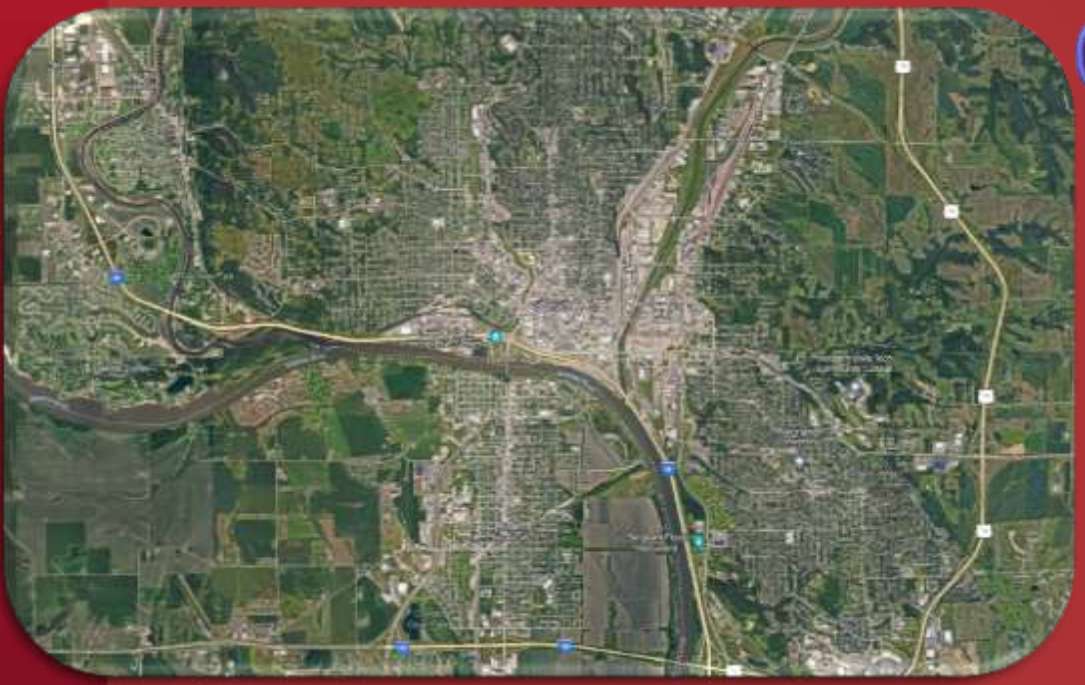


Contemporary pain control, update on local anesthesia and sedation, and what's new in oral surgery for general practitioners

February 9, 2024

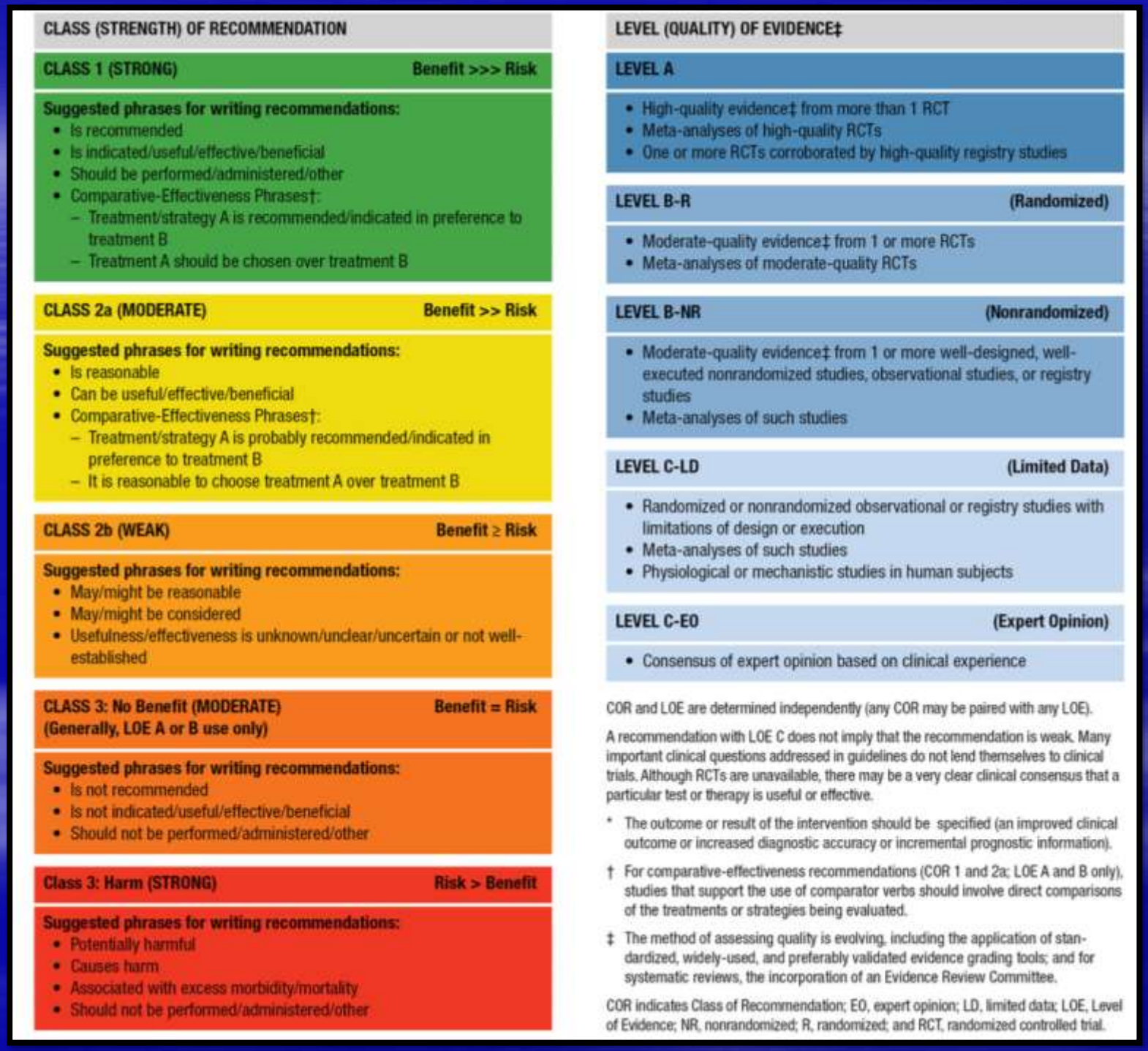
Dr. J. Bruce Bavitz

Chair, Department *of* Surgical Specialties
University of Nebraska Medical Center
Lincoln, Nebraska, USA

University of Nebraska Medical Center

Agenda

1. Get patient in the chair (sedation?)
2. Get patient numb and comfortable, minimize medical emergencies (sedation, local anesthesia)
3. Perform procedure, possibly a Runzagenic new one (oral surgery)
4. Keep patient comfortable afterwards (pain control)
5. Rinse, spit, repeat, **(questions)**



CLASS (STRENGTH) OF RECOMMENDATION

CLASS 1 (STRONG) — **Benefit >>> Risk**

Suggested phrases for writing recommendations:
- Is recommended
- Is indicated/useful/effective/beneficial
- Should be performed/administered/other
- Comparative-Effectiveness Phrases†:
  - Treatment/strategy A is recommended/indicated in preference to treatment B
  - Treatment A should be chosen over treatment B

CLASS 2a (MODERATE) — **Benefit >> Risk**

Suggested phrases for writing recommendations:
- Is reasonable
- Can be useful/effective/beneficial
- Comparative-Effectiveness Phrases†:
  - Treatment/strategy A is probably recommended/indicated in preference to treatment B
  - It is reasonable to choose treatment A over treatment B

CLASS 2b (WEAK) — **Benefit ≥ Risk**

Suggested phrases for writing recommendations:
- May/might be reasonable
- May/might be considered
- Usefulness/effectiveness is unknown/unclear/uncertain or not well-established

CLASS 3: No Benefit (MODERATE) — **Benefit = Risk**
(Generally, LOE A or B use only)

Suggested phrases for writing recommendations:
- Is not recommended
- Is not indicated/useful/effective/beneficial
- Should not be performed/administered/other

Class 3: Harm (STRONG) — **Risk > Benefit**

Suggested phrases for writing recommendations:
- Potentially harmful
- Causes harm
- Associated with excess morbidity/mortality
- Should not be performed/administered/other

LEVEL (QUALITY) OF EVIDENCE‡

LEVEL A
- High-quality evidence‡ from more than 1 RCT
- Meta-analyses of high-quality RCTs
- One or more RCTs corroborated by high-quality registry studies

LEVEL B-R — **(Randomized)**
- Moderate-quality evidence‡ from 1 or more RCTs
- Meta-analyses of moderate-quality RCTs

LEVEL B-NR — **(Nonrandomized)**
- Moderate-quality evidence‡ from 1 or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies
- Meta-analyses of such studies

LEVEL C-LD — **(Limited Data)**
- Randomized or nonrandomized observational or registry studies with limitations of design or execution
- Meta-analyses of such studies
- Physiological or mechanistic studies in human subjects

LEVEL C-EO — **(Expert Opinion)**
- Consensus of expert opinion based on clinical experience

COR and LOE are determined independently (any COR may be paired with any LOE).

A recommendation with LOE C does not imply that the recommendation is weak. Many important clinical questions addressed in guidelines do not lend themselves to clinical trials. Although RCTs are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

* The outcome or result of the intervention should be specified (an improved clinical outcome or increased diagnostic accuracy or incremental prognostic information).

† For comparative-effectiveness recommendations (COR 1 and 2a; LOE A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.

