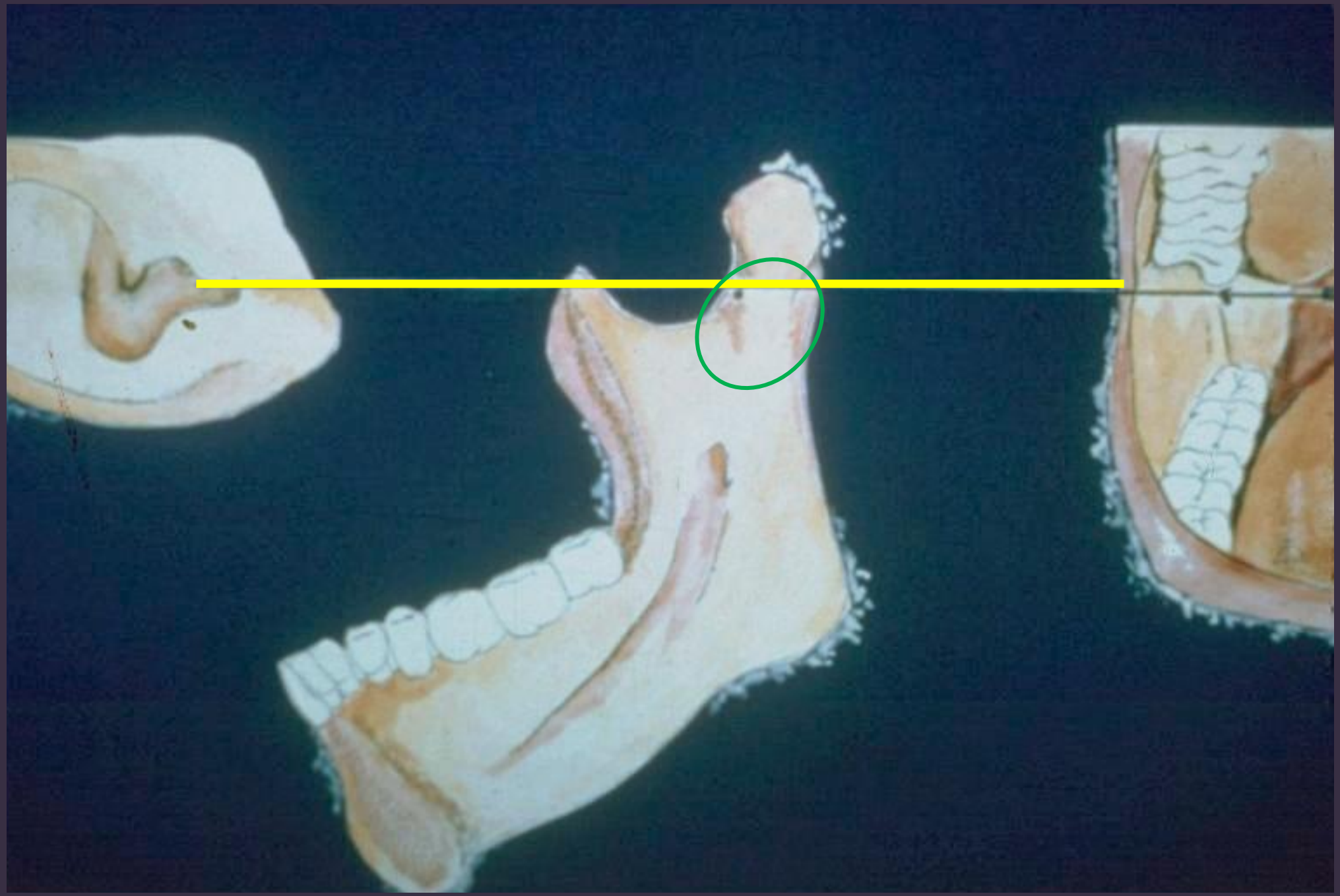


Anatomical Considerations

Leonardo Da Vinci



V3 - foramen ovale to the mandibular foramen



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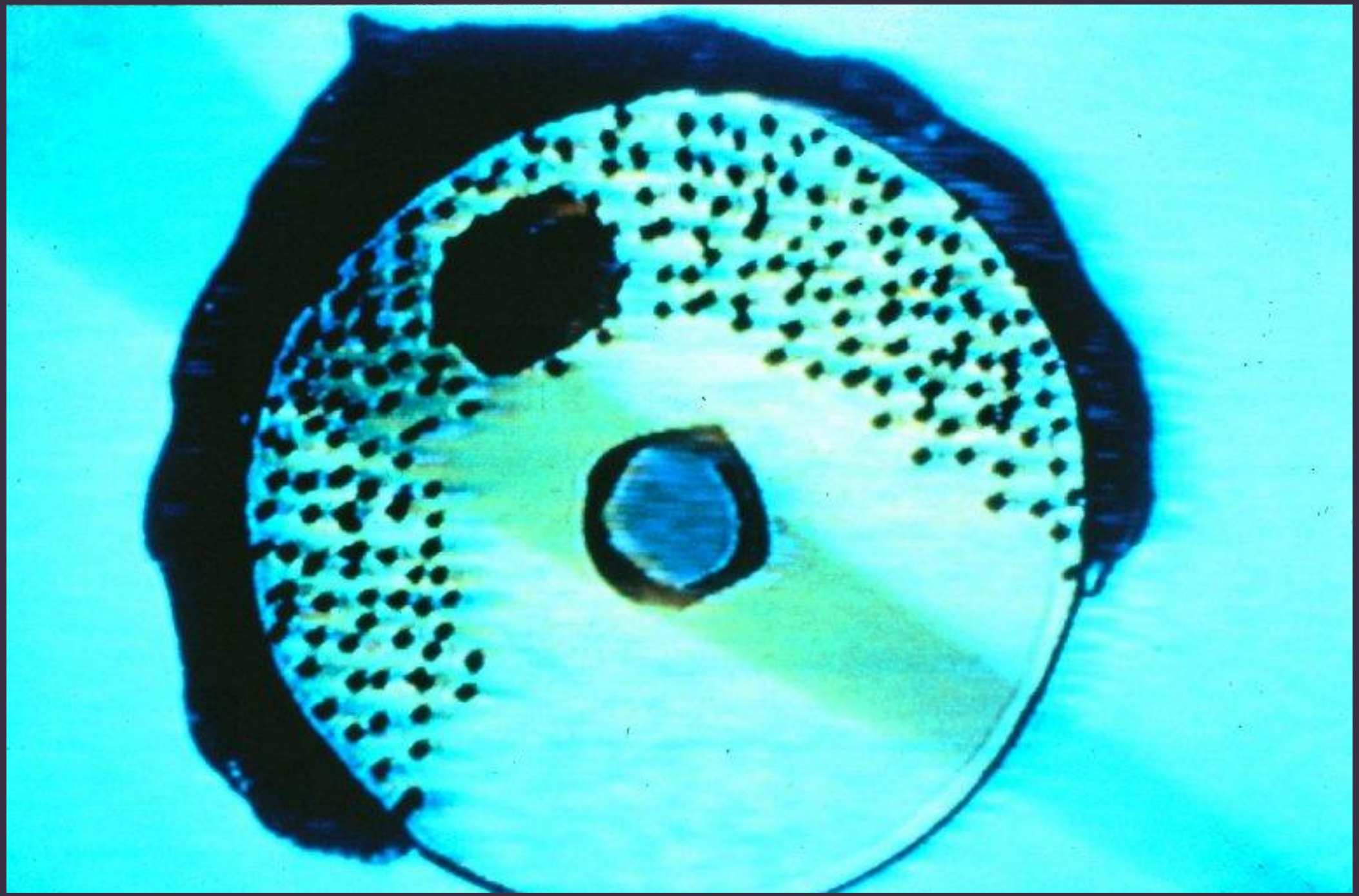
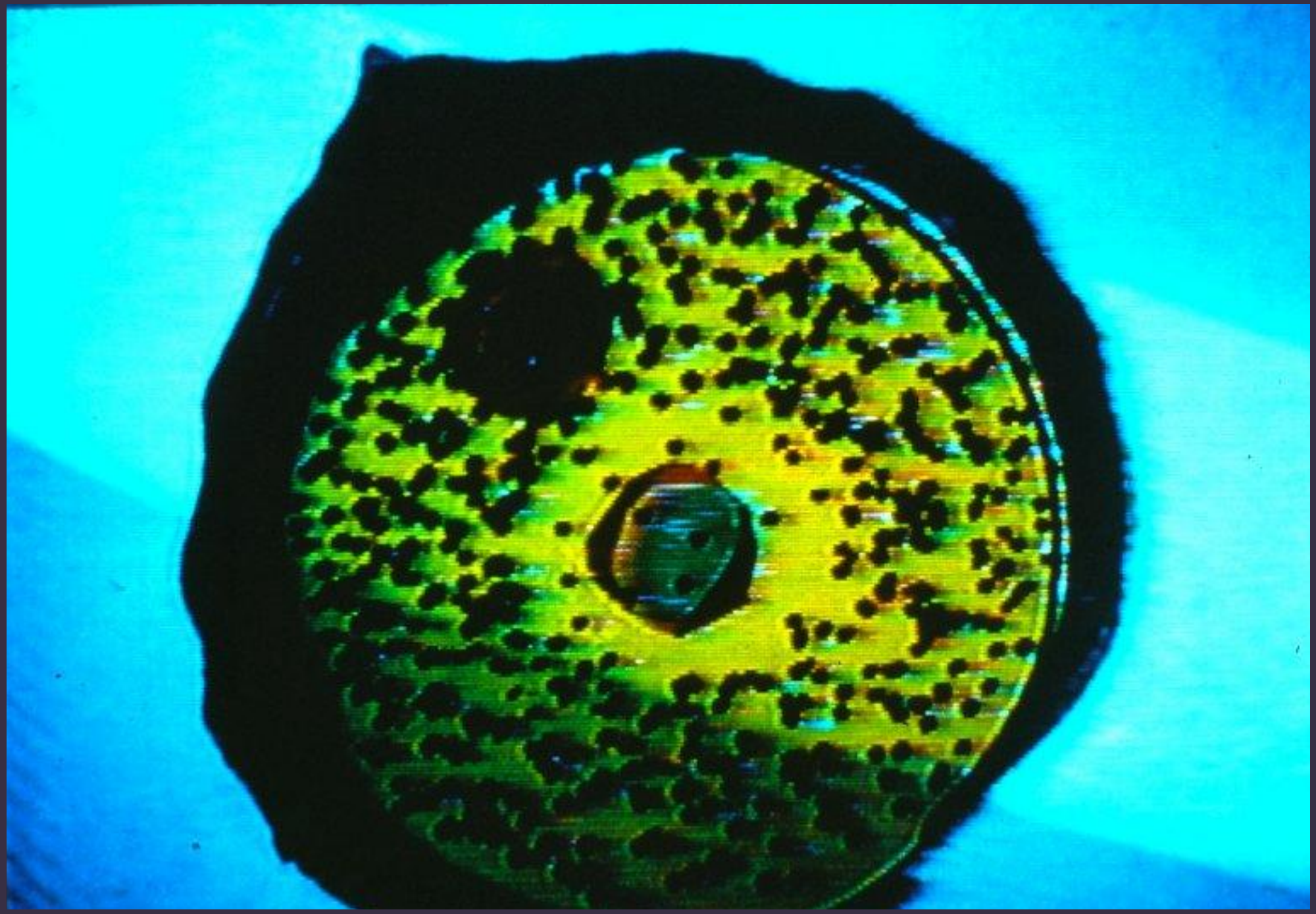


Graphic Courtesy of Dr. George Gow-Gates



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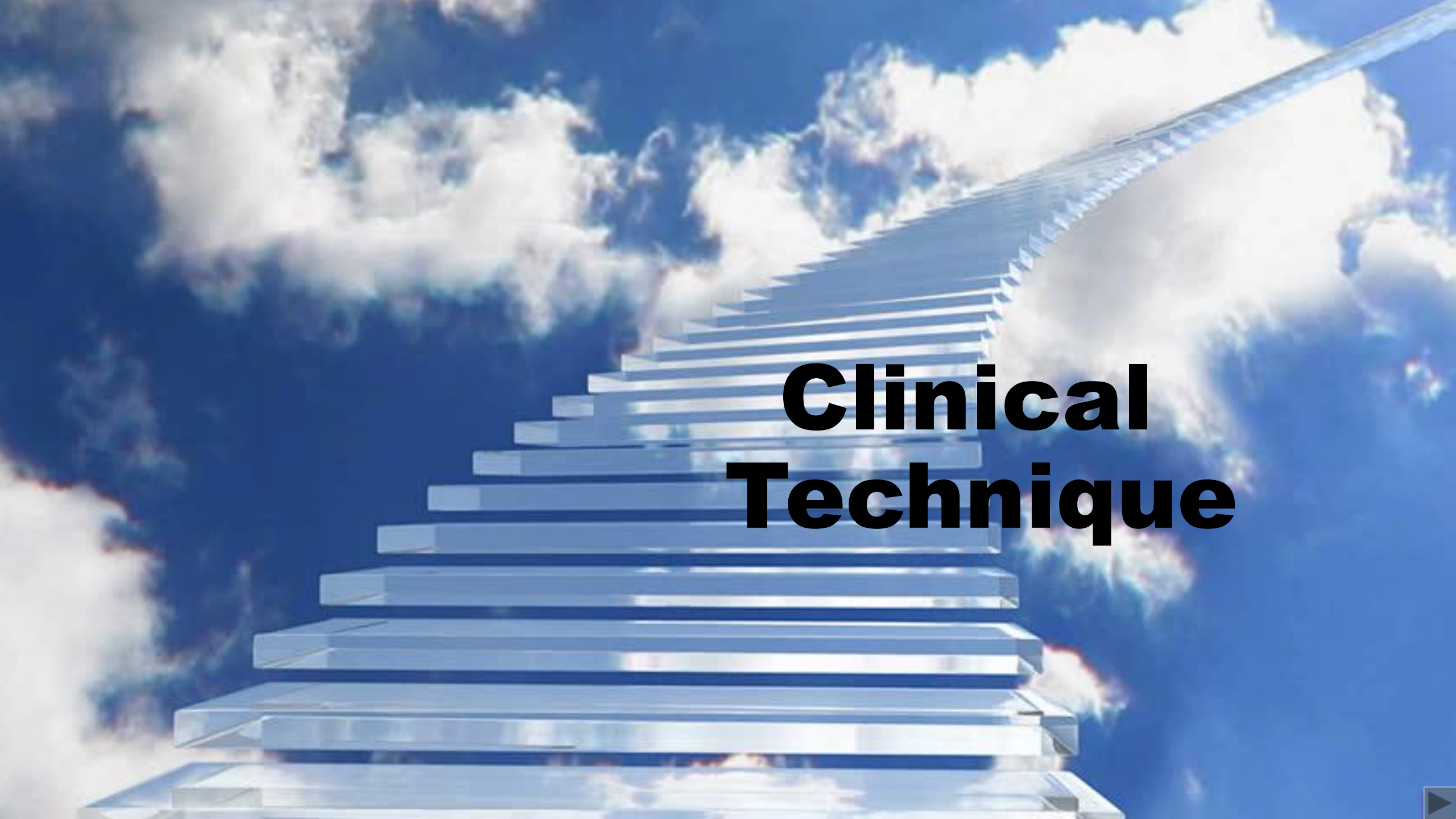
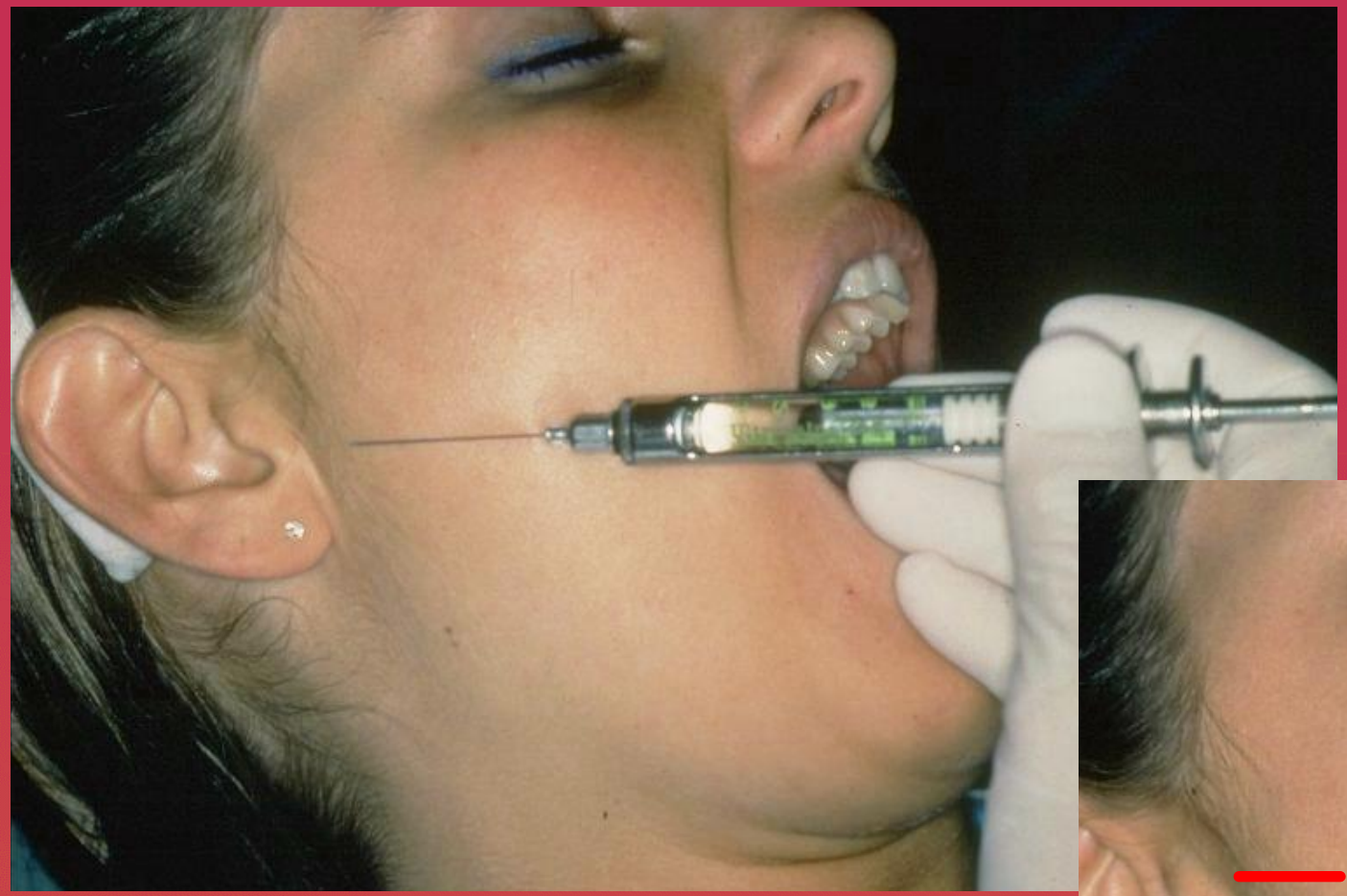
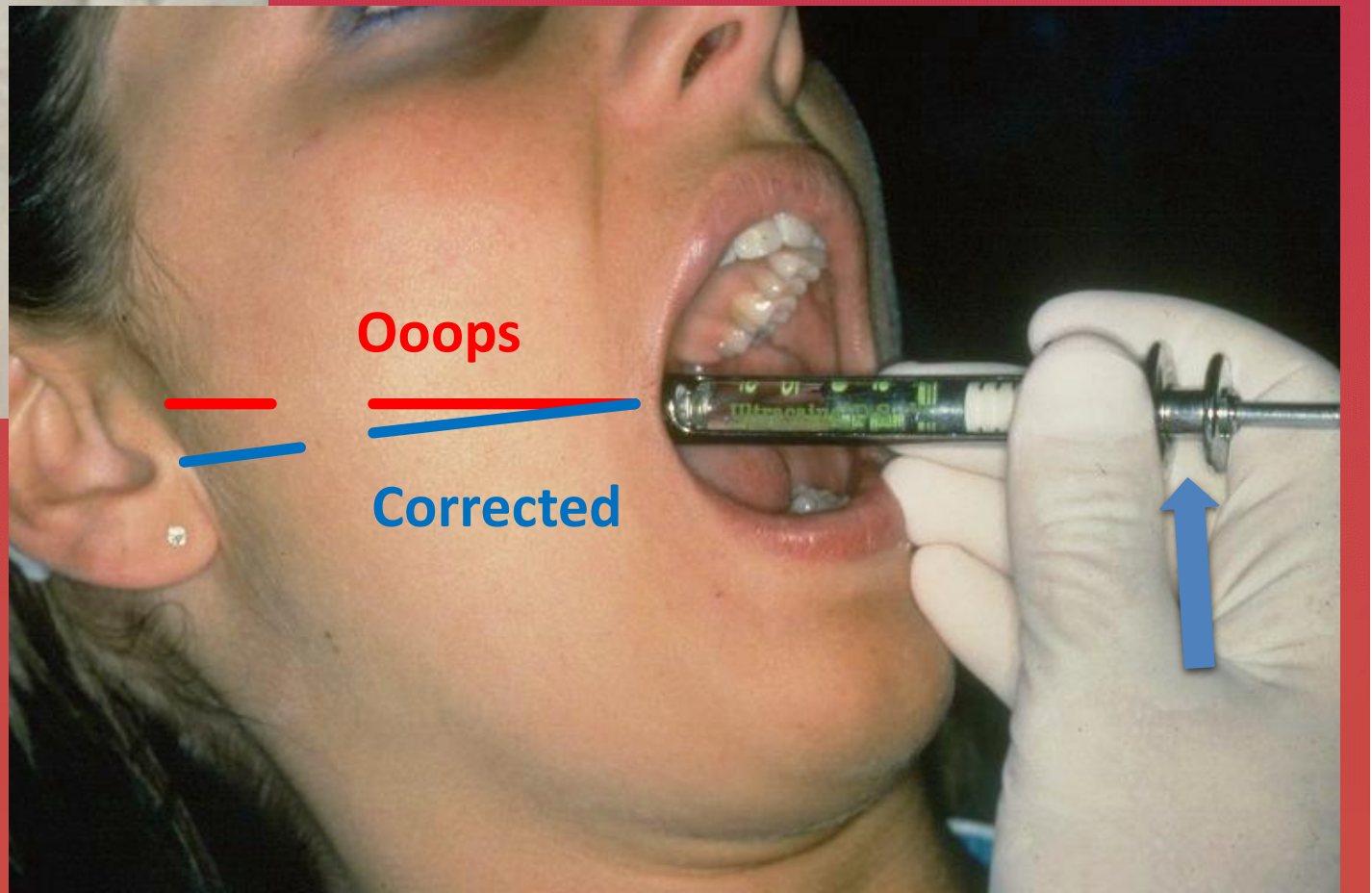
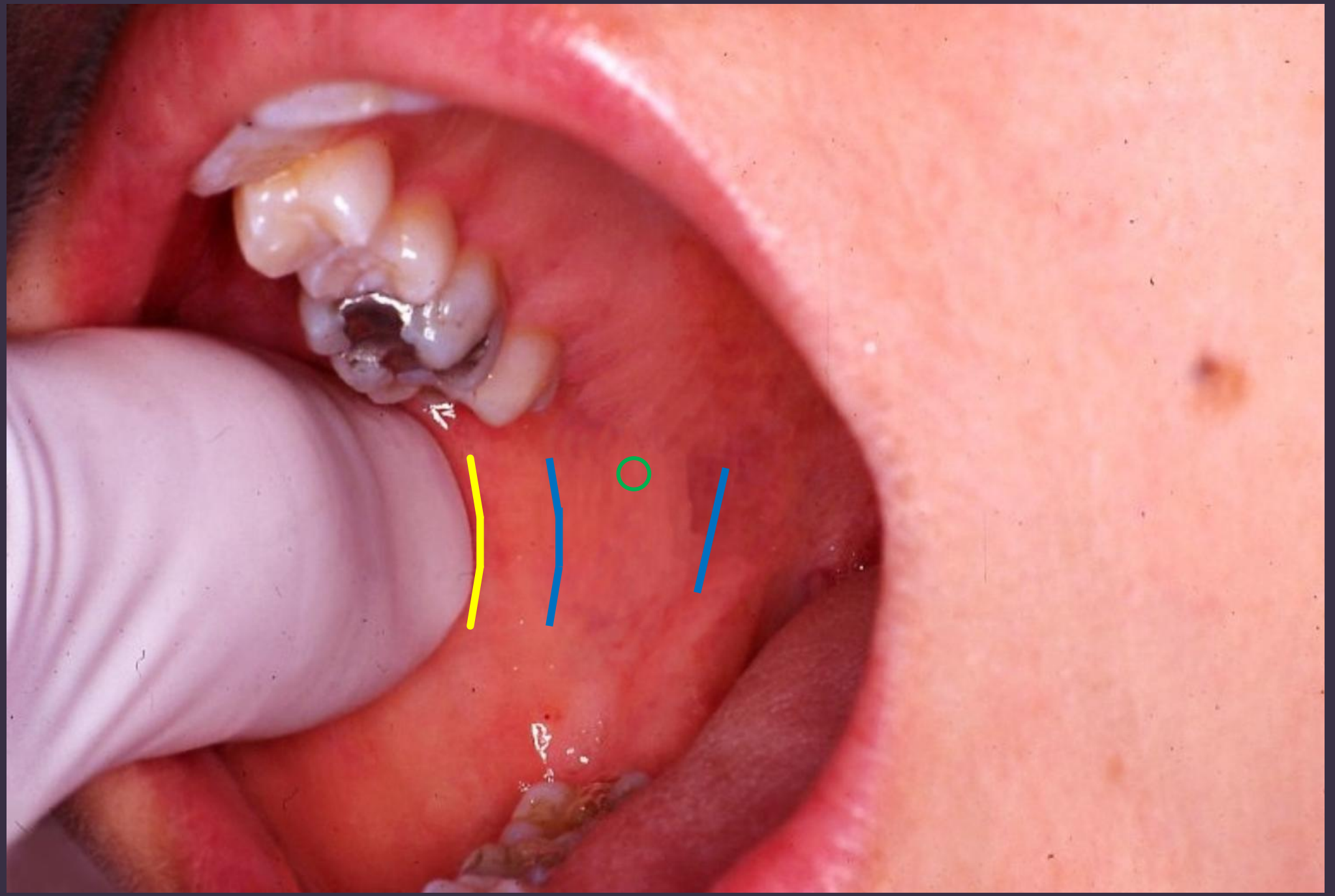
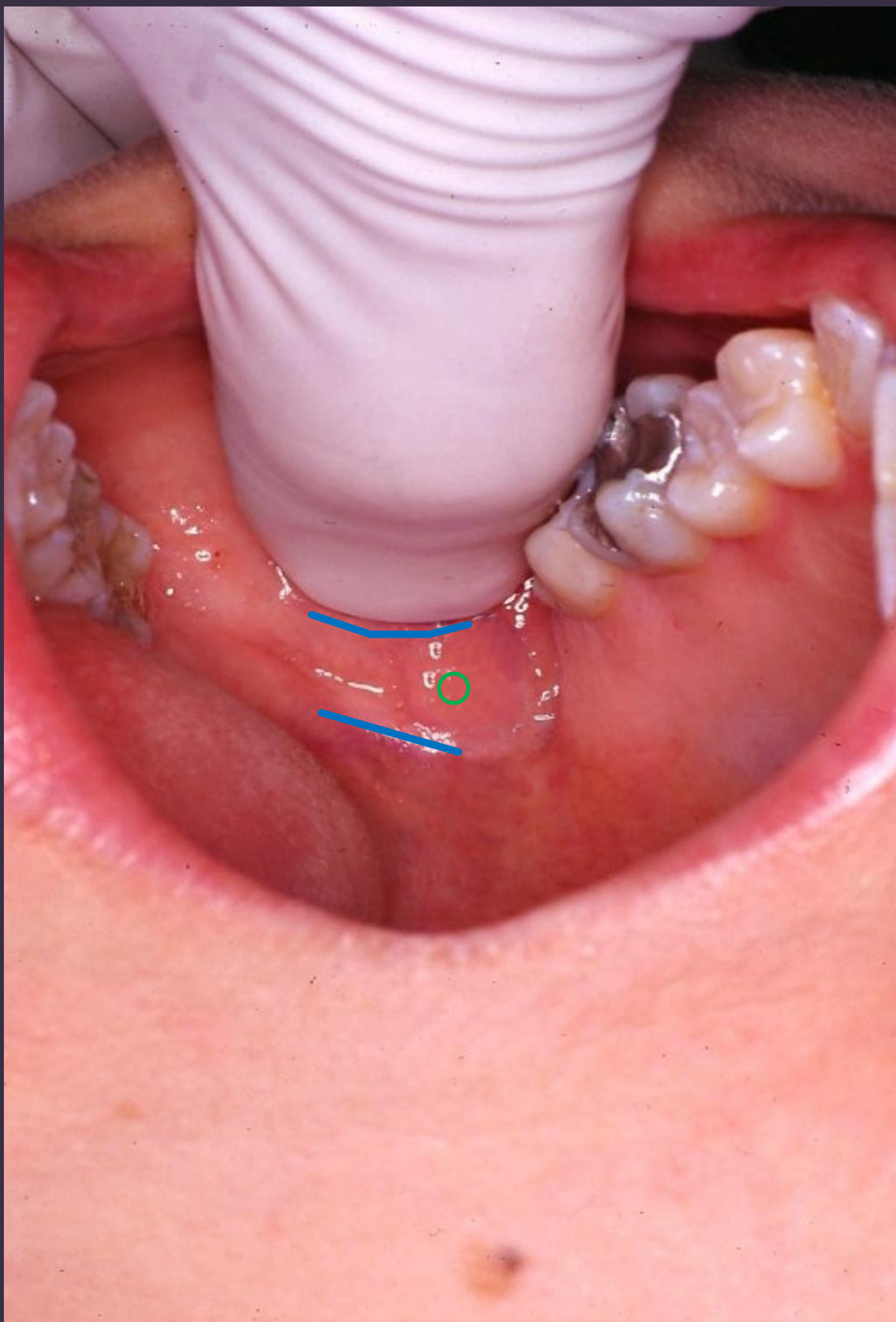
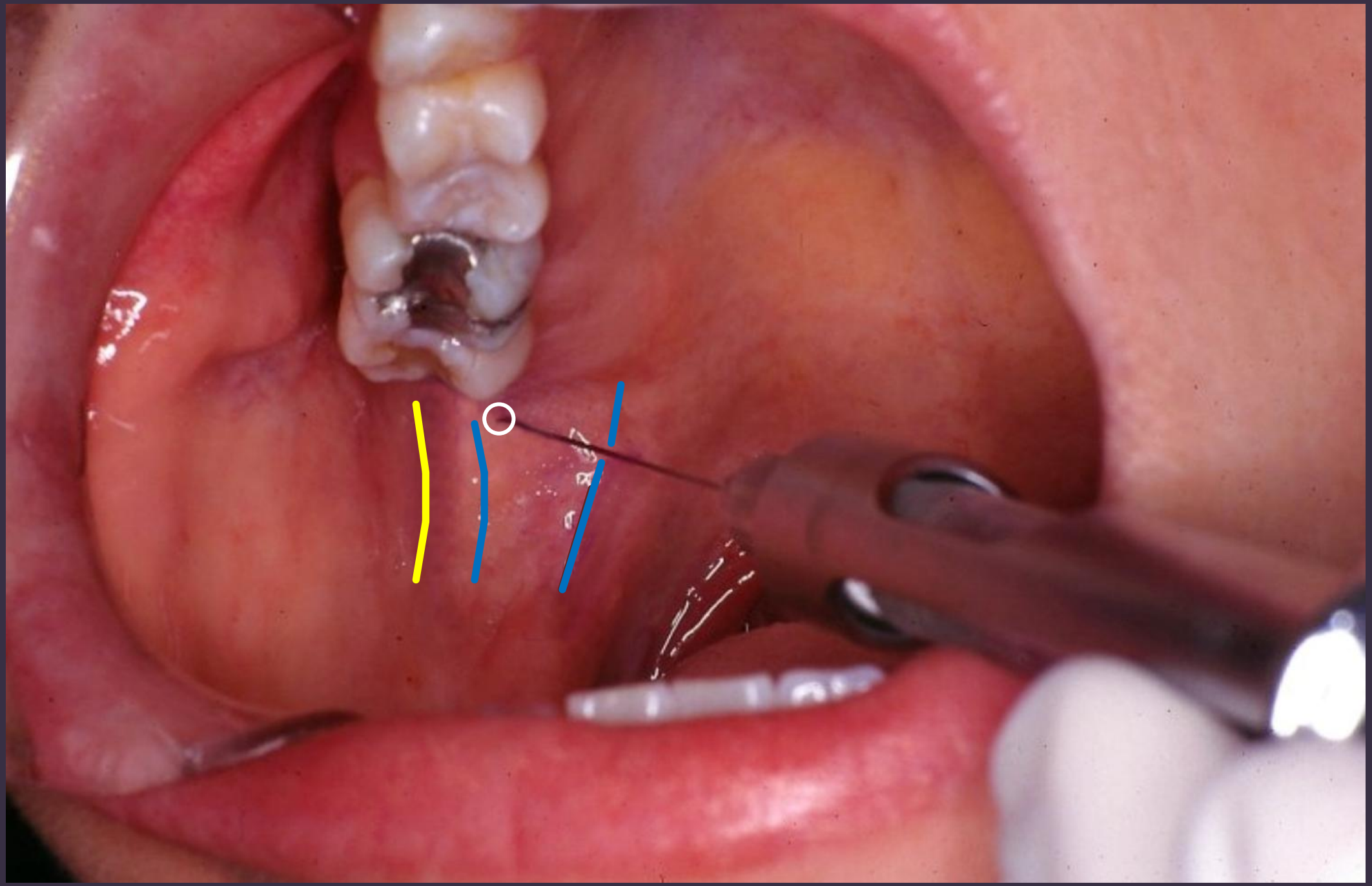