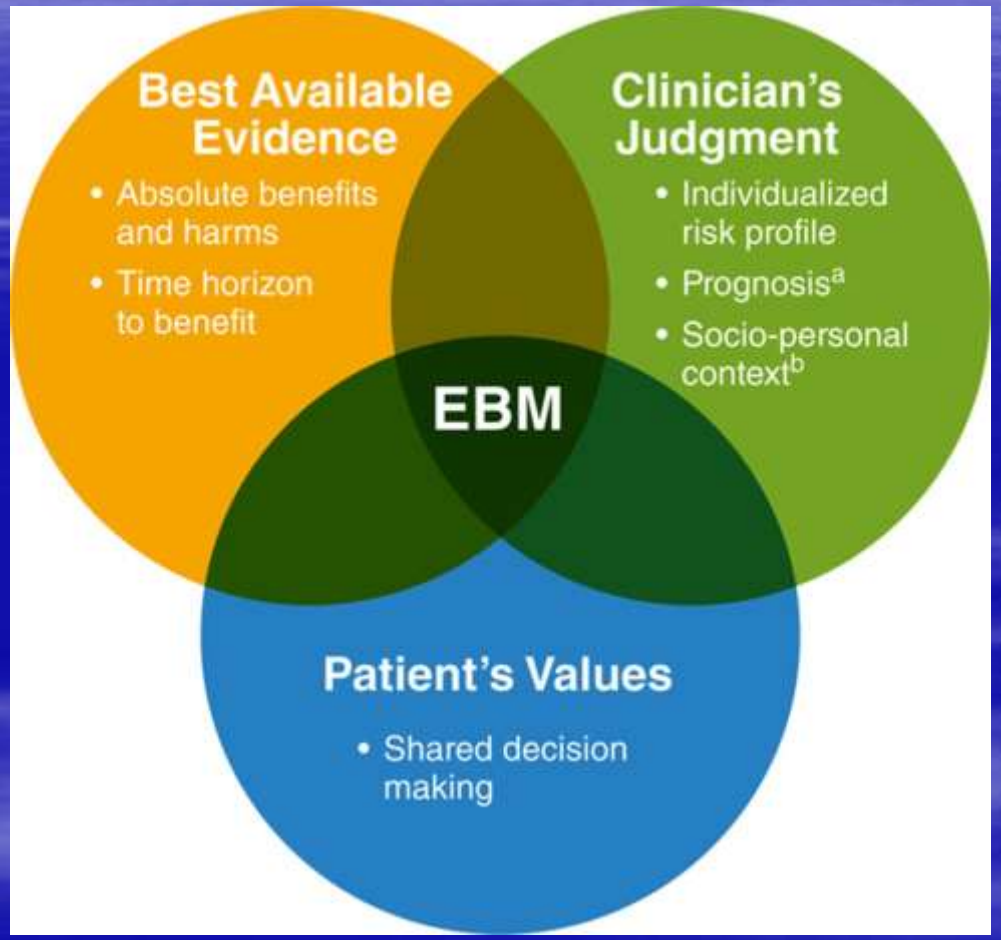
‡ The method of assessing quality is evolving, including the application of standardized, widely-used, and preferably validated evidence grading tools; and for systematic reviews, the incorporation of an Evidence Review Committee.

COR indicates Class of Recommendation; EO, expert opinion; LD, limited data; LOE, Level of Evidence; NR, nonrandomized; R, randomized; and RCT, randomized controlled trial.

JO Halperin, GN Levine, SM Al-Khatib, *Further evolution of the ACC/AHA clinical practice guideline recommendation classification system: a report of the American College of Cardiology* Circulation, 2016 133:1426–1428.

Dental School Faculty?

We got 0.2 mm new attachment



You are **not** giving me antibiotics before my cleaning??

Why bother with the medical history and physical exam?

- Will they show up for next appointment?
- Will they get numb and sit still?*
- Will they have a medical emergency?*
- Will they stop bleeding?*
- Will they resist infection?**
- Will they heal?**
- Will the operation “work”?**

**An intra-operative problem*
***A post-operative problem*

Common Changes/Modifications from Normal Surgical Routine

- Antibiotic Pre-medication
- D/C anticoagulants
- Prior Radiation Therapy ? Consider HBO
- **Oral, Nitrous oxide, or IV sedation**
- M.D. consult for tune up or “clearance”
- Allergy (penicillin, latex, sulfite etc)
- Abs + BCP…… Consider warning patient
- Delay Elective TX (Pregnancy, MI, CVA, BP)
- Long acting *or* quickly metabolized local anesthetics
- Limit epi to .04 mg for “cardiac” patients
- Insulin dose modification for major oral surgery
- Bisphosphonate (Anti-resorptives) subplots

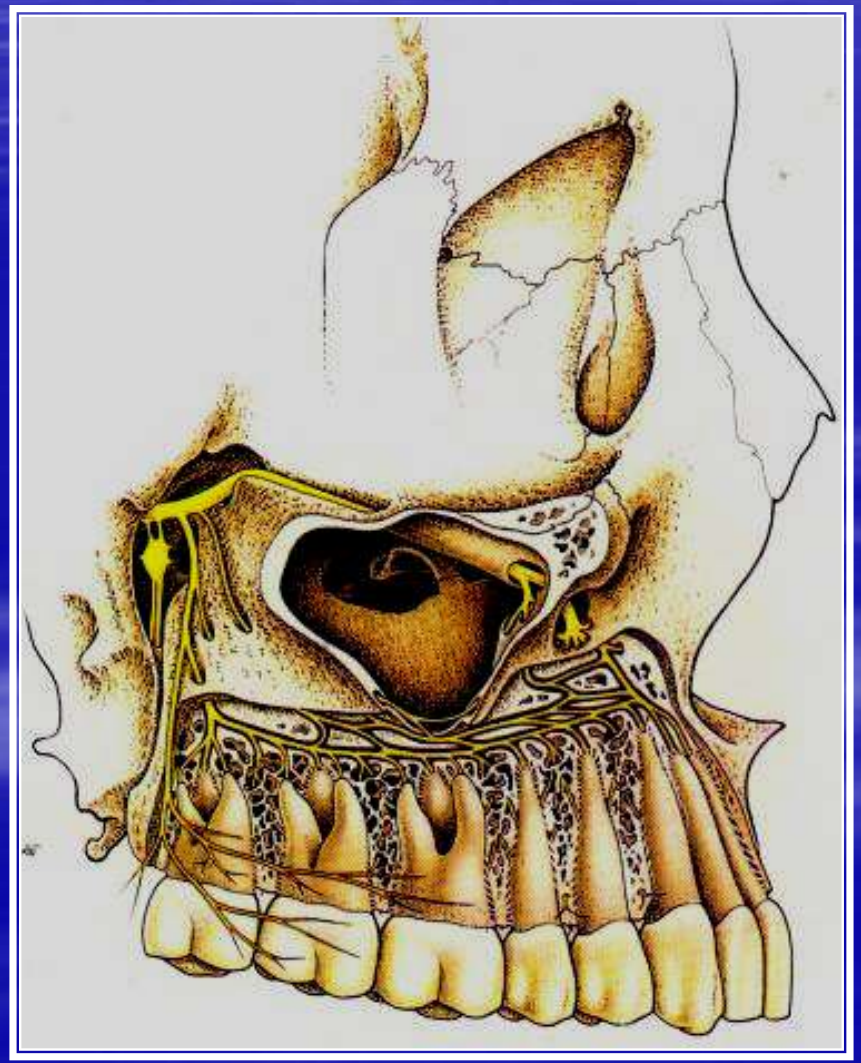
Common Changes/Modifications from Normal Surgical Routine

(Does the patient pose an unusual risk of transmitting a blood, saliva, or aerosol borne infectious disease?)

- COVID Test?
- Care with extra PPE?
- Care in special room?
- Mallet and osteotome (hammer/chisel)

Why Do I Ever Need "More" Than Just Local Anesthesia?

How many of you are doing more??



Evers & Haegerstam. *Introduction to Dental Local Anesthesia*. Astra Media Globe: 1990.

Rationale: Local Anesthesia Adequately Controls Procedural Pain for Most Patients, However:

- Local anesthesia does not control all pain on all patients (the perception of pain is highly subjective).
- Local anesthesia does not treat fear or anxiety. Although pain is subjective, we do know it is proportional to anxiety.

Most patients who claim they are "unable to get numb" have not had their anxiety diagnosed and treated….the local anesthesia is working just fine.

Rationale ….continued

- Most patients dislike receiving local anesthesia (*The Needle*)
- About 10 -30% of the U.S. Population avoid dental care because of fear*
- Treating the “stressed” patient is among the least pleasant tasks for you and your staff

*Even 10% of the population in your area = many untreated patients

Rationale ….continued

- Nervous patients are more likely to have medical emergencies *and* nervous dentists are more likely to make mistakes
- Some patients are unwilling or unable to cooperate enough to receive local anesthesia (extremes of age, mentally compromised, cerebral palsy)
- Rarely, a patient may have a true local anesthesia allergy

Rationale ….continued

- Some patients like, and are willing to pay for, Sedation. $$
- It is difficult to obtain profound local anesthesia for some procedures (I+D, endodontic access on acutely inflamed pulps, reducing facial fractures, extracting deeply impacted 3rds).