Clinical
Technique

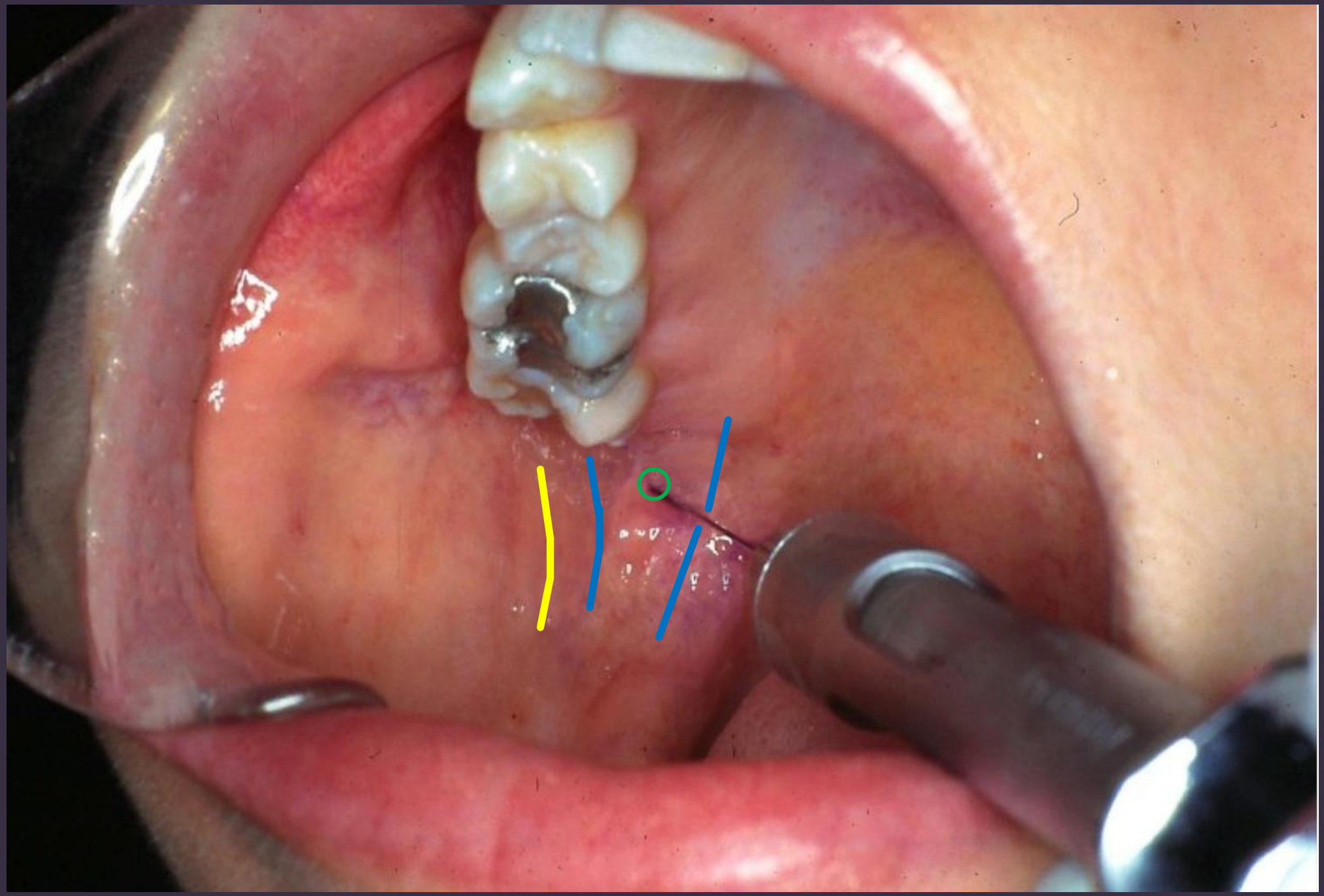


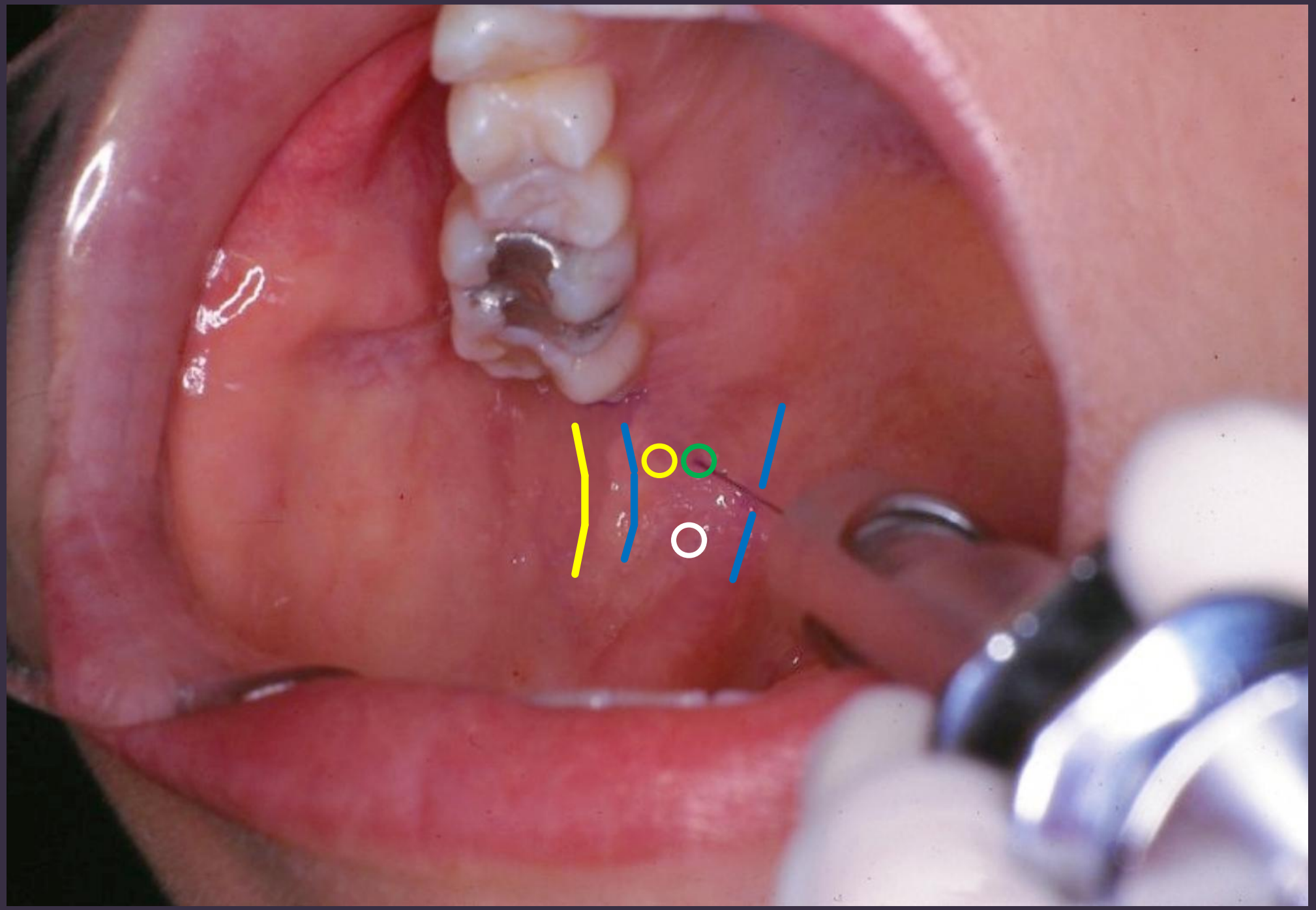

Ooops
Corrected











Gow-Gates Summary

Onset	5 - 15 minutes
Characteristic	posterior ⇨ anterior onset “wave”
Duration	1 - 1.5 hours pulpal Soft tissue-variable
Post-op analgesia	0.5% bupivacaine 1:200K epinephrine ⇨ 2 carpules®

Mel Hawkins, DDS, BScD AN, Toronto, ON Canada

QUESTIONS?

PART

2

What can go wrong?

and

What to do about it

Infiltration of Mandibular Molars

Buccal and Lingual

Lingual Infiltration Summary

Where	Apical to mucogingival junction ⇨ unattached, dark red gingiva
How	2-3 mm submucosal Bevel faces bone
Characteristics	Tissue balloons and blanches Patient tolerance
Volume	0.3 - 0.7 ml. 4% articaine HCL 1:100K epi
Onset	4 – 6 min

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Local Anesthetic News:

Pregnancy

Cover Story

JADA® AUG. 2015 146(8)

Dental Treatment Safety with Local Anesthetics during Pregnancy **572**

Hagai, A, Diav-Citrin, O, Shechtman, S, Ornoy, A, *JADA* 146(8) Aug 2015

Pregnancy Safety

- A prospective, comparative observational study by the Israeli Teratology Information Services* (**TIS**), 1999 – 2005
- **210 pregnant patients** were exposed to dental treatment, including local anesthetics
- 112 (**53%**) in 1st trimester
- vs. control group = **794 pregnant patients were not** exposed to any dental treatment or local anesthetics

* Hagai A et al, Pregnancy outcome after in utero exposure to local anesthetics as part of dental treatment: A prospective comparative cohort study, JADA 146(8), Aug 2015

Pregnancy Safety

- The rate of major anomalies was not significant between the two groups.
- There was **no** difference in the rate of miscarriages, gestational age at delivery, or birth weight.

Hagai A et al, Pregnancy outcome after in utero exposure to local anesthetics as part of dental treatment: A prospective comparative cohort study, JADA 146(8), Aug 2015

Pregnancy Safety

Safest local anesthetics during pregnancy and breast-feeding:

- **Lidocaine** and **prilocaine** are FDA pregnancy risk **category B**
- All others are FDA pregnancy risk **category C**

Donaldson M & Goodchild JH, *Pregnancy, breast-feeding and drugs used in dentistry,* J Am Dent Assoc, 143 (8), August 2012

Pregnancy Safety

U.S. Food and Drug Administration pregnancy risk factor definitions.*	
CATEGORY	**DEFINITION**
A	The results of controlled studies in women fail to demonstrate a risk to the fetus in the first trimester (and there is no evidence of risk in later trimesters), and the possibility of fetal harm appears remote
B	Either the results of animal reproduction studies have not demonstrated a fetal risk but there are no controlled studies in pregnant women OR the results of animal reproduction studies have shown an adverse effect (other than a decrease in fertility) that was not confirmed in controlled studies in women in the first trimester and there is no evidence of risk in later trimesters
C	Either the results of studies in animals have revealed adverse effects (teratogenic, embryocidal or other) on the fetus and there are no controlled studies in women OR results of studies in women and animals are not available; drug should be given only if the potential benefit justifies the potential risk to the fetus
D	There is positive evidence of human fetal risk, but the benefits of use in pregnant women may be acceptable despite the risk (for example, if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective)
X	Results of studies in animals or humans have demonstrated fetal abnormalities or evidence of fetal risk based on human experience, or both, and the risk of the use of the drug in pregnant women clearly outweighs any possible benefit; use of the drug is contraindicated in women who are or may become pregnant
* Sources: U.S. Food and Drug Administration.[8,20,21]	

(!!)

Pregnancy Safety

Safest local anesthetics during pregnancy and breast-feeding:

- **Lidocaine** and **prilocaine** are **B**
- All others are C
- Risk of methemoglobinemia with **topicals** (especially esters: benzocaine, tetracaine) and injectable prilocaine
- **Epinephrine is OK!**

Donaldson M & Goodchild JH, *Pregnancy, breast-feeding and drugs used in dentistry,* J Am Dent Assoc, 143(8), August 2012

Pregnancy: Safety- Local Anesthetics

Epinephrine is a catecholamine, which normally is present in the body, with **no** clear evidence of increased risk of malformation when used during pregnancy with local anesthetics.

Hagai, A, Diav-Citrin, O, Shechtman, S, Ornoy, A,
JADA 146(8) Aug 2015

Pregnancy Safety

Conclusions:

The use of dental local anesthetics, as well as dental treatment during pregnancy, **does not** represent a major teratogenic risk.

Hagai A et al, *Pregnancy outcome after in utero exposure to local anesthetics as part of dental treatment: A prospective comparative cohort study*, JADA 146(8), Aug 2015

Pregnancy Safety

Despite the reassuring considerations…

- Dentists are still **reluctant** to perform dental treatment for pregnant patients

and

- Women are still **reluctant** to receive dental treatment during pregnancy.

Hagai A et al, *Pregnancy outcome after in utero exposure to local anesthetics as part of dental treatment: A prospective comparative cohort study*, JADA 146(8) , Aug 2015

2

Local Anesthetic News:

Reversal Agent

OraVerse™

Phentolamine Mesylate Injection

“Reversing” Local Anesthesia

Phentolamine Mesylate

reverses *SOFT TISSUE*
ANESTHESIA ONLY

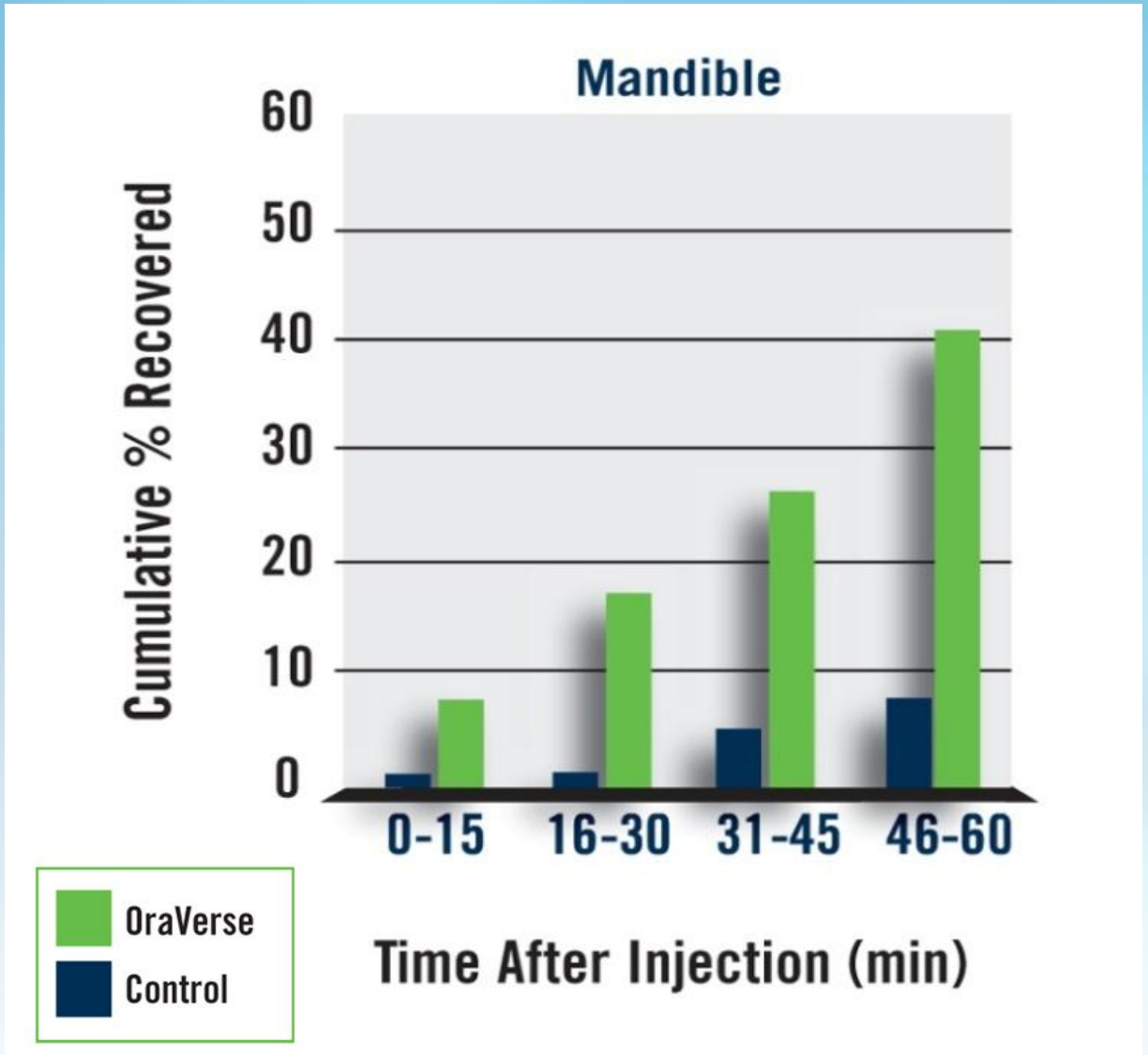
Phentolamine Mesylate is **NOT** a **LOCAL ANESTHETIC** reversal agent

13% of pediatric patients receiving **IANB** suffer post-treatment traumatic **injury** to soft tissues.

College C, Feigal R, Wandera A, Strange M. Bilateral versus unilateral mandibular block anesthesia in a pediatric population. Pediatr Dent. 22(6):453-457, 2000.

Adults and Adolescents: *60 Minute Efficacy Data*

Time to Recovery of Normal Lip Sensation

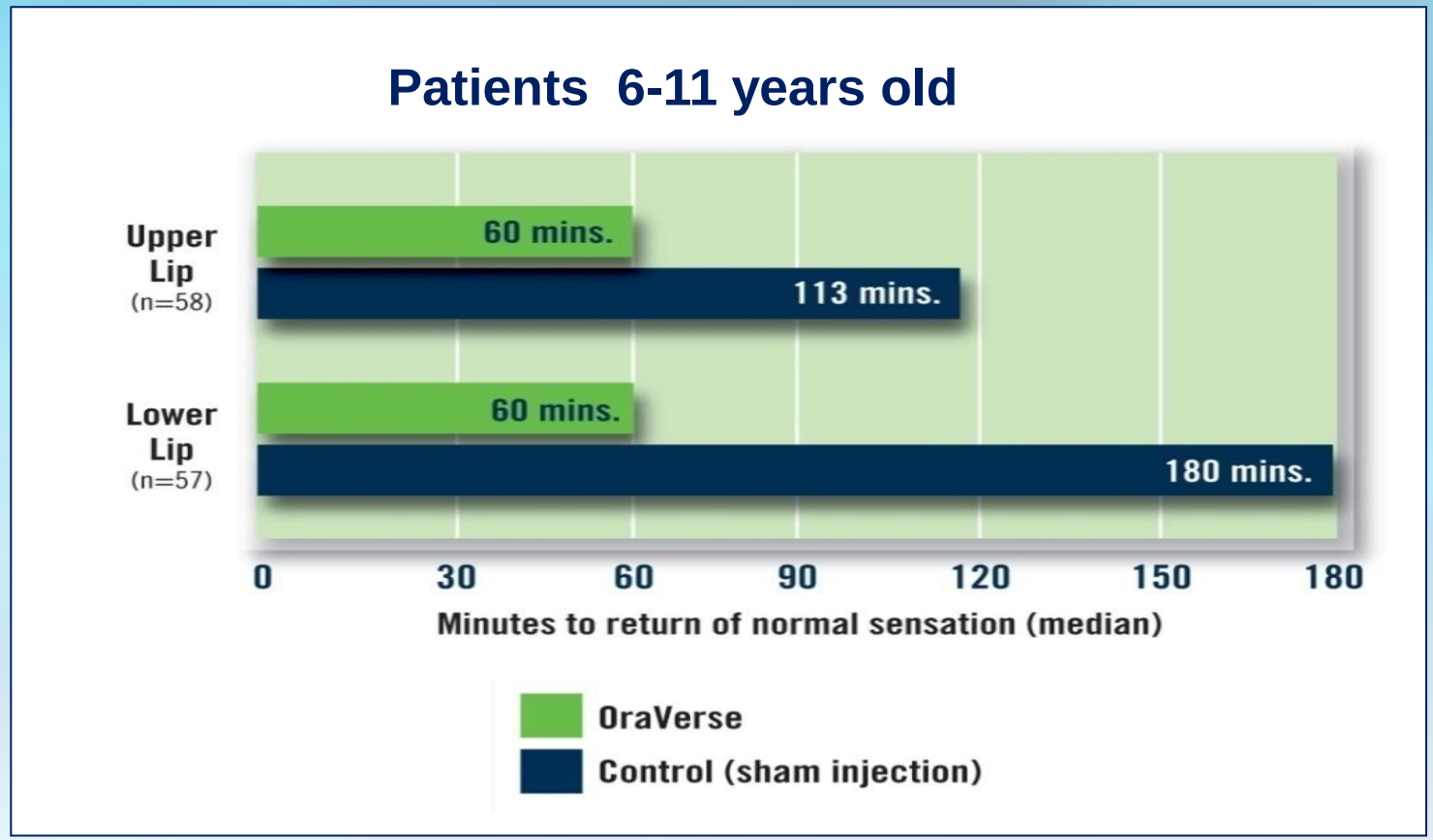


Mandible

- **54.8%**; p<0.000 Phentolamine mesylate accelerates the return to normal sensation by **85 minutes**
- **41%** phentolamine mesylate patients fully recovered in **60 minutes**
- **7%** for control patients

Pediatric patients also recover sensation in half the time

- Median time to recovery of normal lip sensation compared to control was **reduced by:**
  - 120 minutes (**67%**) in the mandible
  - 53 minutes (**47%**) in the maxilla



Source: Tavares M, Goodson JM, Studen-Pavlovich D, and colleagues. Reversal of soft-tissue local anesthesia with phentolamine mesylate in pediatric patients. JADA 2008;139(8):1095-1104.

Dosing

- **Easy to Dose**
  - 1:1 cartridge ratio to local anesthetic with a vasoconstrictor using identical injection site
- **Maximum recommended dose**
  - 2 cartridges for adults & adolescents 12 years of age and older
  - 1 cartridge for patients 6-11 years of age and over 66 lbs.
  - ½ cartridge for children 6 years of age or older weighing 33-66 lbs.

Potential complications

Needle-related:

- Trismus
- Paresthesia

OraVerse™

Now sold in sleeves of ten (10)

Phentolamine Mesylate

OraVerse™ Cost?

$8/cartridge

3

Local Anesthetic News:

Buffering Agents

Performance Limitations of Current Anesthetics

- **Onset Time**

  Time for body to buffer anesthetic

- **Analgesia**

  Is No pain attainable? Always?

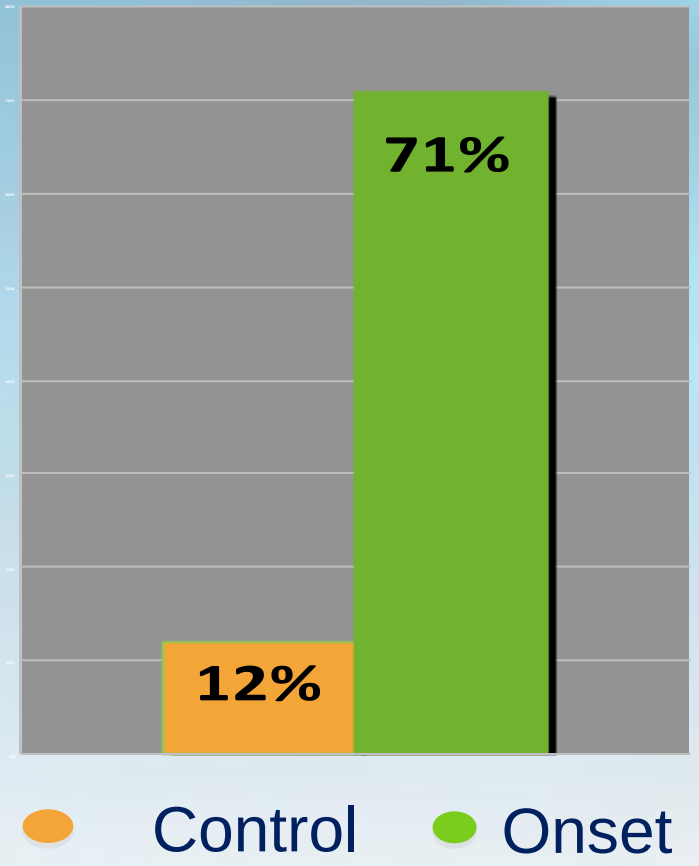
- **Injection Pain**

  Stinging is a concern for patients

Clinical Study Data Pulpal - IANB

Percentage of Participants Profoundly Numb at 2 Minutes

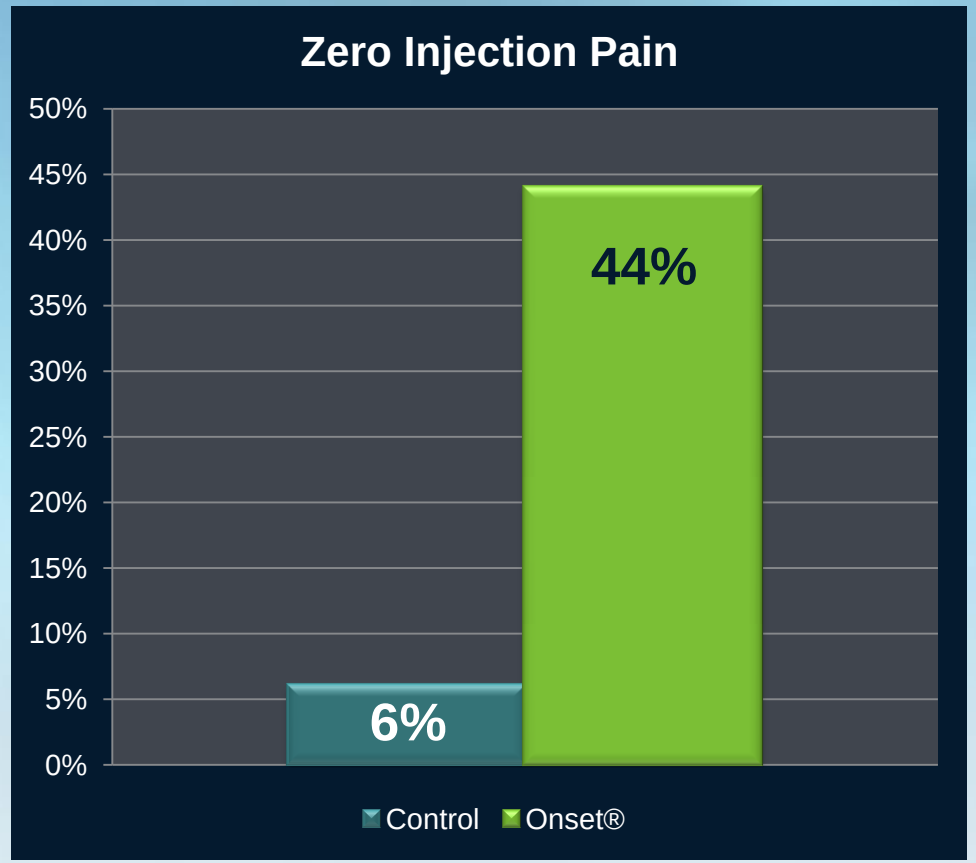
- **71%** of the participants receiving buffered anesthetic achieved pulpal anesthesia in under two minutes
- **12%** of the control participants achieved pulpal anesthesia in under two minutes



Clinical Data – Pain Free Injections

44% of buffered anesthetic patients experienced
zero injection pain

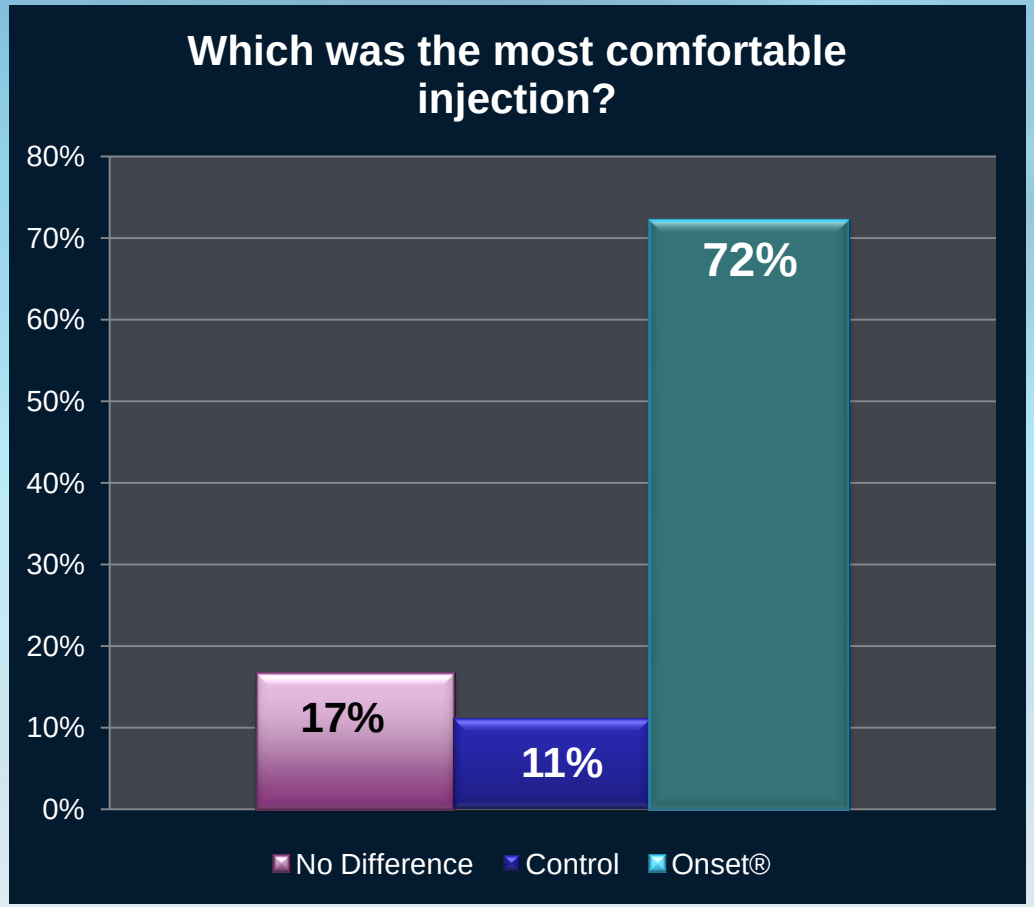
6% of traditional anesthetic patients experienced
zero injection pain



From: Malamed S, Falkel M, Decreasing anesthetic injection pain using an automated dental anesthetic buffering system: A prospective, randomized, double-blind, crossover study, Draft for Publication, 2011

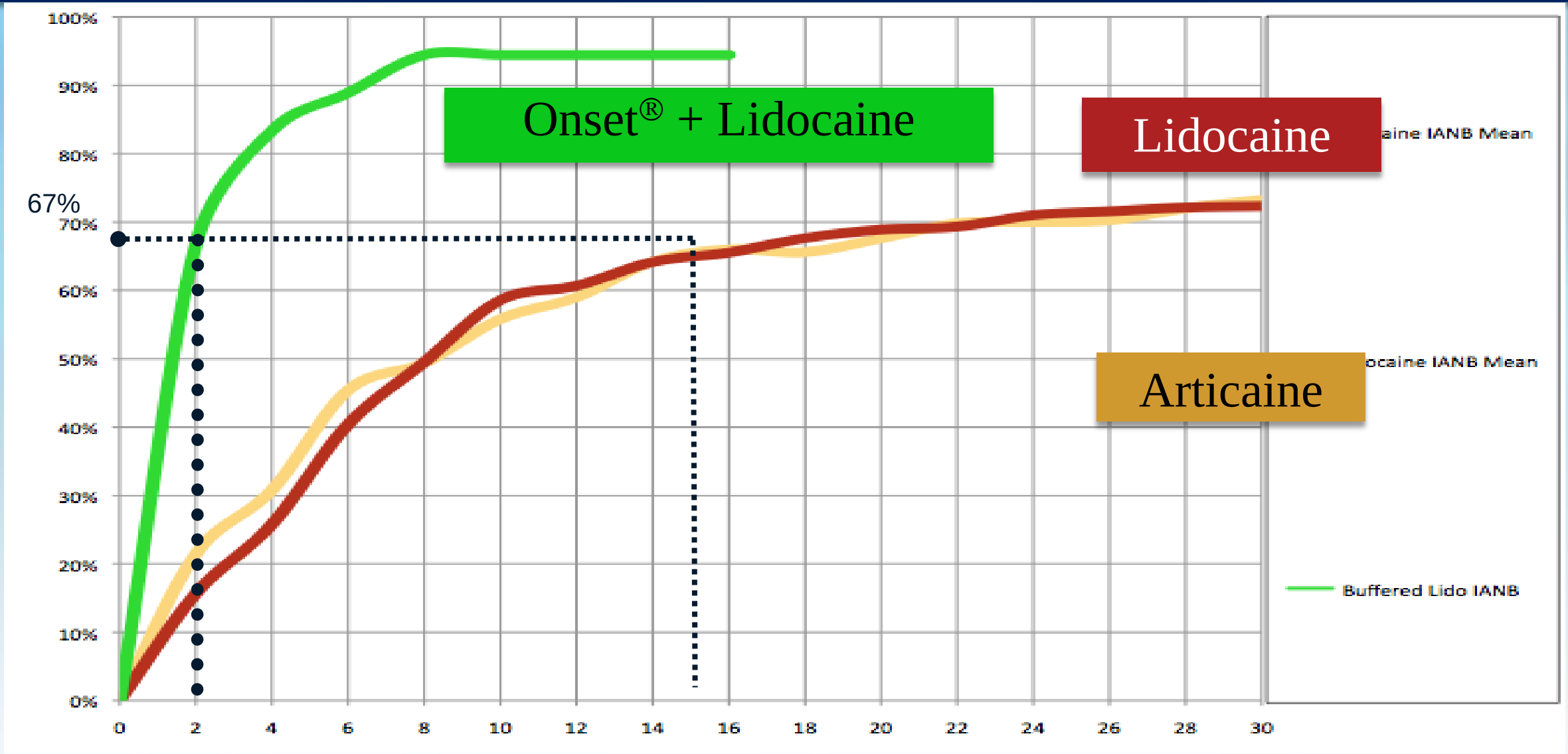
Clinical Data – Patient Preference

72 % of patients rated Onset® as **the most** comfortable injection



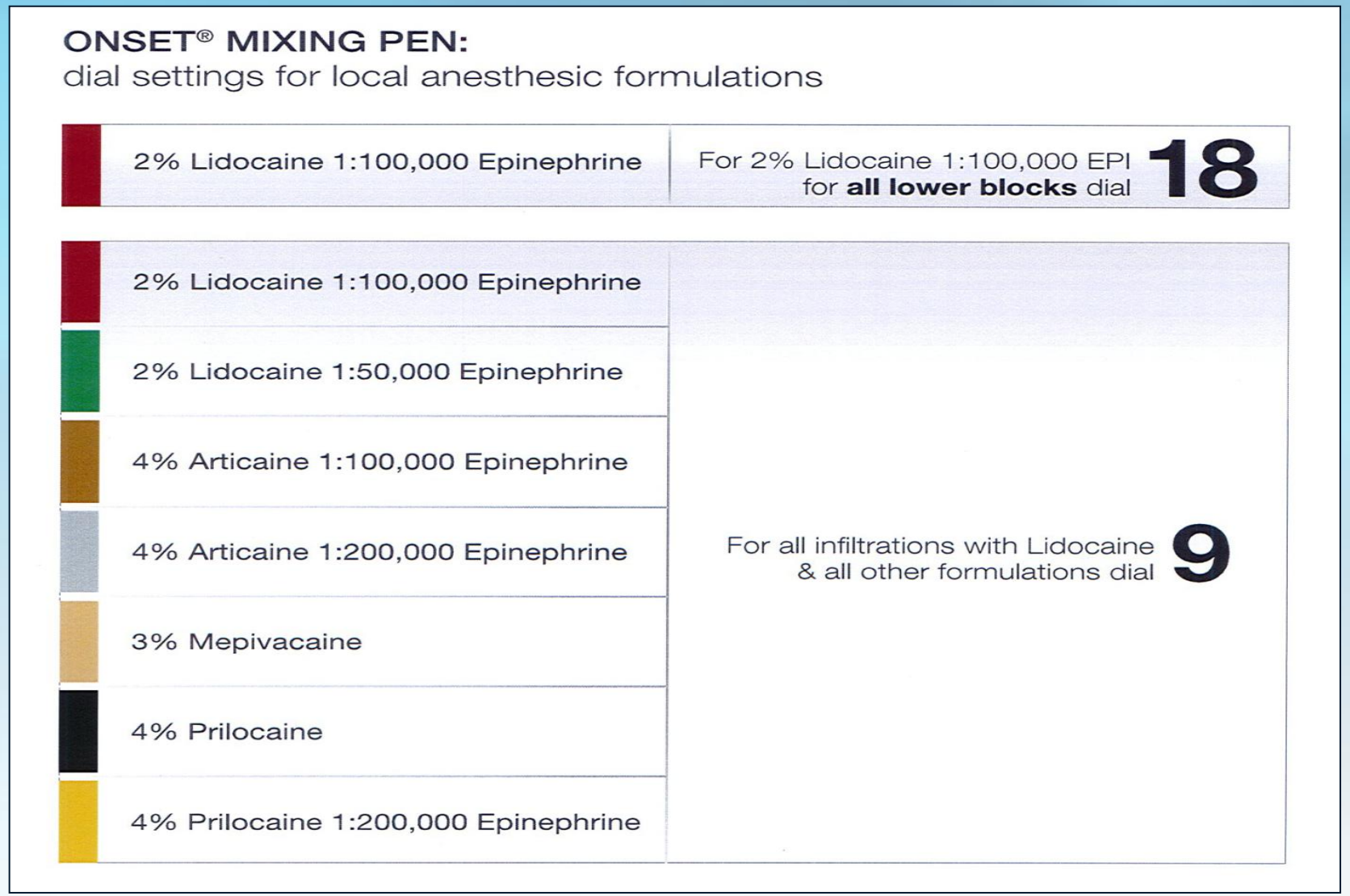
From: Malamed S, Falkel M, Decreasing anesthetic injection pain using an automated dental anesthetic buffering system: A prospective, randomized, double-blind, crossover study, Draft for Publication, 2011