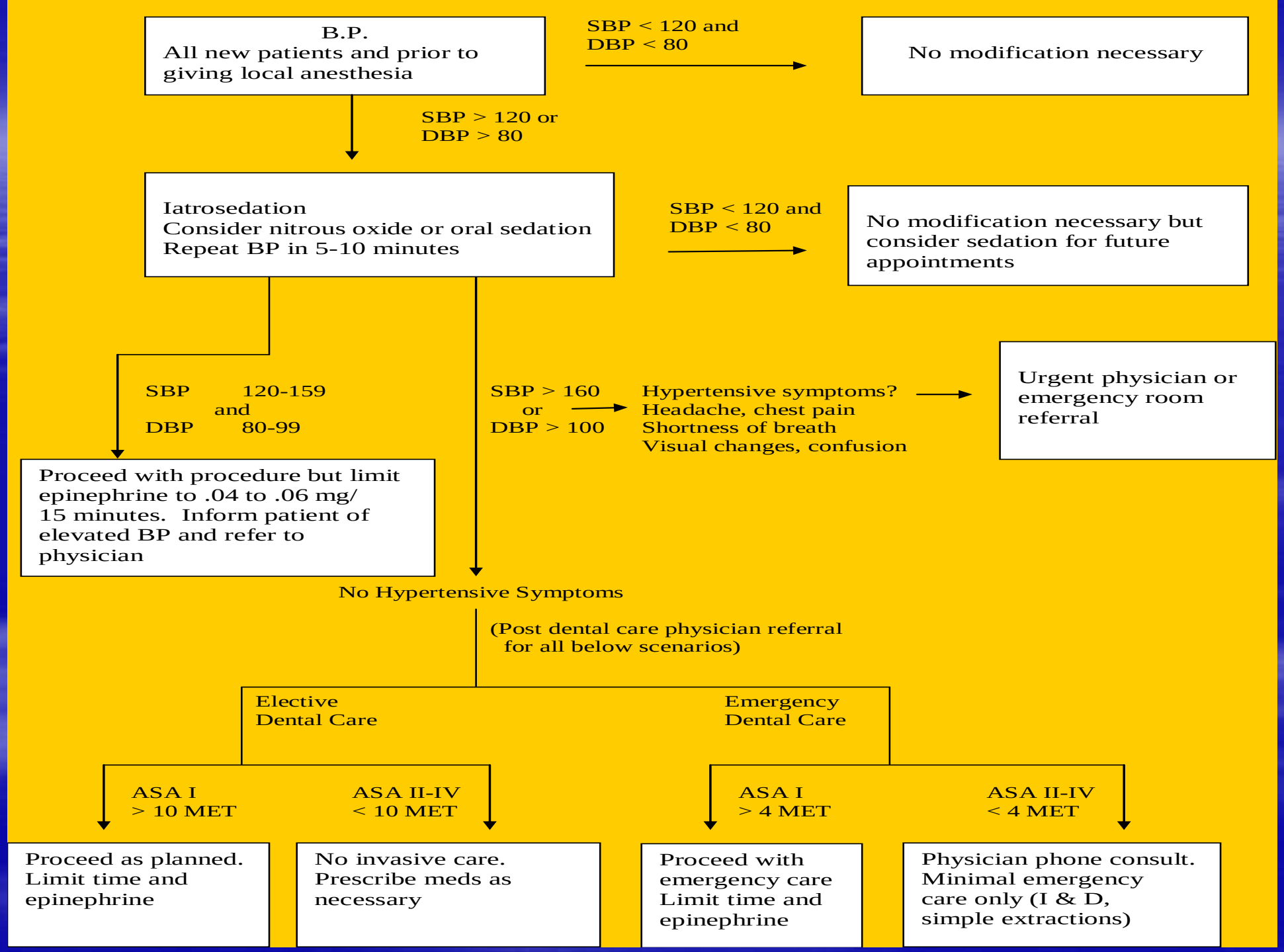
UNMC

COD

C. GUIDELINES FOR PATIENTS WITH HYPERTENSION

Blood Pressure Reading	Action	Dental Treatment
140/90 or below (except severe hypotension)	Usual precautions(e.g., aspiration, etc.)	No restrictions
140/90-165/95	Repeat blood pressure readings at each visit. If readings are consistently between these figures, referral to and consultation with physician is indicated.	Routine preventive and restorative. Sedation or anxiety control may be necessary. Surgery only after consultation.
165/95-180/105	Referral to and consultation with physician required.	Diagnosis
180/105-or above	Immediate referral to and consultation with physician.	None (Emergency treatment on a case-by-case basis

NOTE: Guidelines apply if either systolic or diastolic pressure meets guideline for action. Patients being treated for hypertension need a physician's letter for all readings of 165/95 or above. The requirements and restrictions above are applicable.


B.P.
All new patients and prior to giving local anesthesia
SBP < 120 and DBP < 80
No modification necessary
SBP > 120 or DBP > 80
Iatrosedation
Consider nitrous oxide or oral sedation
Repeat BP in 5-10 minutes
SBP < 120 and DBP < 80
No modification necessary but consider sedation for future appointments
SBP 120-159 and DBP 80-99
SBP > 160 or DBP > 100
Hypertensive symptoms?
Headache, chest pain
Shortness of breath
Visual changes, confusion
Urgent physician or emergency room referral
Proceed with procedure but limit epinephrine to .04 to .06 mg/ 15 minutes. Inform patient of elevated BP and refer to physician
No Hypertensive Symptoms
(Post dental care physician referral for all below scenarios)
Elective Dental Care
Emergency Dental Care
ASA I > 10 MET
ASA II-IV < 10 MET
ASA I > 4 MET
ASA II-IV < 4 MET
Proceed as planned. Limit time and epinephrine
No invasive care. Prescribe meds as necessary
Proceed with emergency care Limit time and epinephrine
Physician phone consult. Minimal emergency care only (I & D, simple extractions)

Grossman E, Nadler M, Sharabi Y, Thaler M, Shachar A, Shamiss A. Antianxiety treatment in patients with excessive hypertension. Am J Hypertens 2005; 18(9 Pt 1):1174-7.

Grossman looked at treating hypertensive patients with 5 mg of diazepam versus the ACE inhibitor, captopril. Patients in this study presented to the emergency room with blood pressure readings greater than 190/100 and responded equally well to both treatments, reducing, on average their systolic blood pressure by an impressive 30 mm Hg, and diastolic values by 25 mm.

J Am Dent Assoc
2020 Apr;151(4):239-244.

Canceling dental procedures due to elevated blood pressure: Is it appropriate?

Steven A Yarows, Olga Vornovitsky, *et al*

Conclusions. To the author's knowledge, there are no prospective study investigators that have addressed whether or when to cancel dental procedures due to office-measured elevated BP. We recommend using current anesthesiology guidelines based on functional status and past BP measurements to prevent unnecessary cancellations.

Practical Implications. It is seldom necessary to cancel dental procedures on the basis of BP measured before a planned procedure for patients under a physician's care.

Canceling an elective, invasive procedure on a frail patient not seen by his or her physician for over 1 year, especially with BP in the 180/110 mm Hg range and dyspnea or chest pain walking to the chair is reasonable. Any intraoperative or immediate postoperative complication in such cases would be hard to defend. However, with no known benefit, the risks and costs of canceling and rescheduling secondary to isolated elevated BP readings in most patients unwarranted. This practice should stop.

So, dentists should be able treat pain/fear/anxiety with techniques other than local anesthesia alone.

Pain/Anxiety Control Techniques

Pharmacologic

- Oral
- Inhalation
- I.M.
- I.V.
- Submucosal
- Others

Non-Drug

- Hypnosis
- Iatrosedation
- Electronic/TENS
- Acupuncture

"Sedation Depth is a Continuum"

Anxious

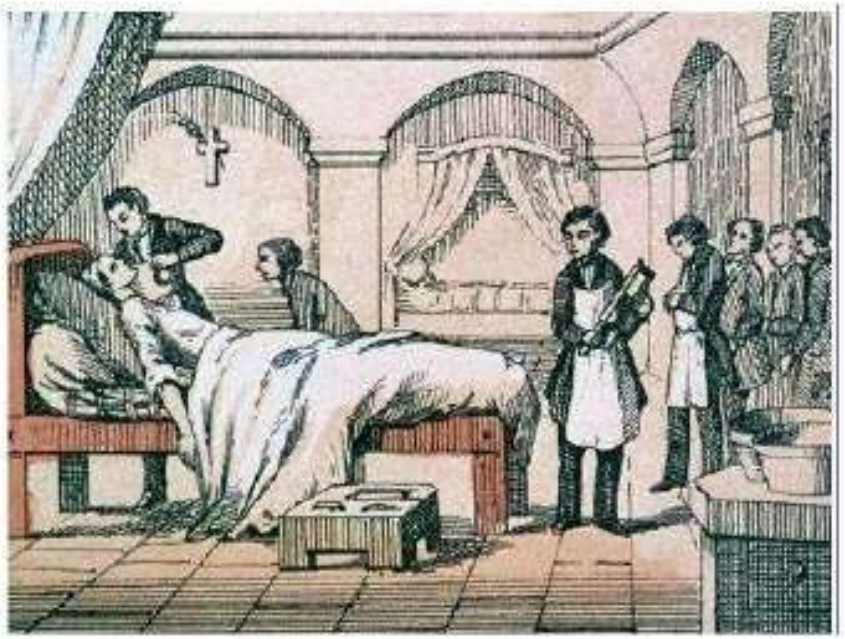
Minimal,.... Moderate,....Deep,.....GA

Dead

Need good local

Historical Perspective

- Original discoverer of general anesthetics
  - Crawford Long: 1842, ether anesthesia
- Chloroform introduced
  - James Simpson: 1847
- Nitrous oxide
  - Horace Wells



19th Century physician administering chloroform

CONTINUUM OF DEPTH OF SEDATION: DEFINITION OF GENERAL ANESTHESIA AND LEVELS OF SEDATION/ANALGESIA*

Committee of Origin: Quality Management and Departmental Administration

(Approved by the ASA House of Delegates on October 13, 1999, and last amended on October 15, 2014)

	Minimal Sedation Anxiolysis	*Moderate Sedation/ Analgesia ("Conscious Sedation")*	*Deep Sedation/ Analgesia*	*General Anesthesia*
Responsiveness	Normal response to verbal stimulation	Purposeful** response to verbal or tactile stimulation	Purposeful** response following repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained	May be impaired

Iatrosedation

- Also known as good chair-side manner, is a non-drug technique where the doctor and his/her staff lessen a patient's fear/anxiety. If a patient perceives empathy, competence, and caring in the dental team, then anxiety is lessened leading to a more positive experience. There are no contraindications to iatrosedation, and it therefore should be applied to all patients.

(Sights, Smells, Sounds)

There are no contraindications to a good bed side manner, and a skilled operator can often relax (sedate) a patients without drugs

Pre-Operative Preparation

The patient, parent, or guardian must be advised regarding the procedure associated with the delivery of any sedative agents and informed consent for the proposed sedation must be obtained. Determination of adequate oxygen supply and equipment necessary to deliver oxygen under positive pressure must be completed. Baseline vital signs (blood pressure, pulse and *oximetry*) must be obtained unless invalidated by the nature of the patient. A focused physical evaluation must be performed (*airway)* including recording the patient's body weight and BMI. Preoperative dietary restrictions must be considered based on the sedative technique prescribed. Pre-operative verbal and written instructions must be given to the patient, parent, escort, guardian or care giver.

Don't Forget: Signed Written Informed Consent for Anesthesia *and* the Procedure

- Must **NOT** be under influence of sedative agent while signing, or validity might be questioned
- Need parent/guardian's signature for minor

ASA PHYSICAL STATUS CLASSIFICATION

ASA physical status	I	II	III	IV	V	VI
Definition	"Healthy"	"Mild systemic disease"	"Severe systemic disease but not incapacitating"	"Incapacitating disease"	"Dying"	"Declared brain death"
Age	> 3 months to < 65 years	≤ 3 months or ≥ 65 to 84 years	≤ 1 month preterm NB or ≥ 85 years			
Functional capacity; walk up 1 flight of stair or 200 m. on the level	Complete without distress	Rest at completion because of distress	Stop en route because of distress	Unable to do		
Medical status	No organic, physiologic, or psychiatric disturbance	Single/multiple systemic disease(s) with good control No functional limitations or vital organ involvement	Poorly controlled systemic disease(s) Some functional limitations No immediate life threatening condition	Poorly controlled systemic disease(s) Significant functional limitation Constant potential threat to life	End stage disease(s) and not expected to survive within 24 hours	Clinically dead patients awaiting organ harvest
Mortality rate (%)	0.06 – 0.08	0.27 – 0.4	1.8 – 4.3	7.8 – 23	9.4 – 51	
Emergency status	In addition to indicating ASA physical status, any patient undergoing an emergency operation is indicated by the suffix "E", e.g., ASA III E					

The concept of metabolic equivalent or METS is in vogue. One MET is defined as 3.5 ml of 02/Kg/min. It essentially is a test of the patient's ability to perform physical work. Some examples are:

1-4 METS (eating, dressing, walking around house, dishwashing)

4-10 METS (climbing stairs – 1 flight, walking level ground 6.4 km/hr, running short distance, game of golf)

≥ 10 METS (swimming, singles tennis, football)

People with capacities of 4 METS or less are at high risk for medical complications, while those who can perform 10 METS or more at very low risk. A person who is anxious with a BP 200/115 but can perform 10 METS of work would likely have no problems with a simple extraction.

Prevent serious medical emergencies in your practice by:

Placing the office in the 3rd or 4th floor of a building without an elevator

Sedation Golden Rules

- Most patients do well with iatrosedation, and one drug, the local anesthetic.
- When administering sedative drugs, one should still use good chair side techniques.
- If you are sedating a patient, then you need to know their medical history even better than if using L.A. alone.

Sedation Golden Rules

- All sedatives/anxiolytics, **regardless of the route of drug administration,** can place the patient into deep sedation or general anesthesia.
- Most morbidity/mortality from dental office sedations are from respiratory arrest.

Sedation Golden Rules

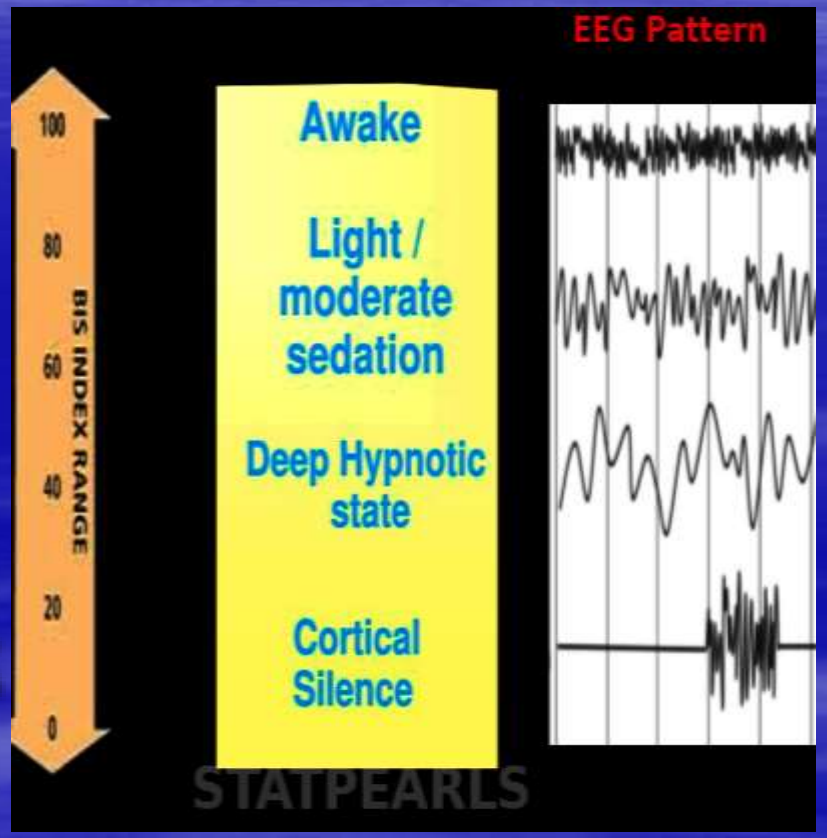
- Patients under 6 or over 65 require special precautions. *(Postoperative cognitive dysfunction)*
- A ~~consciously~~ minimally sedated patient is less likely to have a medical emergency than a person with local anesthesia alone, but general anesthesia is risky on the medically compromised (frail, old and skinny)
- Each state has its own rules and regulations regarding sedation in the dental office.

Monitor

- CNS
- Respiration/Ventilation
- Cardiovascular
- Temperature

CNS

- Sedative drugs effect the CNS first, sensory nerves before motor
- For minimal sedation, the patient should be able to talk and respond appropriately to command



Respiration

- Morbidity/Mortality from outpatient sedations most often are due to respiratory arrest.
- Sedative drugs depress respiratory rate and tidal volume before the cardiovascular system.
- Pulse oximetry is the standard of care for assessing respiration and thus oxygenation.
- Also assess color of blood, breath sounds and respiratory rate
- Capnography (CO_2 monitoring) useful for GA

Pulse Oximetry

- Non-invasively, measures percent oxygenation of hemoglobin in capillary blood
- Also measures heart rate
- Should maintain above 90%

Mandated for Minimal in NE??

Oral Agents

- ETOH
- Barbiturates
- Benzodiazepines
- Antihistamines
- Narcotics
- Others (Sugar?)

They are an intriguing people. From the moment they wake they devote themselves to the perfection of whatever they pursue. I have never seem such discipline.

Comply with state laws, and be the best you can be.

Iowa Admin. Code 650-29.4
Minimal sedation standards

(1) A dentist shall evaluate a patient prior to the start of any sedative procedure. In healthy or medically stable patients (ASA I, II), the dentist should review the patient's current medical history and medication use. For a patient with significant medical considerations (ASA III, IV), a dentist may need to consult with the patient's primary care provider or consulting medical specialist. A dentist shall obtain informed consent from the patient or the patient's parent or legal guardian prior to providing minimal sedation.
(2) Record keeping. A time-oriented anesthesia record must be maintained and must contain the names of all drugs administered, including local anesthetics and nitrous oxide, dosages, time administered, and monitored physiological parameters, including oxygenation, ventilation, and circulation.

3) Minimal sedation for ASA I or II nonpediatric patients.

a. A dentist may prescribe or administer a single medication for minimal sedation via the enteral route that does not exceed the MRD for unmonitored home use. A dentist may administer a supplemental dose of the same drug provided the total aggregate dose does not exceed 1.5 times the MRD on the day of treatment. The dentist shall not administer a supplemental dose until the clinical half-life of the initial dose has passed.

b. A dentist may administer a single medication for minimal sedation via the enteral route that does not exceed the MRD for monitored use on the day of treatment.

c. A dentist may utilize nitrous oxide inhalation analgesia in combination with a single enteral drug.

(4) Minimal sedation for ASA III, ASA IV or pediatric patients.

a. A dentist may prescribe or administer a single medication for minimal sedation via the enteral route for ASA III or IV patients or pediatric patients that does not exceed the MRD for unmonitored home use.