30-Minute Time Course, Pulpal Analgesia, IANB



Buffering of Local Anesthetics

- Mixing Pen settings:



Falkel M & Goeltz J, *Buffering, it's not just for lidocaine anymore,* Dentistry Today, Nov. 2015

Onset® by On**ph**arma®

The exchange volume is only 0.18 ml.

The first and only chair side approach for precision buffering of local anesthetic

Cartridge Connector

Bicarbonate Solution

Mixing Pen

$55.00 / day based on X9 use

$299.00
Not autoclavable

Buffering of Local Anesthetics

- Released February 2015
- An anesthetic buffering device and a multi-dose delivery syringe
  - Uses medical multi-dose anesthetic vials
  - Contain preservative methylparaben: increased potential for allergic reaction?

Larson CE, Methylparaben – an overlooked cause of local anesthetic hypersensitivity, Anesth Prog, 1977
Cashman AL & Warshaw EM, Parabens: a review of epidemiology, structure, allergenicity, and hormonal properties, Dermatitis, 2005

4

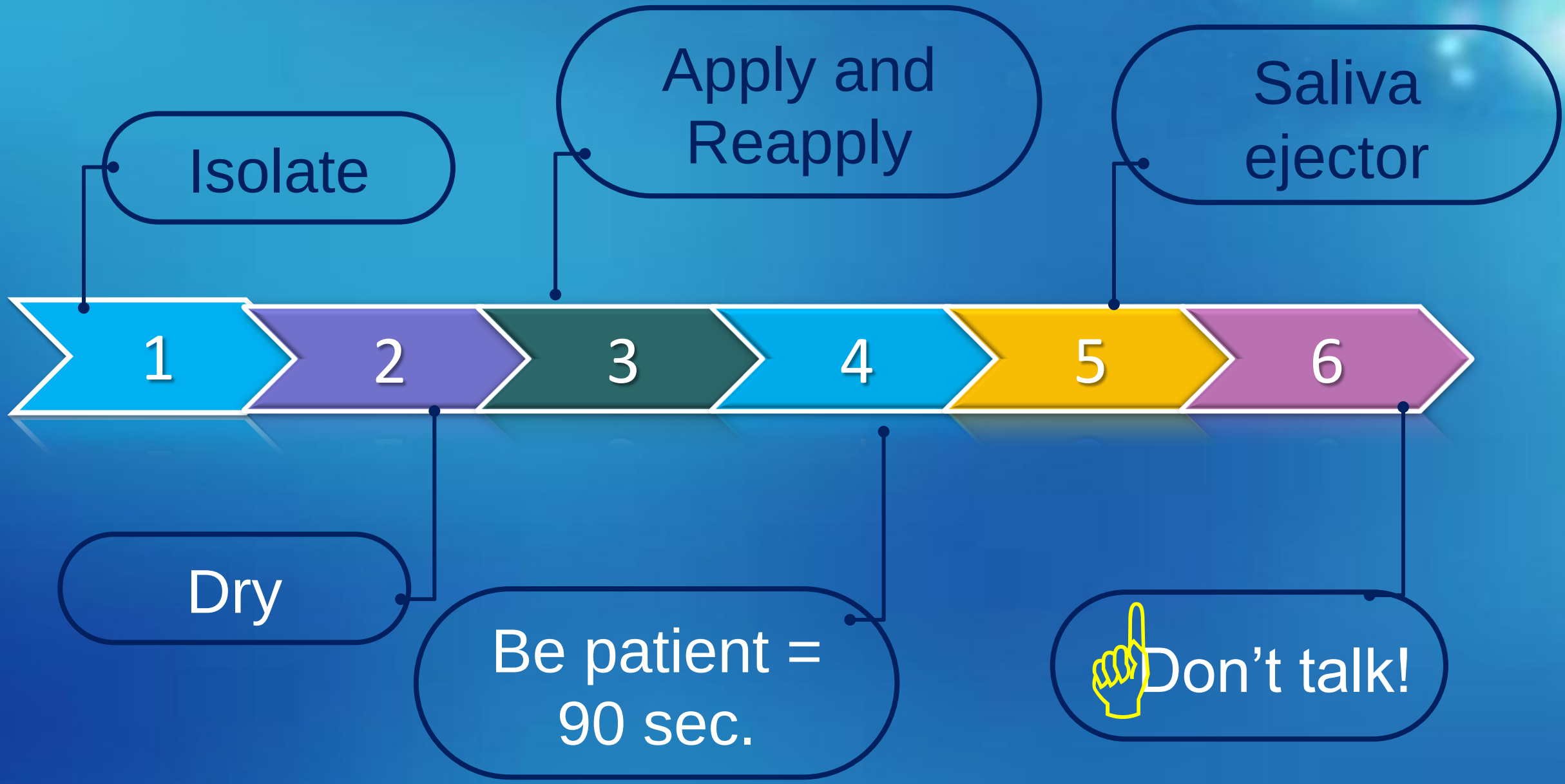
Local Anesthetic News:

Topical Anesthetics

Topical Anesthetics

Product Analysis

Topical Anesthetic: Compromises



Topical Anesthetics

- What do you do if you ***KNOW*** that the area can't be isolated (saliva, tongue), ***or***
- The topical won't penetrate into tissue far enough to cover a deeper block?

Topical Anesthetics

Patients expect the use
of a topical anesthetic!

Dr. Kit Weathers

Endo Magic® Founder's Technique!
Griffin, GA.

Lidocaine Viscous

FDA announces

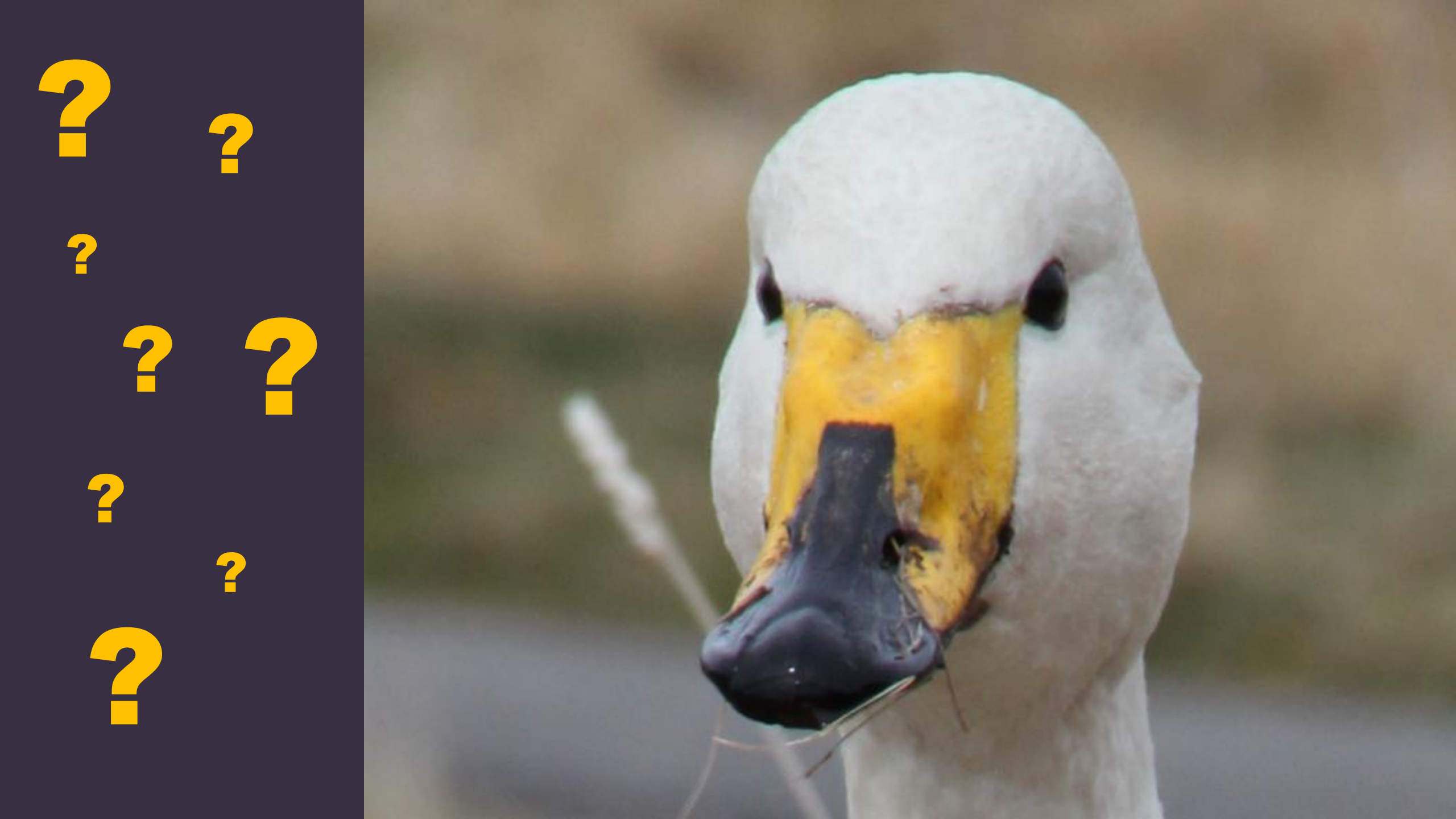
Box Warning

Required

Product Analysis: Lidocaine HCl

“Should not be used for teething pain”

Product Analysis: Oraqix®



PART

3

A FEW

TIPS & TRICKS BY TRIAL AND FAILURE!

CONVENTIONAL MANDIBULAR ANESTHESIA

1

Conventional mandibular anesthesia

Chin on the Chest Syndrome

1

Poor opening

1

Open the airway

1

Chin toward the ceiling

1

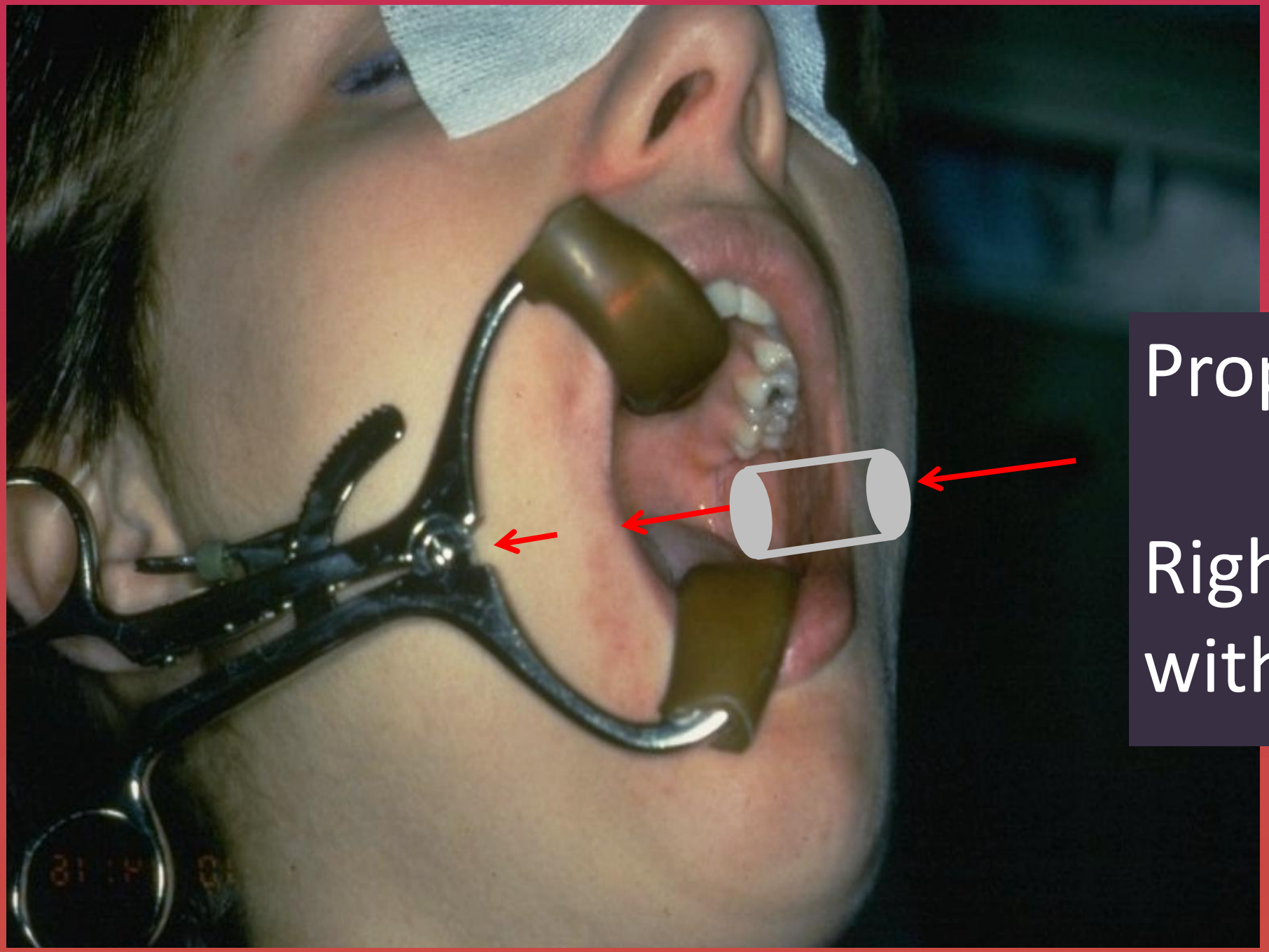
Head position - consistent

Patient supine and

Roll of gravity?

2

Scissors prop or
Mouth *rester*



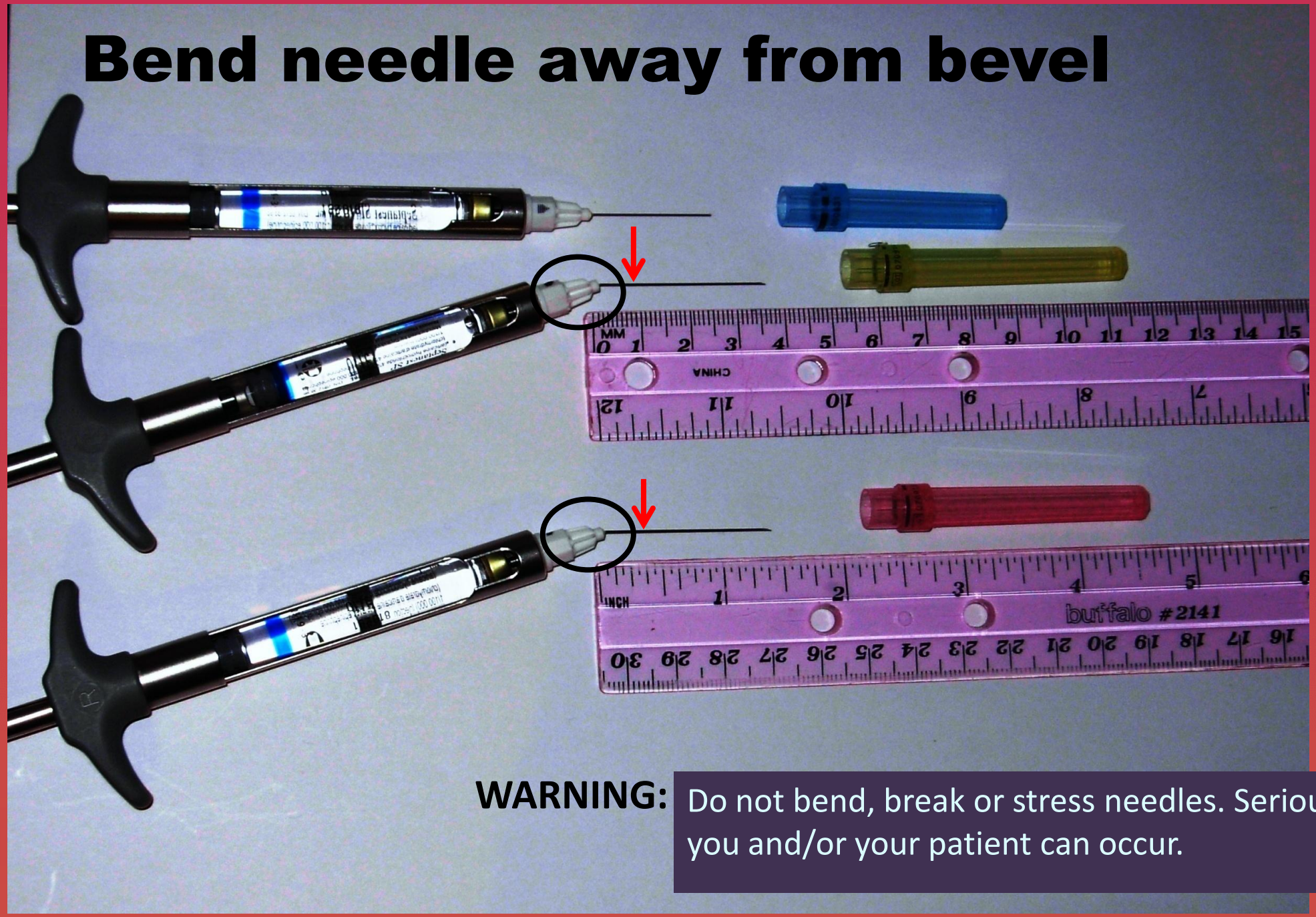
2

Prop or “rester”

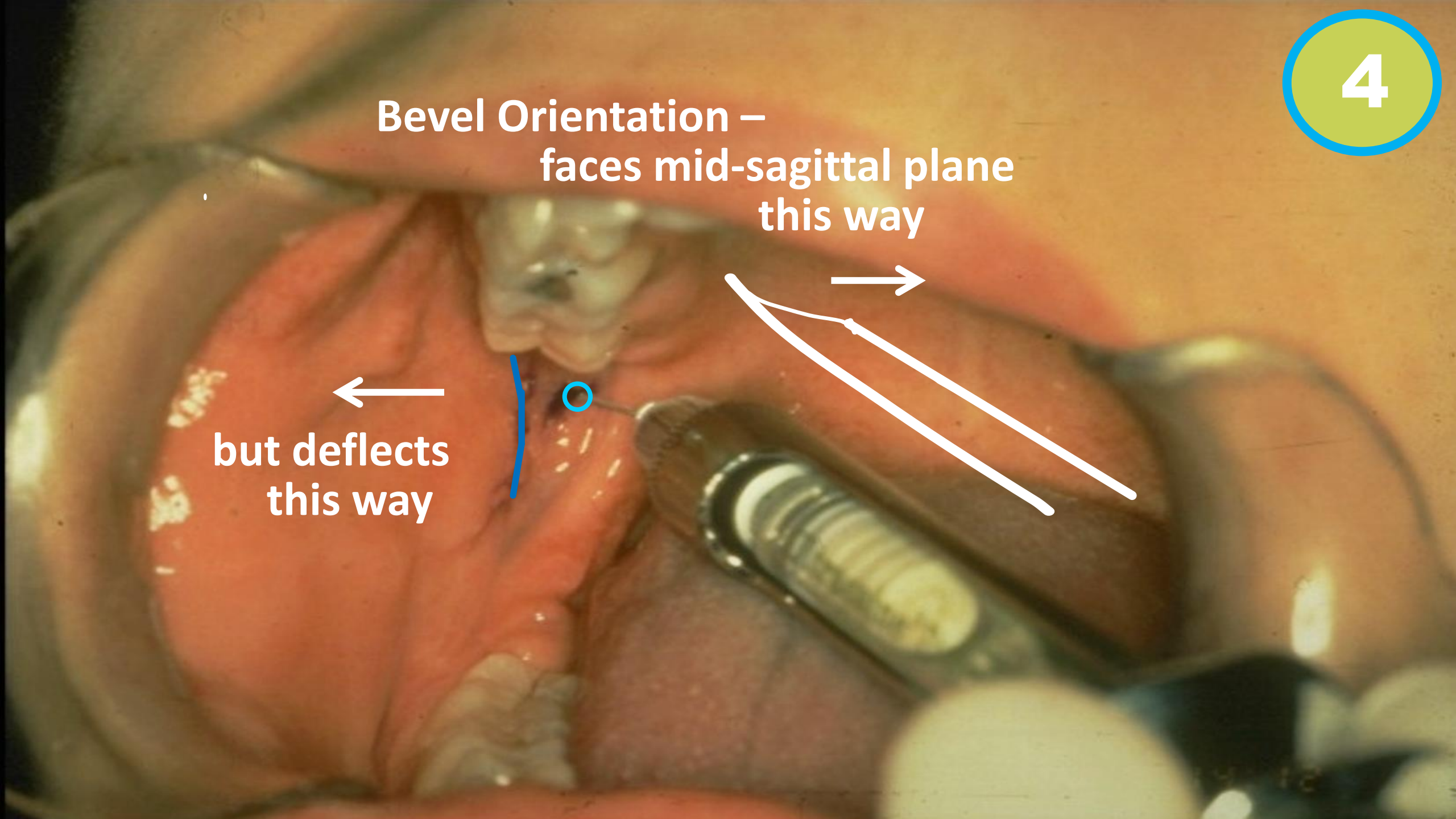
Right side goes with right side

Bend needle away from bevel

3



WARNING: Do not bend, break or stress needles. Serious injuries to you and/or your patient can occur.


4
Bevel Orientation –
faces mid-sagittal plane
this way
but deflects
this way

Volume Considerations

- Amount given / amount available
- Time for diffusion
- Neuroanatomy (penetrable diameter)

5

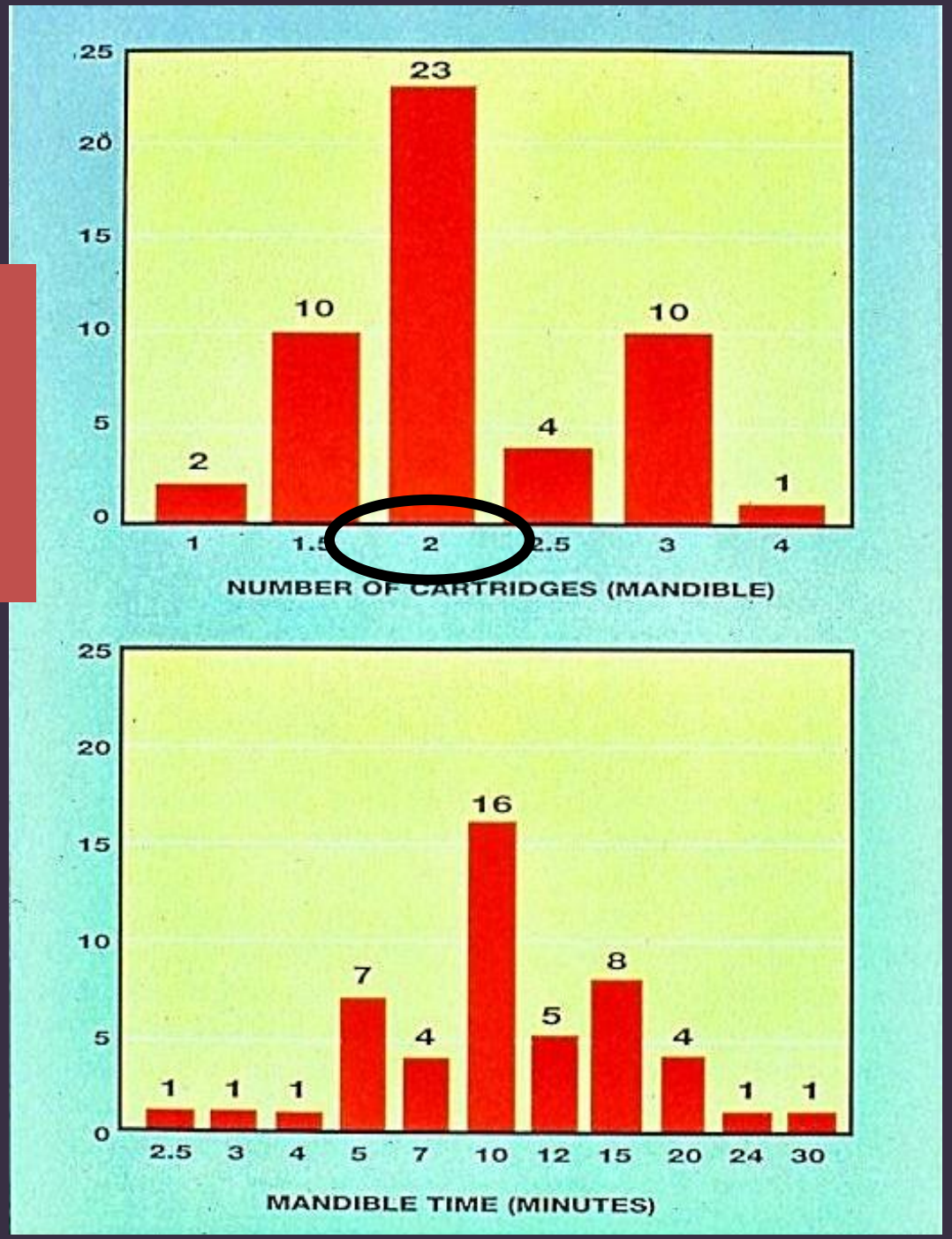
How many ‘carps’ ?

How many ‘carps’

Enough	> 1	?
Better/Best	= 2	?
Too many	< 4	?

for a block

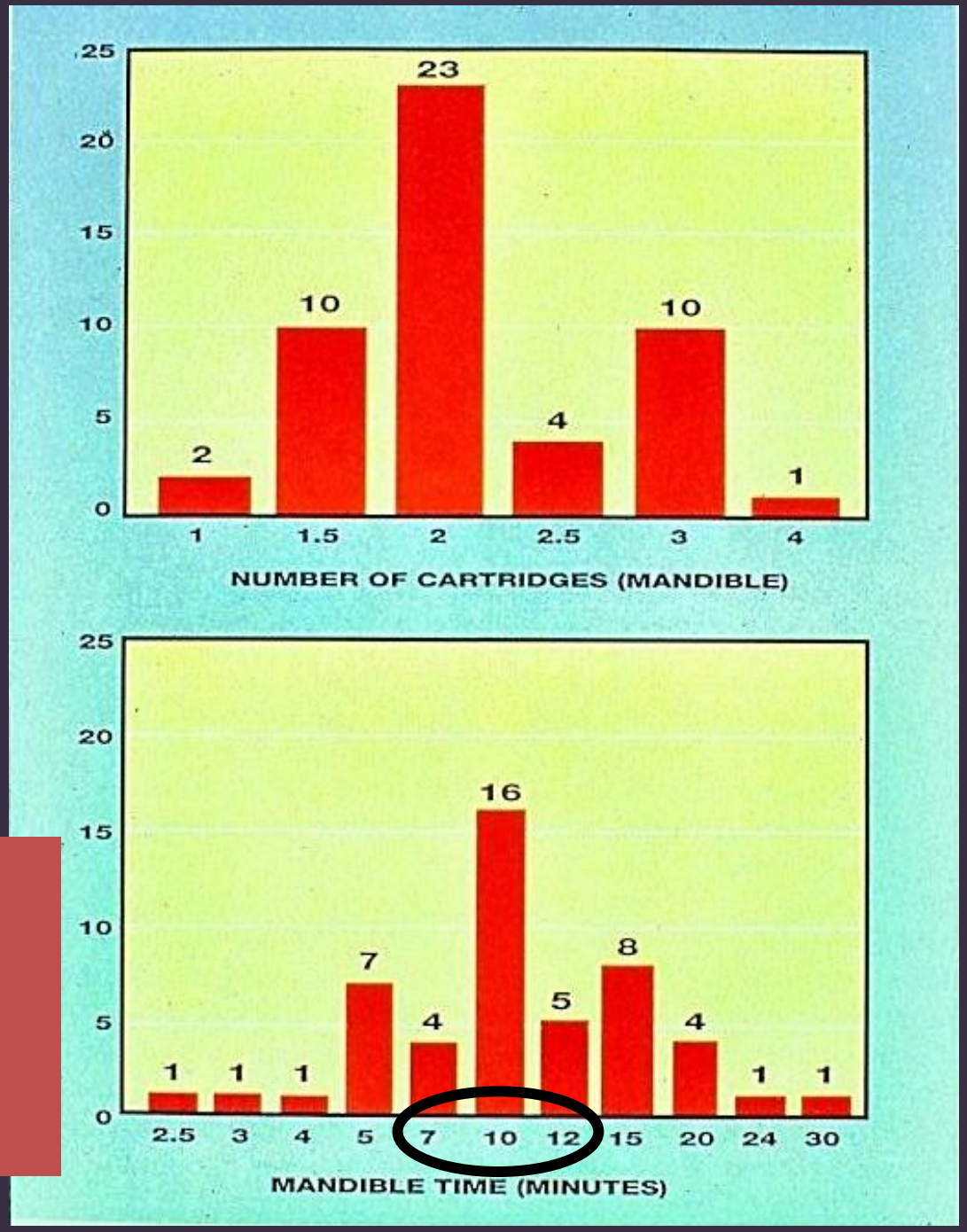
Mean Number of Carps →



Leonard M, **Local Anesthesia Volume** and **Success Rates** *JADA Vol. 126(833)*

6

Onset Time



Latency time →

Leonard M, **Local Anesthesia Volume** and **Success Rates,** *JADA Vol. 126(833)*

The Influence of SOLUTION pH

Primarily due to concentration of **HCl** the LA molecules are dissolved in.

Also proportional to **vasoconstrictor concentration** and the antioxidant, $NaHSO_3$

H_2SO_4

The Influence of SOLUTION pH

generic name	epinephrine	pH
3% mepivacaine		~5.4
4% prilocaine		~5.4
4% articaine	1:200,000	~4.9
4% prilocaine	1:200,000	~4.9
2% lidocaine	1:100,000	~4.3
4% articaine	1:100,000	~4.3
2% lidocaine	1: 50,000	~3.9

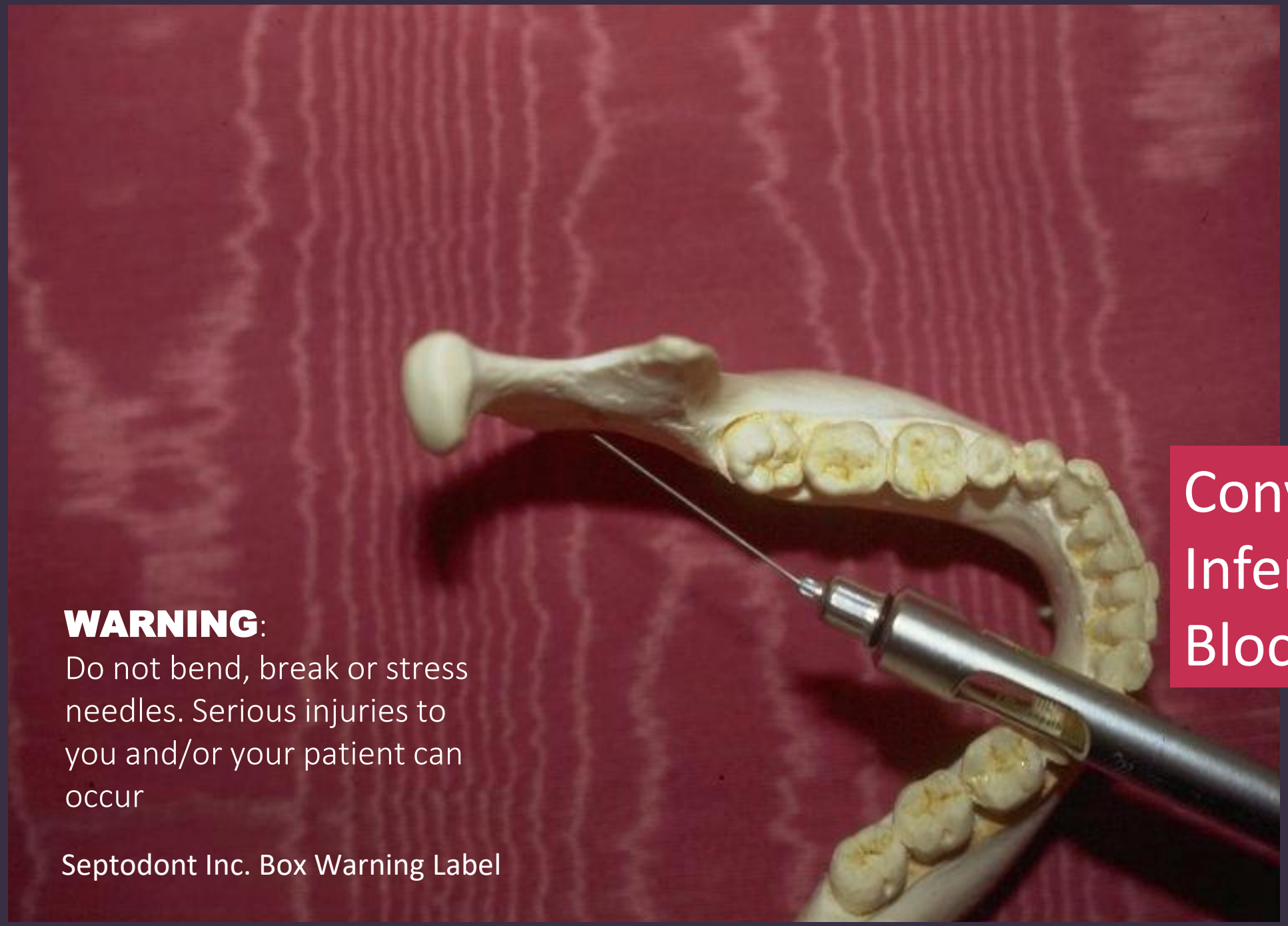
Bulk Buying

7

Local anesthetic **ages** on the shelf

pH goes ↓ i.e. it becomes more acidic

Stings more



Conventional Inferior Alveolar Block

WARNING:
Do not bend, break or stress needles. Serious injuries to you and/or your patient can occur