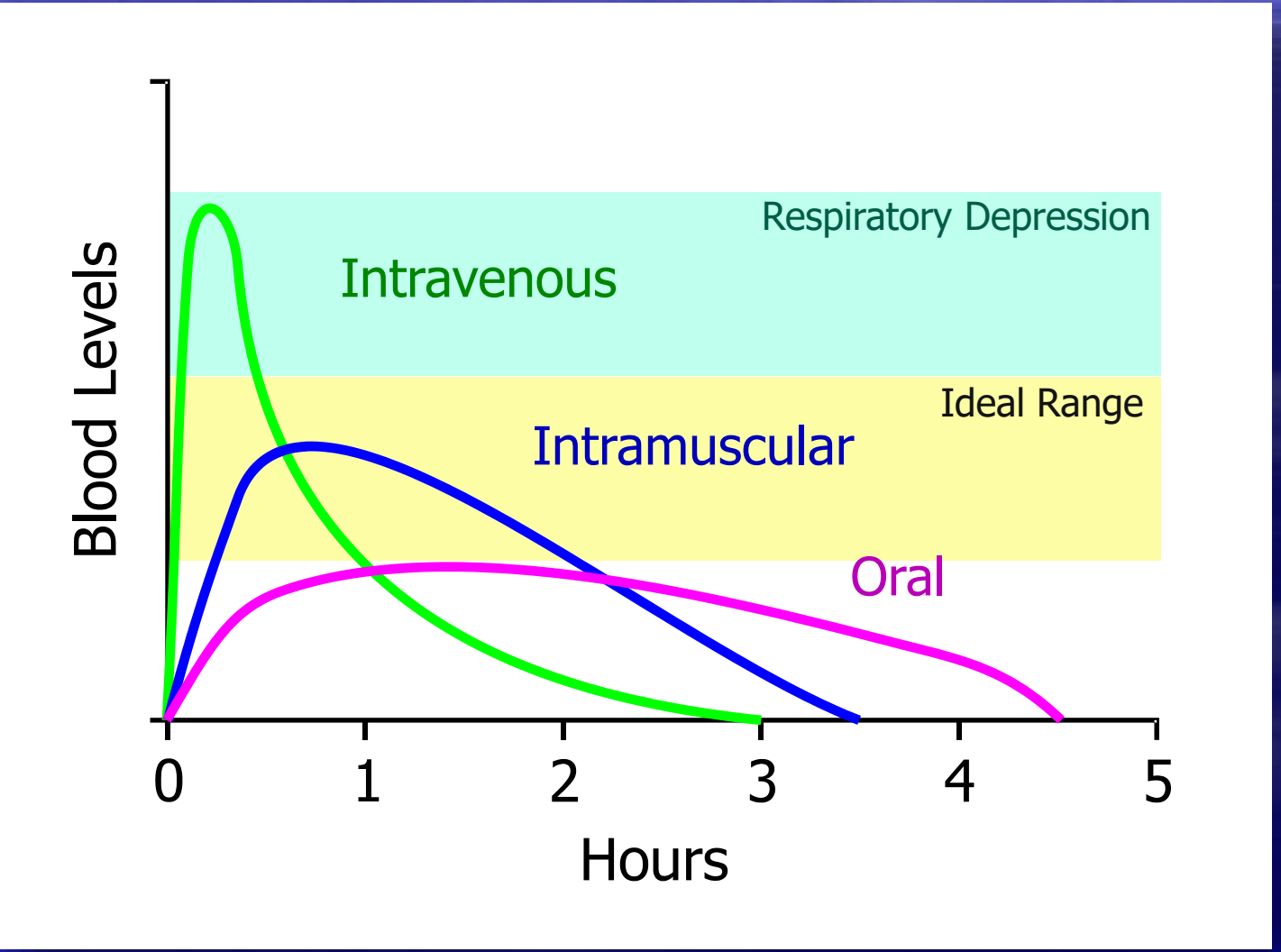
b. A dentist may administer a single medication for minimal sedation via the enteral route that does not exceed the MRD for monitored use on the day of treatment.

c. A dentist may administer nitrous oxide inhalation analgesia for minimal sedation of ASA III or IV patients or pediatric patients provided the concentration does not exceed 50 percent and is not used in combination with any other drug

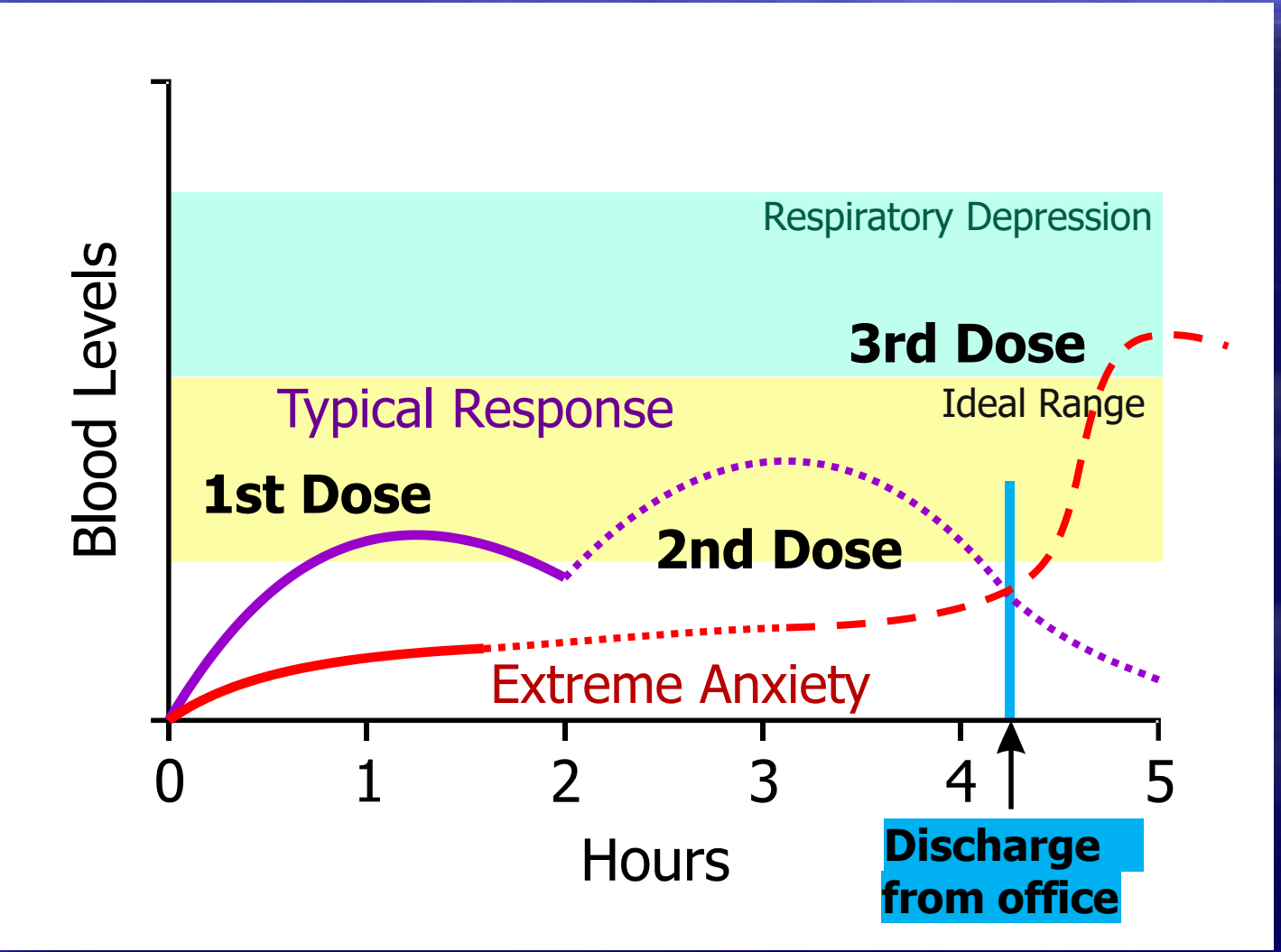
Oral (Enteral)

+	-
▪ Acceptance	▪ Variable absorption
▪ No special skills	▪ First pass effect
▪ Low side effects	▪ Need compliance
▪ No extra equipment	▪ ~ 1 hour to peak, therefore can't easily titrate
▪ Pt. can take night before	▪ May actually reach maximum sedation after discharge!
▪ No extra state permit?	

10 mg Midazolam Administration



0.25 mg Triazolam (oral dose)



Benzodiazepines: The Big 3

- Diazepam (Valium) long half-life (~24 hr.)with active metabolite, cheap 10 mg
- Triazolam (Halcion) popular sleeping pill, short half-life (~3 hours) 0.25 mg
- Midazolam elixir (or mix IV form in juice) (Versed) "Approved" for use in children. rapid absorption 0.5 mg/kg....don't exceed 20 mg

Triazolam

U.S. Brand Names: Halcion

Generic Available: Yes

Children <18 years: Dosage not established.

Adults maximum dose: 0.5 mg/day

Sedation for dental procedure: 0.25 mg taken the evening before oral surgery; and/or 0.25 mg 1 hour before procedure

(Sublingual administration results in a 28 percent greater bioavailability compared with oral administration, in turn resulting in higher plasma concentrations at one to two hours after the drug is administered Sublingual administration of triazolam should produce a faster onset and enhance titration ability by reducing some of the variables associated with oral administration)

Contraindications

Hypersensitivity to triazolam, other benzodiazepines, or any component of the formulation; concurrent therapy with cytochrome P450 3A (CYP 3A) inhibitors including itraconazole, ketoconazole, nefazodone, and several HIV protease inhibitors; pregnancy **(X)**

Pricing

Tablets Halcion

0.25 mg (10): $51.18

Tablets (Triazolam Oral)

0.125 mg (10): $31.89

0.25 mg (100): $274.23

Metabolic Subplots

- CYP3A enzymes in the intestines and the liver metabolize triazolam. Antiretroviral agents inhibit CYP3A, resulting in a two-fold increase in plasma concentrations.
- Other CYP3A4 inhibitors include azole antifungals, ciprofloxacin, clarithromycin, diclofenac, doxycycline, erythromycin, imatinib, isoniazid, nefazodone, nicardipine, propofol, protease inhibitors, quinidine, and verapamil.

Midazolam

U.S. Brand Names: Versed

Decrease dose (by ~30%) if narcotics or other CNS depressants are administered concomitantly. Children <6 years may require higher doses and closer monitoring than older children; calculate dose on ideal body weight.

Children: 0.25-0.5 mg/kg as a single dose preprocedure, up to a maximum of 20 mg; administer 30-45 minutes prior to procedure. Children <6 years and uncooperative patients may require as much as 1 mg/kg as a single dose; 0.25 mg/kg may suffice for children 6-16 years of age.

Pregnancy Risk Factor D

Reversal Agent (Antidote)

ROMAZICON is indicated for the complete or partial reversal of the sedative effects of benzodiazepines in cases where general anesthesia has been induced and/or maintained with benzodiazepines, where sedation has been produced with benzodiazepines for diagnostic and therapeutic procedures, and for the management of benzodiazepine overdose.

ROMAZICON® (flumazenil)

INJECTION

The use of Romazicon has been associated with the occurrence of seizures. These are most frequent in patients who have been on benzodiazepines for long-term sedation or in overdose cases where patients are showing signs of serious cyclic antidepressant overdose. Practitioners should individualize the dosage of Romazicon and be prepared to manage seizures.

For the reversal of the sedative effects of benzodiazepines administered for conscious sedation, the recommended initial dose of ROMAZICON is 0.2 mg (2 mL) administered **intravenously** over 15 seconds. If the desired level of consciousness is not obtained after waiting an additional 45 seconds, a second dose of 0.2 mg (2 mL) can be injected and repeated at 60-second intervals where necessary (up to a maximum of 4 additional times) to a maximum total dose of 1 mg (10 mL).

The intramuscular, subcutaneous and sublingual routes of flumazenil injection have been studied in dogs. Although reversal of midazolam-induced respiratory depression was successful with all injection methods, the mean reversal time was significantly shorter with intravenous administration (120 versus 262 seconds with sublingual administration).

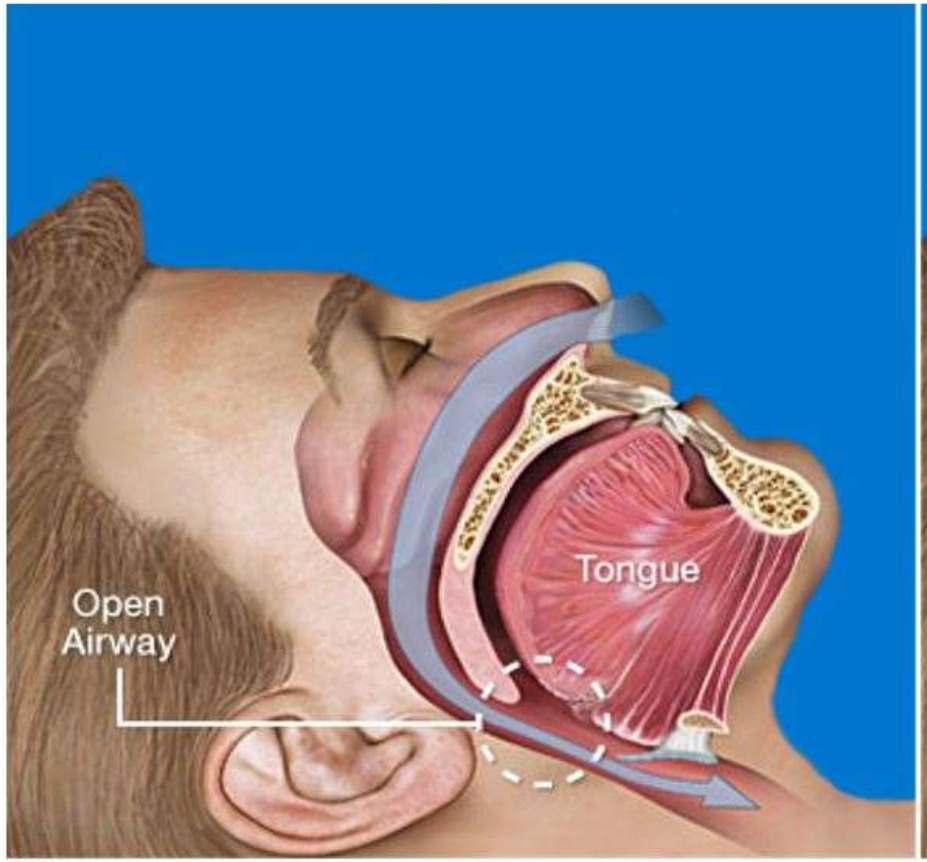
Flumazenil is administered by rapid (over 15–30 seconds) **IV** injection through a freely flowing IV infusion into a large vein. Because of the risk of local irritation, the drug is recommended for IV use only, and extravasation into perivascular tissues should be avoided. Patients should have a secure airway and established IV access prior to administration of the drug.

Minimal Sedation Party Pack:

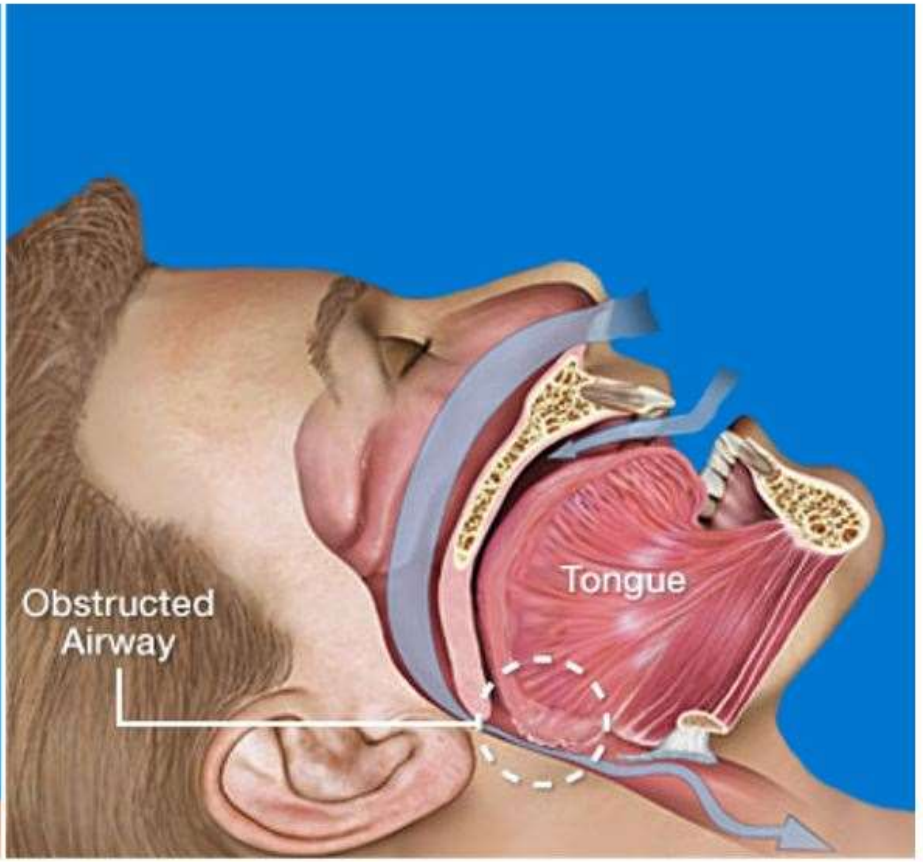
1. Portable Pulse Ox $ 75-300.00
2. Reversal Drugs/Syringes $ 75.00
3. Ambu Bag and several size masks $225.00
4. Oral-Pharyngeal Airways, various sizes, and Tonsillar suction $200.00
5. 2 portable E cylinders and regulators $350.00
6. Preventing major complication…priceless

Narcotics

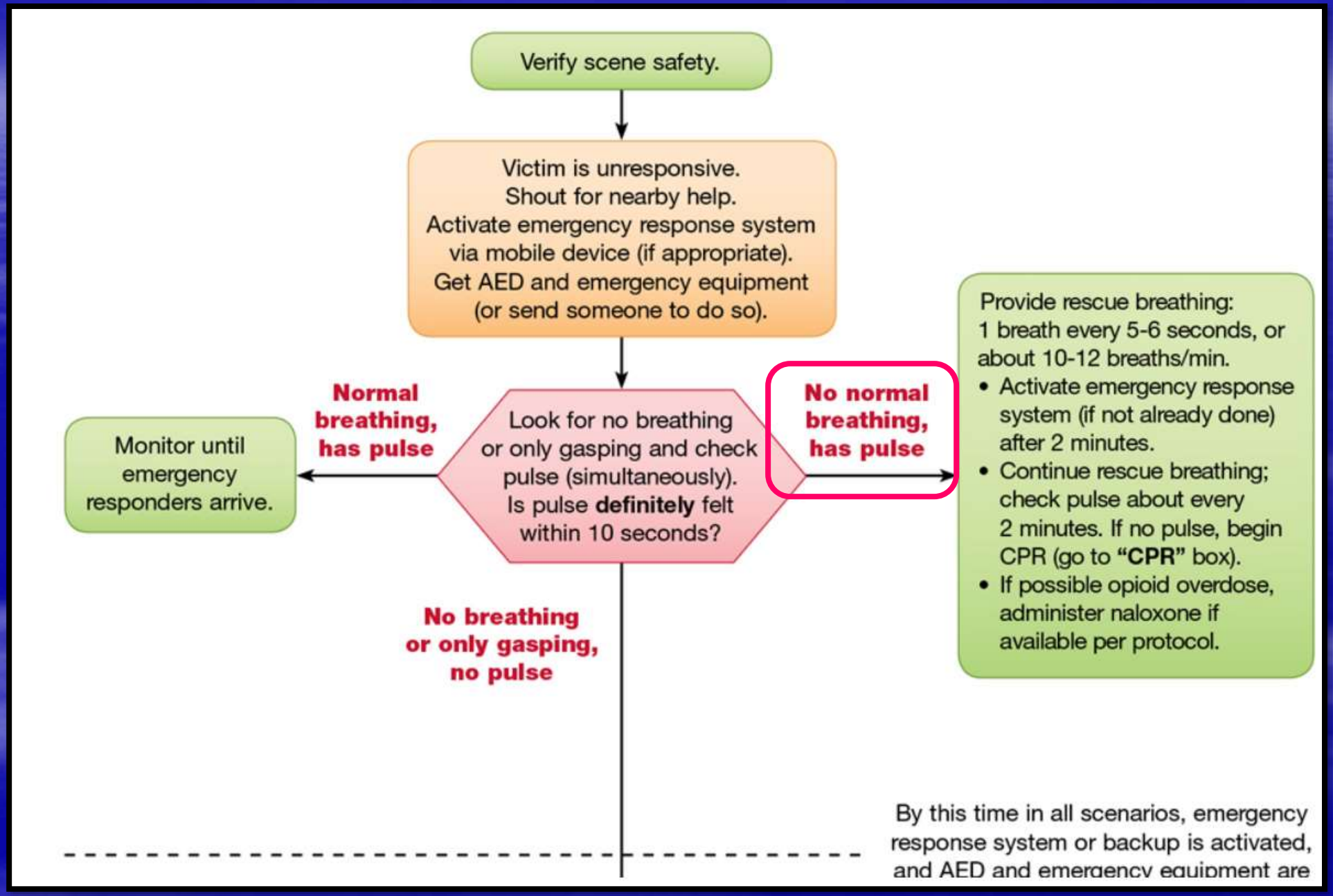
- Provide centrally acting analgesia, sedation, and euphoria
- Always get respiratory depression at therapeutic doses
- Reversal agent available (Narcan)
- Rarely given as sole agent
- Efficacy continues to improve with dose, as does incidence of side effects. *(Can induce GA with nitrous and narcotics)*