Septodont Inc. Box Warning Label

8

Add and/or administer a true mandibular block

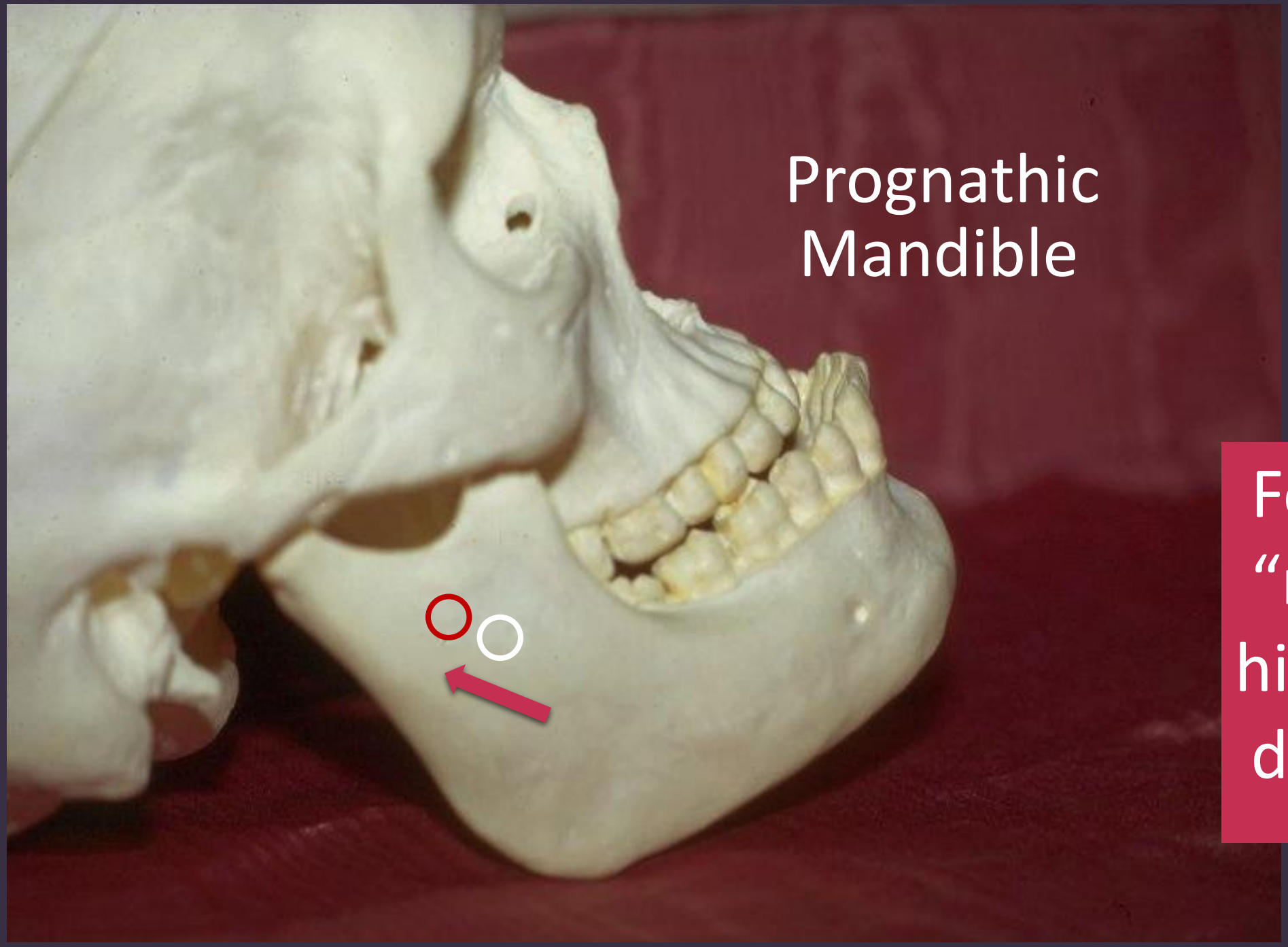
WARNING

Do not bend, break or stress needles. Serious injuries to you and/or your patient can occur

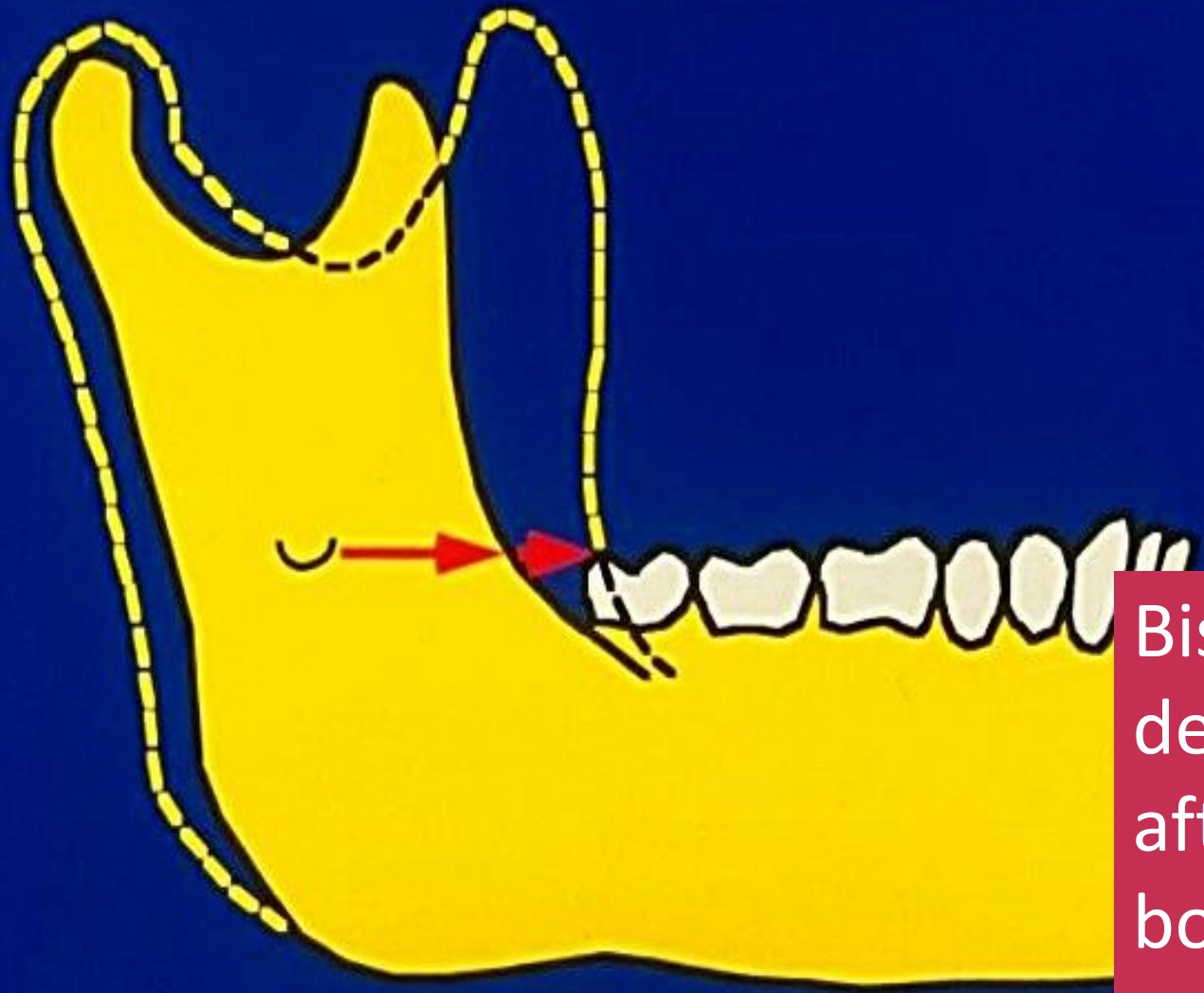
Septodont Inc. Box Warning Label

Akinosi

Gow-Gates

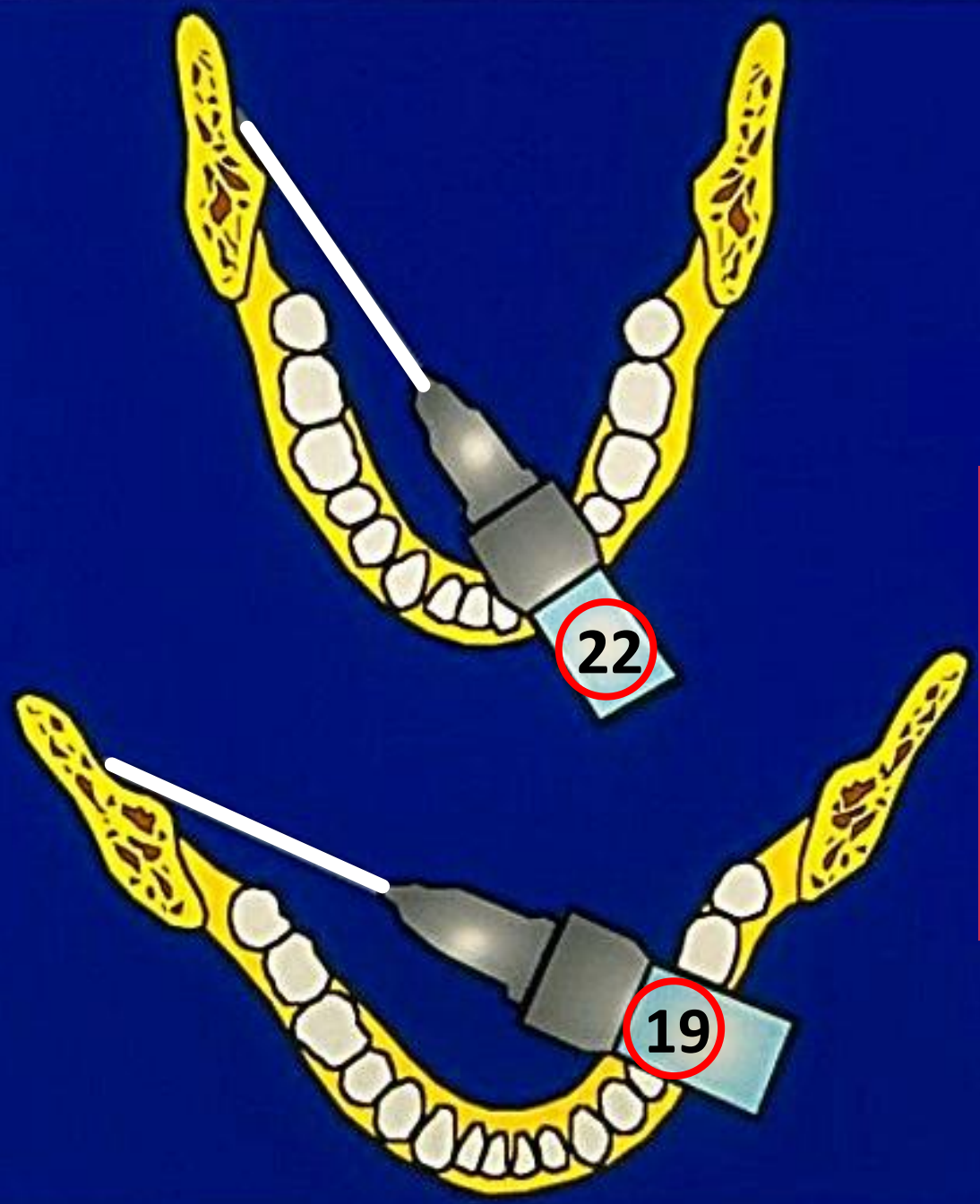


Foramen "moves" higher and deeper



The relative position of the mandibular foramen will vary with the width of the ascending ramus, as shown by the arrows.

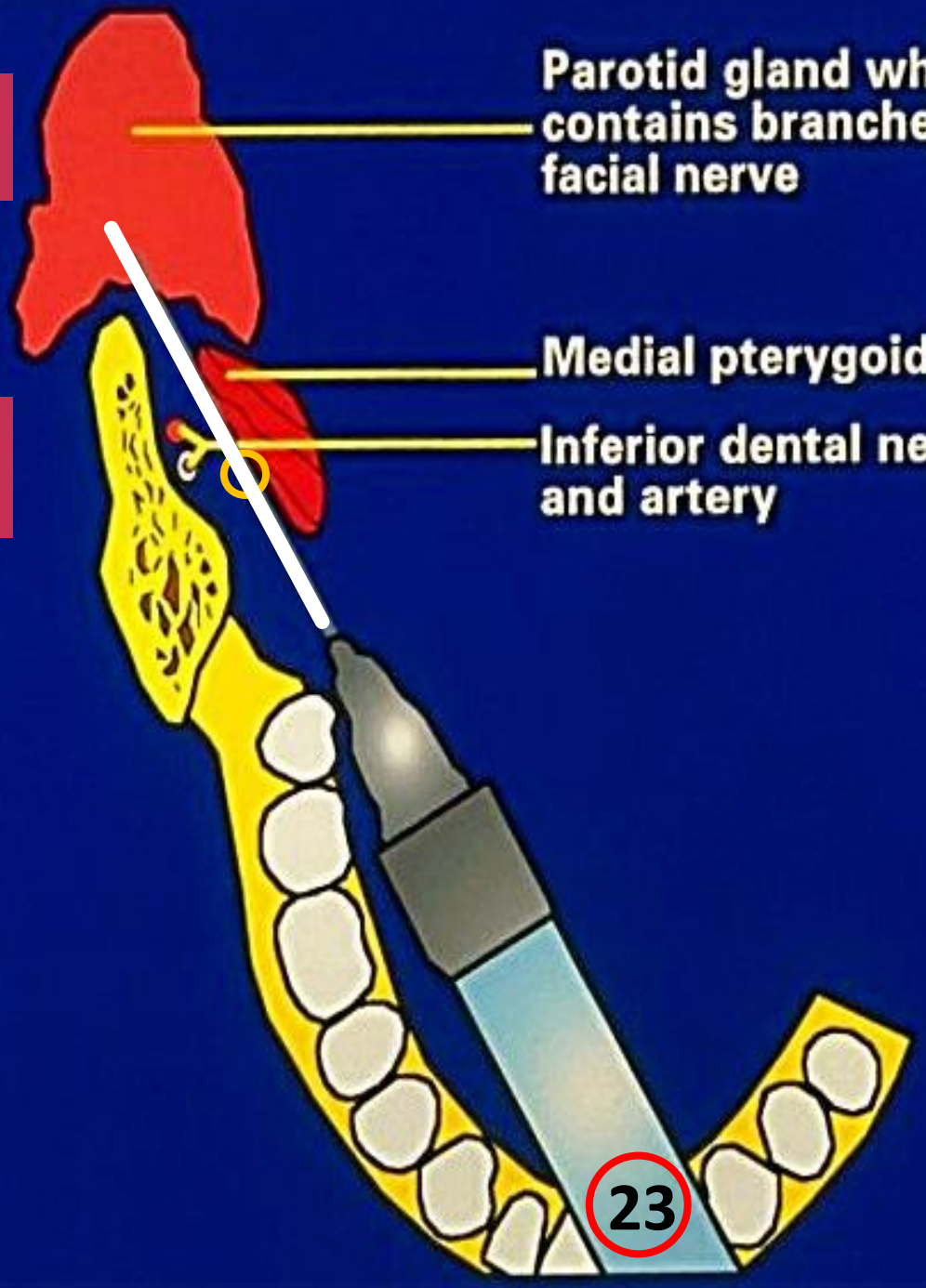
Bisection Injection-
deeper
after anterior
bone growth