Non-Obstructed Airway



Obstructed Airway


Verify scene safety.
Victim is unresponsive.
Shout for nearby help.
Activate emergency response system via mobile device (if appropriate).
Get AED and emergency equipment (or send someone to do so).
Look for no breathing or only gasping and check pulse (simultaneously). Is pulse definitely felt within 10 seconds?
Normal breathing, has pulse
Monitor until emergency responders arrive.
No normal breathing, has pulse
Provide rescue breathing:
1 breath every 5-6 seconds, or about 10-12 breaths/min.
• Activate emergency response system (if not already done) after 2 minutes.
• Continue rescue breathing; check pulse about every 2 minutes. If no pulse, begin CPR (go to "CPR" box).
• If possible opioid overdose, administer naloxone if available per protocol.
No breathing or only gasping, no pulse
By this time in all scenarios, emergency response system or backup is activated, and AED and emergency equipment are

Positive Pressure..
If they ain't breathing, they ain't leavin

Checklist

- Consent
- Medical History (Allergies, Pregnancy?)
- Responsible ride/escort
- Reversal Drugs, Oxygen, Airways ready?
- Baseline Vital Signs, O2 sats
- Discharge Vital Signs, O2 sats
- Document (wheelchair) stable to car?

J Am Dent Assoc. 2016 Apr 13. ***Patient fire during dental care: A case report and call for safety.*** Bosack RC, Bruley ME, Fire risk is present whenever there is a convergence of fuel, oxidizer, and an ignition source, which is called the fire triangle.

CASE DESCRIPTION:

A 72-year-old woman received second-degree facial burns from a fire that ignited near the nasal hood supplying a nitrous oxide-oxygen mixture. The presumed ignition source was heat generated during the preparation of a titanium post with a high-speed, irrigated carbide bur…after possible pulmonary complications were ruled out, the patient was discharged home with second-degree burns.

CONCLUSIONS AND PRACTICAL IMPLICATIONS:

When the source of a fuel cannot be removed from the immediate area, soaked with water, or covered with a water-soluble jelly, the dentist should stop the open flow of oxygen or nitrous oxide-oxygen mixtures to the patient for 1 minute before the use of a potential ignition source, and intraoral suction should be used to clear the ambient atmosphere of oxidizer-enriched exhaled gas.

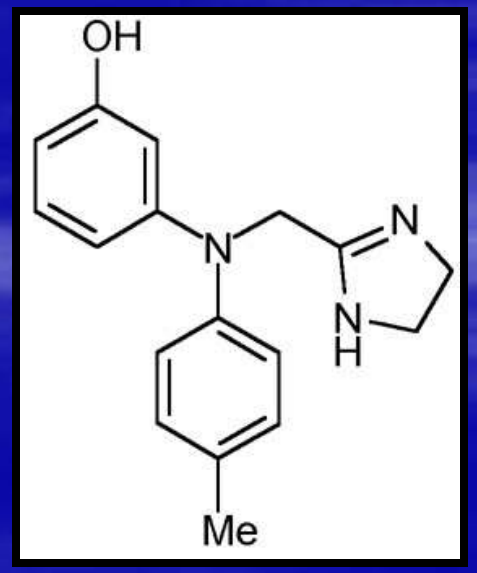
Aust Den 61(2):157-62.

Methoxyflurane on its role in dental

Methoxyflu introduced into
clinical pr sed analgesic
properti ost favour in
genera ate 1970s.
rug
Admin 005. It has
also b ues to be
used i algesic by
emerge e attractive
for use i algesic and
its additio l as its use in
dentistry in analgesic
doses, advers rs should be well
aware of risks as administration, and
carefully assess w ood alternative options
that do not the carry the urane is reviewed below with
an emphasis on its use in dental practice.

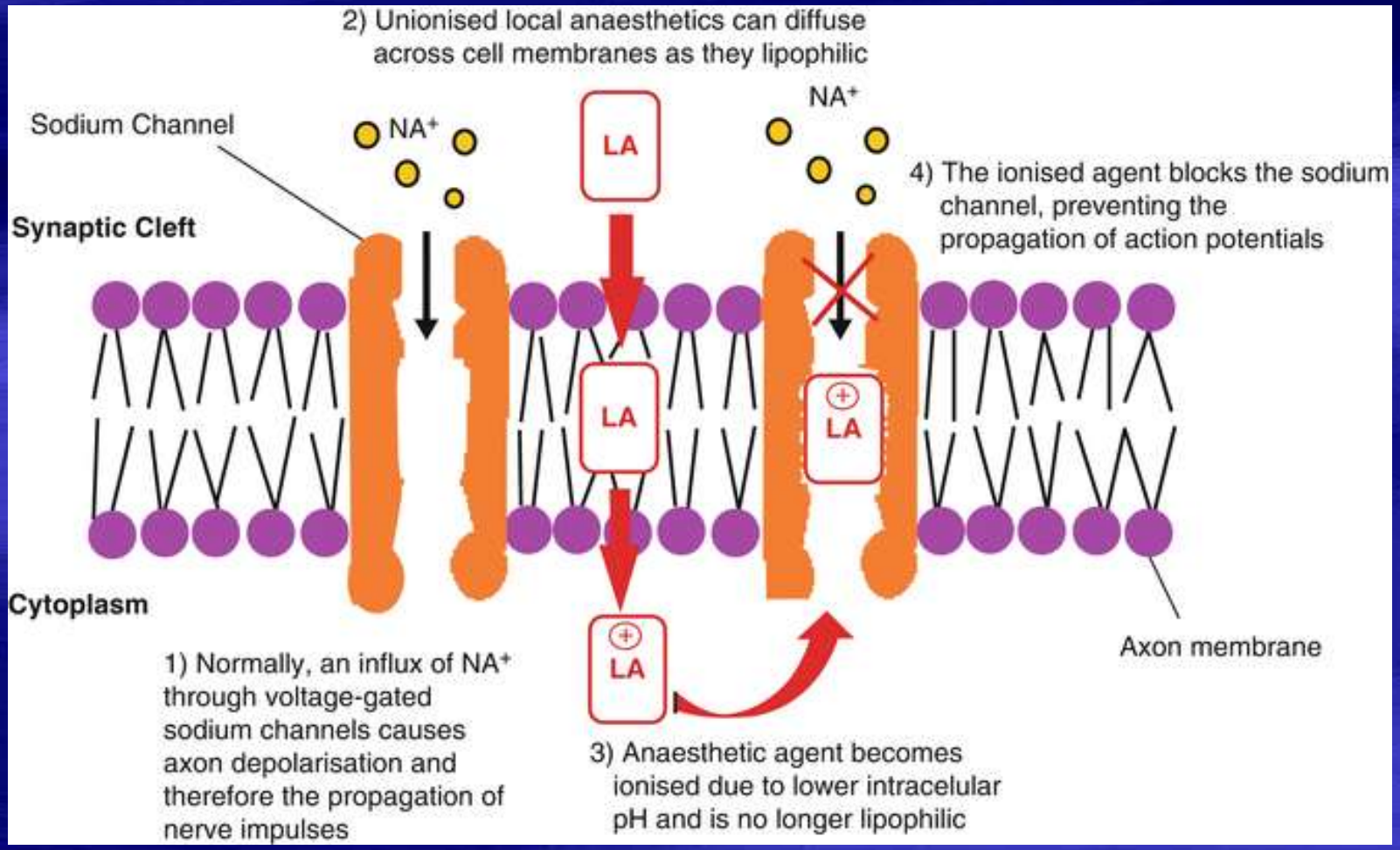
What's New and Groovy in Local

- New Drugs (better efficacy, longer acting?)
- Compounded Topicals
- Buffering
- Novel Delivery Methods
- Reversal Agent