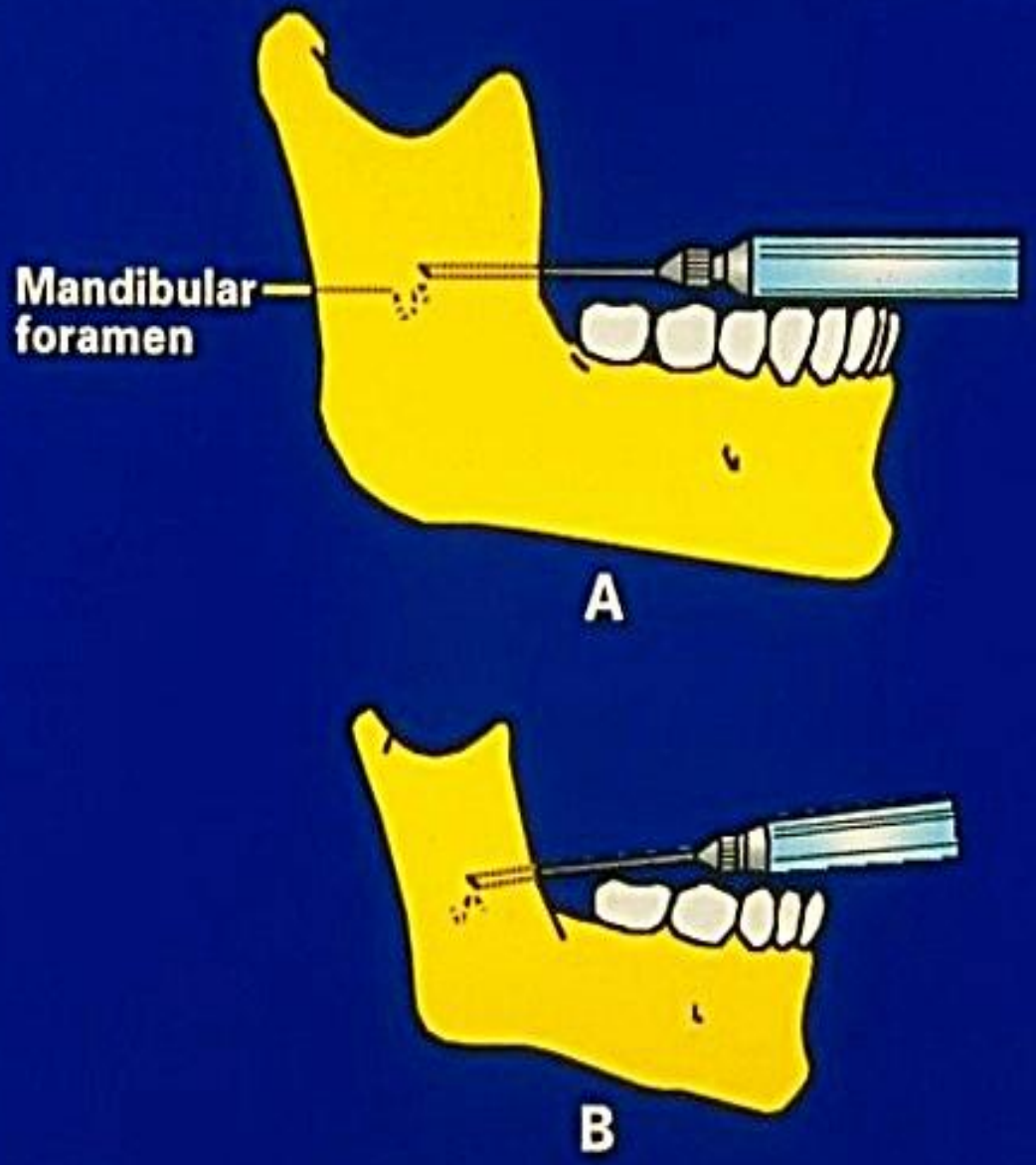
Assess ramus flare extraorally first

CN VII →

Lingual n →

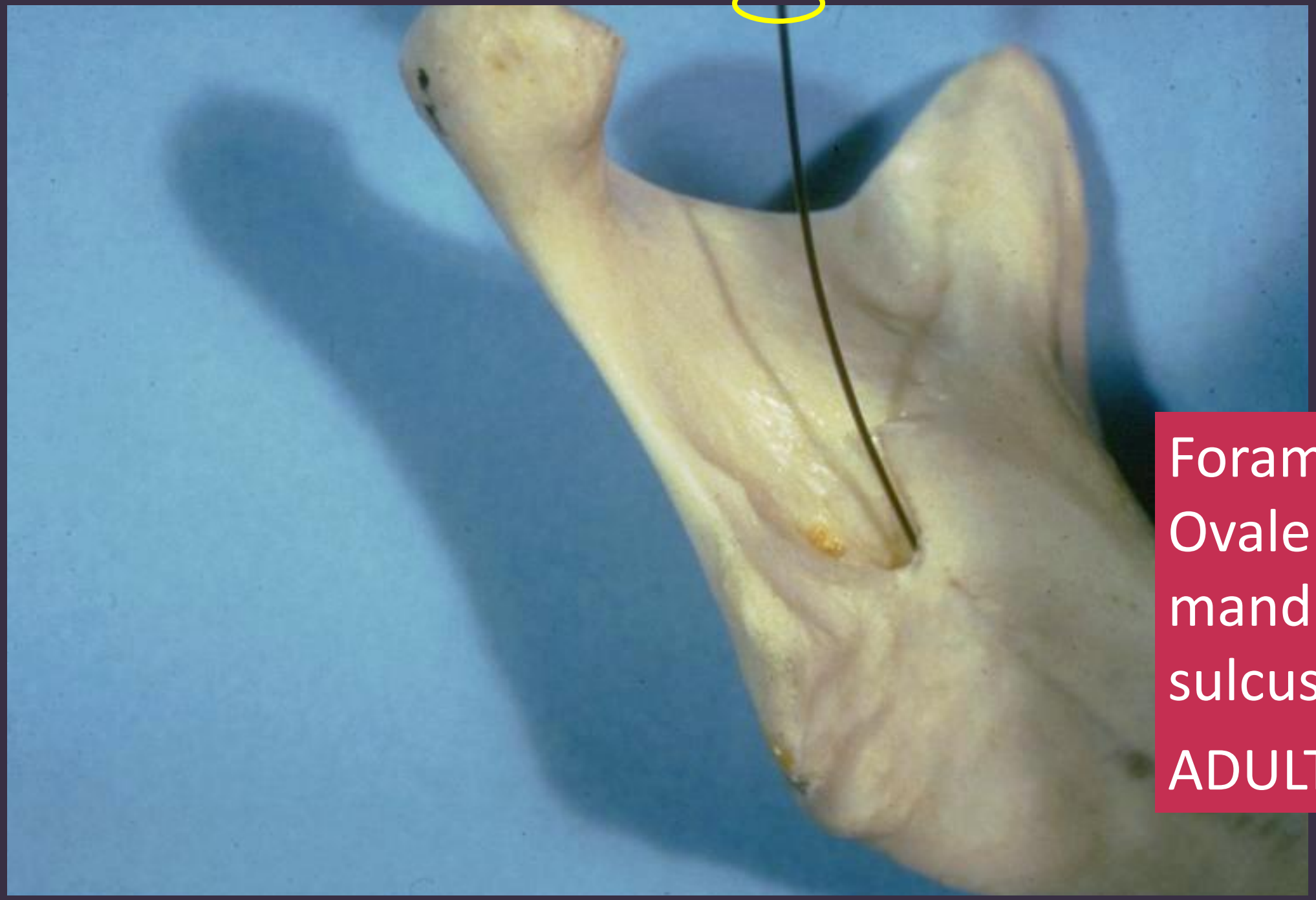


Can you contact the ramus?



Inferior dental block. Position of syringe in the adult (A) and in the child (B).

6 - 9 y.o.
At or below occlusal plane



12

Foramen Ovale to mandibular sulcus

ADULT

13

Intranasal Local Anesthesia

The Future of Pain Control in Dentistry?

FDA has now approved:
NASAL SPRAY DENTAL ANESTHETIC

13

St. Renatus, LLC July 20, 2016

What is it?

- Intranasal Spray of **3% tetracaine**,
- An ester **formally marketed** as 4% Ravocaine®
- With **0.05% oxymetazoline**

  which is an α - adrenergic agonist

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

Produces regional anesthesia for restorative procedures on teeth # 4-13 and A-J in patients weighing over 88 lbs

Articaine

PANACEA or PROBLEM?

Articaine

A statistically significant scientific study demonstrated 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

Articaine v. lidocaine

Articaine solutions had a probability of achieving anesthetic success **superior** to **lidocaine** when analyzing infiltration.

Not as pronounced but still statistically significant, articaine performed superiorly for blocks too.

Brandt RC et al JADA 142(5):493-504 2011

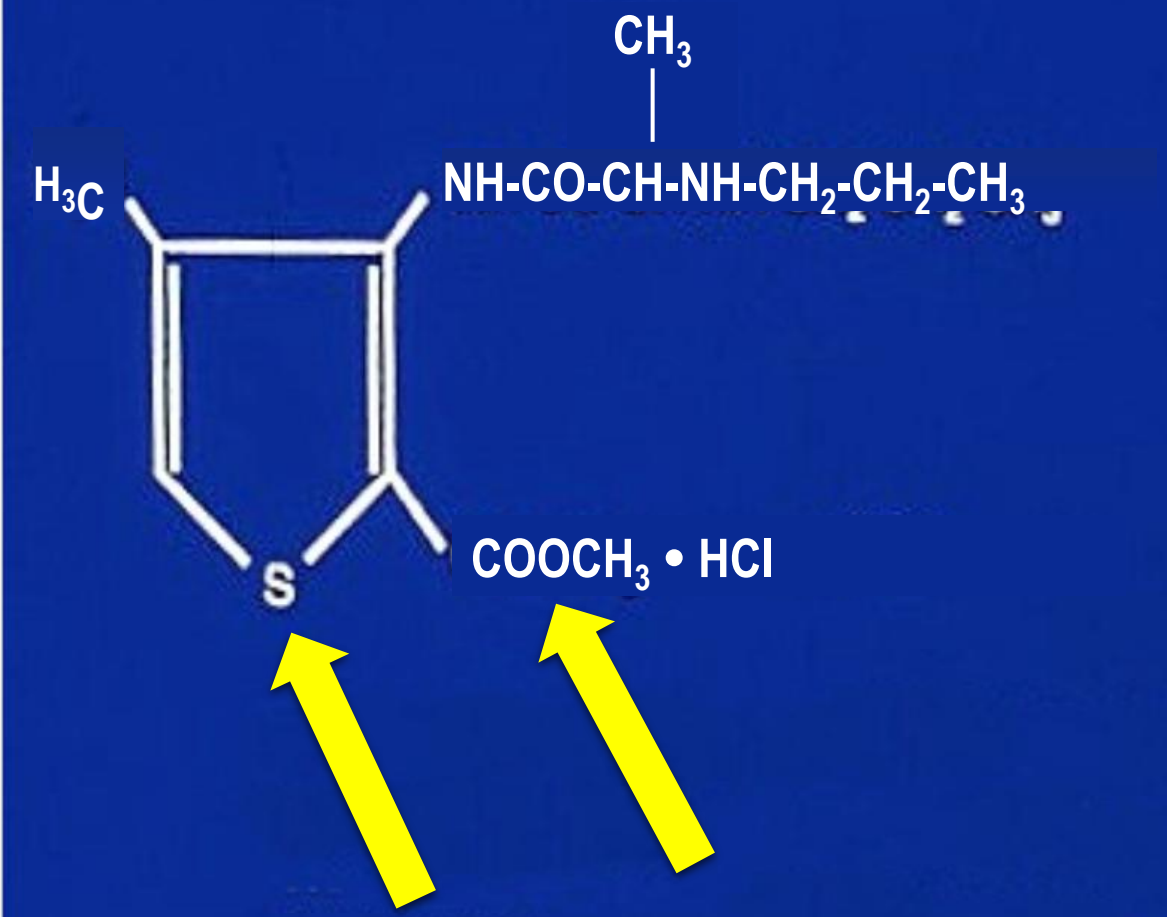
Articaine Brands: “100” / “200” epinephrine

Septocaine®
Orabloc®
Articadent®
Zorcaine®

Articaine Chemistry – Sulfur Atom

- The sulfur atom forming the highly lipid soluble thiophene ring is non-reactive.
- **There is NO cross allergenicity (Ag-Ab) interaction for a patient allergic to “sulfas” or “sodium or potassium metabisulfites”**

Articaine



Structural formula and physical - chemical data for articaine

Articaine Metabolism

Although classified as an amide local anesthetic, the **articaine molecule** is 90% inactivated by plasma ***cholinesterases*** and only 10% by ***hepatic enzymes*****.**

Articaine – Metabolite? Safety?

The good news is:

- The metabolite from the ester linkage inactivation is **NOT** *para-amino benzoic acid (PABA),* a known allergen.
- The ***FAST action*** results in a short ½ life **(27 minutes)**. This represents a systemic **safety phenomenon.**

Articaine – Safety Search - Deaths

- These authors could **not** find a single mortality linked to articaine, **in any age group**, in it's years of dental administration in Europe, Canada and currently the U.S.A.

Hawkins JM, Moore PA, **Local Anesthesia: Advances in Agents and Techniques,**

Dent *Clin N Am 46 2002 719-73*

Articaine –Adverse Drug Reactions (ADR)

- The product has been available in Germany and France since **1976** and has ~90% of the market, in Canada since 1983 with ~35%, **in the United States since 2000, also with ~35%**,
- The authors expected to find **ADR** reports of **post-op sequellae** such as lingual nerve and/or inferior alveolar nerve **paresthesia**.

Hawkins JM, Moore PA**, Local Anesthesia: Advances in Agents and Techniques**,

Dent *Clin N Am* 46 2002 719-732

Articaine - Search Results - ADR's

This was **NOT** the case, implying that they are:

- Not being reported
- Not occurring
- Accepted as an occasional event in dentistry
- No lawyers in Europe!

Hawkins JM, Moore PA

Paresthesia Research is Unavailable

Is a 4% solution neurotoxic?

Articaine

There is no scientific or research based data to conclude that

4% prilocaine or
4% articaine

is directly causative of dental paresthesia and/or hypesthesia

…HOWEVER…

Paresthesia Product Profile

	1973-1993	1993 Only	
Anesthetic	**Incidence %(#)**	**# Cartridges**	**Incidence %(#)**
Articaine	33.6 (50)	4,398,970	71.4 (10)
Prilocaine	28.9 (43)	2,353,615	28.6 (4)
Lidocaine	3.4 (5)	3,062,613	0
Mepivacaine	2.7 (4)	1,569,037	0
Bupivacaine	0	241,679	0
Unknown	31.5 (41)		0

143 Non-Surgical Paresthesia Tongue (92), Lip (42), Both (9)

Haas DA, Lennon D. JCan Dent Assoc 1995;61(4):319-30

Articaine Risk – Benefit Conclusions

"All local anesthetics can produce toxicity to nerves **if** they achieve sufficiently high intraneural **concentrations**.

The concentrations of formulated local anesthetic solutions are neurotoxic per se and that their **dilution**, in situ or in tissue, is **essential** for safe use."

Miller's 7th Edition, 2009

Use articaine for IAN only when others fail!

Becker, DE: Modular Curriculum in Conscious Sedation Manual, 2011

14

Effects of Lidocaine and Articaine on Neuronal Survival and Recovery

Albalawi, F, Hersh, EV, Effects of Lidocaine and Articaine on Neuronal Survival and Recovery, Anesth Prog 65:82-88 2018

Survey and Anecdotal Reports, 1983 - present

Given that there are reports , although infrequent, of neurotoxity of 4% articaine, this study was designed to compare the neurotoxicity and functional impairment of these two formulations by screening cultured, neural SH-SY5Y cells

Albalawi, F, Hersh, EV, Effects of Lidocaine and Articaine on Neuronal Survival and Recovery, Anesth Prog 65:82-88 2018

Results

4% articaine had no effect on the survival of neural SH-SY5Y cells

Conclusion

4% articaine does not damage neural cells more than 2% lidocaine

This study concludes that articaine is no more neurotoxic, at least in the in vitro setting

Albalawi, F, Hersh, EV, Effects of Lidocaine and Articaine on Neuronal Survival and Recovery, Anesth Prog 65:82-88 2018

Future Overview

THINK of what this could mean

In this in vitro study, since 4% articaine does not damage neural cells and therefore is no more neurotoxic than 2% lidocaine could one

1. Conclude to no longer subject articaine to suggestions that it not be used for IAN and lingual blocks?

2. Reverse the legal settlements involving compensation for paresthesias, at least when the paresthesia is associated with articaine?

THE JURY is STILL OUT.

Future Overview

THINK of what this could mean

In this in vitro study, since 4% articaine does not damage neural cells and therefore is no more neurotoxic than 2% lidocaine could one, furthermore

3. Dismiss the validity of paresthesia survey results?

4. Receive a new product insert which would not need to warn the dentist against using articaine for traditional blocks?

THIS STUDY HAS NOT as YET BEEN PRESENTED at DEPOSITION or in COURT, TO MY KNOWLEDGE

What are *YOUR* choices?

- **Don't use it for IAN / lingual nerve blocks.**
- **Do higher Gow-Gates blocks, where V3 is huge?**
- **Use selectively – Patient selection? History of failure? Desperation? Consent?**
- **Mix, match, dilute with 3% mepivacaine plain - pH 5.4 (Scandanest®, Carbocaine®), administered prior to 4% articaine – pH 4.3 cartridge**

Speaker suggests do NOT use on lawyers, news anchor women, any media, family, alleged friends OR at 4:00 PM Thursday OR Friday afternoons.

Sedation & Anesthesia in Dental Practice

LOCAL ANESTHESIA

"30+ YEARS OF HITS, MISSES AND NEAR MISSES"

The New Hampshire Dental Society
Concord, New Hampshire
November 9th, 2018

Mel Hawkins, DDS, BScD AN
Dentist / Dentist Anesthesiologist
Toronto, ON, Canada