Phentolamine

Local Anesthetic Agents

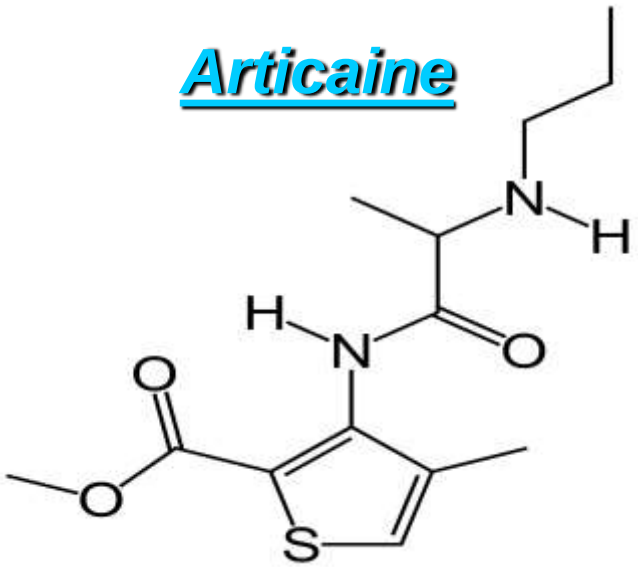


New Drugs

- Articaine
- Ropivacaine

Levobupivacaine

Articaine



Articaine 20 Years Later

Categories: Anesthesia and Sedation

Author(s): Stanley F. Malamed, DDS

Date: 06-24-2020

Prior to the year 2000, dentists in the United States had a choice of four excellent LAs: bupivacaine, lidocaine, mepivacaine, and prilocaine, available in various formulations with and without a vasoconstrictor. *On April 3, 2000*, the United States Food and Drug Administration approved the safety and efficacy of articaine. It entered the dental market in June of that year with the proprietary name Septocaine. Over the next 20 years, articaine has become the second most used dental LA in the United States. Articaine represents the first, and still only, local anesthetic designed specifically for the dental profession.

Articaine…..Bottom Line

- Don’t Use for Mandibular or Lingual Nerve Blocks
- Caution if anesthetizing “entire mouth” all at once
- Slightly better diffusion through bone
- Do use if anesthetizing “entire mouth” over 2 -3 hours (dental school full mouth extractions) Unlike the other amide local anesthetics that undergo metabolism in the liver, the biotransformation of articaine occurs in both the liver and in plasma.

Ropivacaine
Levobupivacaine

- Not “approved” yet for dentistry in USA
- Long acting like Bupivacaine
- Less neuro and cardio toxic
- Ropivacaine is a mild vasoconstrictor
- Levobupivacaine, is actually the “S” enantiomer of “regular” Marcaine

Informed Consent

"The procedure was explained to the patient including its risks benefits and alternatives and all questions were answered."

Consent for local anesthesia too?

"Upgraded Topicals?"

International Academy of Compounding Pharmacists

- Pharmacy Compounding is…
  - the long-established tradition in pharmacy practice that enables physicians to prescribe and patients to take medicines that are specially prepared by pharmacists to meet patients' individual needs.

April 16, 2007

Profound

Profound is a great gel that provides pulpal anesthesia. The gel contains prilocaine, lidocaine and tetracaine (10%/10%/4%) in a loose running mint flavored green gel. We compound the gel in 30g or 45g quantities. The gel should be applied for no longer than 3 minutes to prevent possibility of sloughing- leave on the site for about 2 &1/2 minutes, then rinse thoroughly. We also compound Profound Light which is half the strength and provides good anesthesia for deep cleanings and other work the dental hygienist might do but has less risk of sloughing.

Profound Gel / Profound Light

30g tube - $69.95 mint tube

45g tube - $95.95 mint tube

$5.00 charge to change flavor to Tutti Fruity, Bubblegum, Strawberry, Cherry, Shipping for CA - $8.95

Buffering

- pH of LA with epi ~ 3.5
- Buffering (adding Na Bicarbonate) before injection raises pH closer to tissue (~7.4)
- Theoretically faster onset and less pain
- Equivocal results on skin and intraorally
-  Must mix right before, sterility/strength subplots

Anesth Prog. 2010 Summer;57(2):59-66. **A prospective, randomized, double-blind study of the anesthetic efficacy of sodium bicarbonate buffered 2% lidocaine with 1:100,000 epinephrine in inferior alveolar nerve blocks.**

Whitcomb M, Drum M, Reader A, Nusstein J, Beck M.

"We concluded that buffering a 2% lidocaine with 1:100,000 epinephrine with sodium bicarbonate, as was formulated in the current study, did not statistically increase anesthetic success, provide faster onset, or result in less pain of injection when compared with unbuffered 2% lidocaine with 1:100,000 epinephrine for an IAN block."

Local Anesthesia.....Some patients don't like that persistent swollen/numb feeling*

Why not "reverse" the local?

**Often beneficial following surgery*

October 2006 NOVALAR Announces Positive Phase 3 Results For Novel Dental Anesthesia Reversal Agent

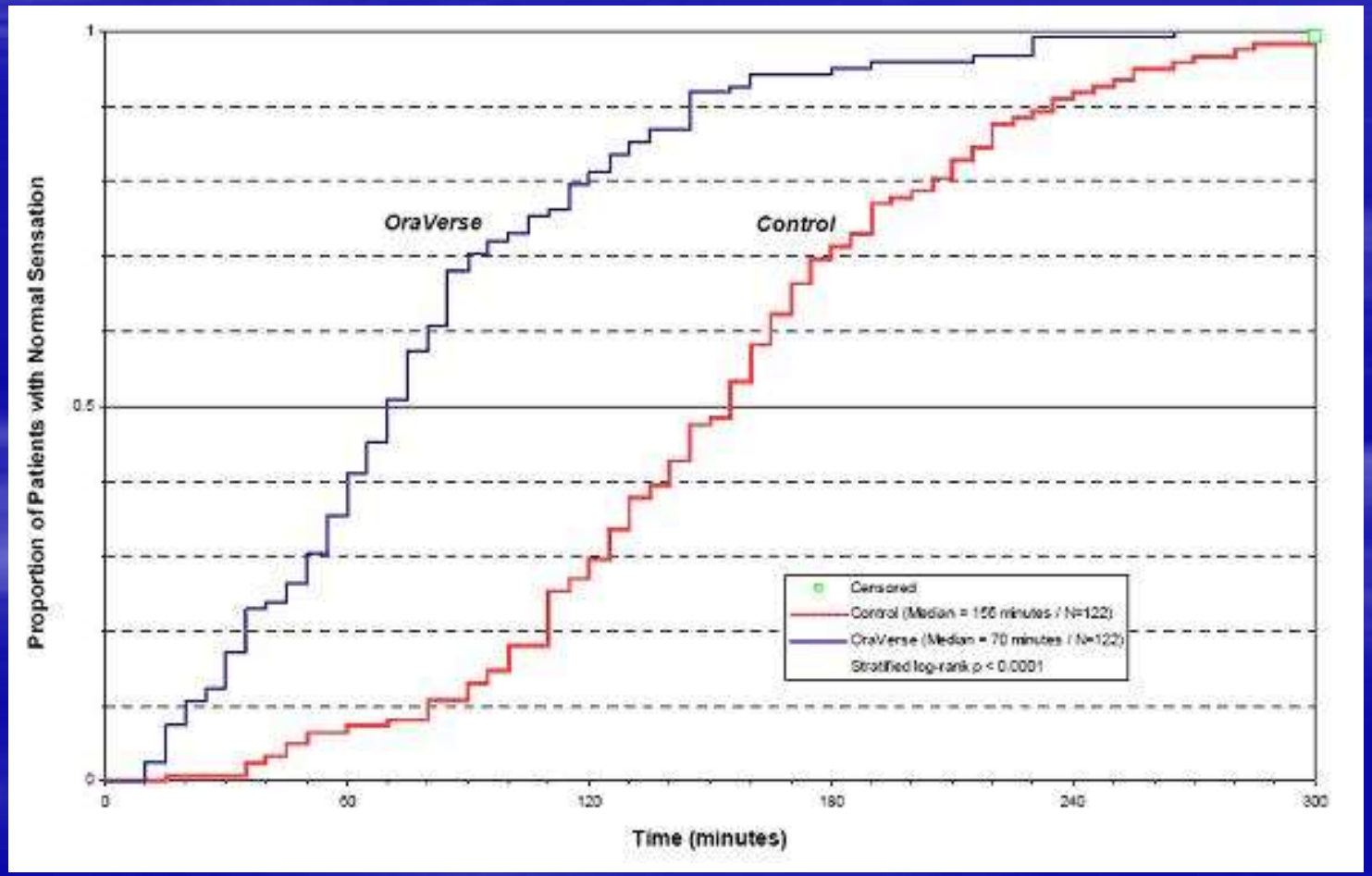
Novalar Pharmaceuticals, Inc. today announced that NV-101, a local dental anesthetic reversal agent, was well tolerated and met its primary endpoints in two pivotal Phase 3 studies. In both trials, NV-101 treated patients reported the return of sensation in less than half the amount of time it normally took after receiving local dental anesthesia.

Novalar Raises $30 Million in Series D Financing

Nov. 1 2007 - Novalar Pharmaceuticals, Inc., a specialty pharmaceutical company focused on developing and in-licensing novel oral healthcare solutions, announced today that it has closed a $30 million Series D financing. The proceeds will be used to support the U.S. launch of NV-101, a first-in-class, local dental anesthetic reversal agent, and the development of other innovative dental pharmaceuticals in Novalar's pipeline.

If approved by the FDA, NV-101 will be the only local anesthetic reversal agent that accelerates the return to normal sensation and function following restorative and periodontal maintenance procedures. The product has been tested in pediatric, adolescent and adult patients. **Phentolamine mesylate** (a vasodilator), the active ingredient in the investigational agent NV-101, has been approved and in use in specific medical indications significantly higher doses for over 50 years.

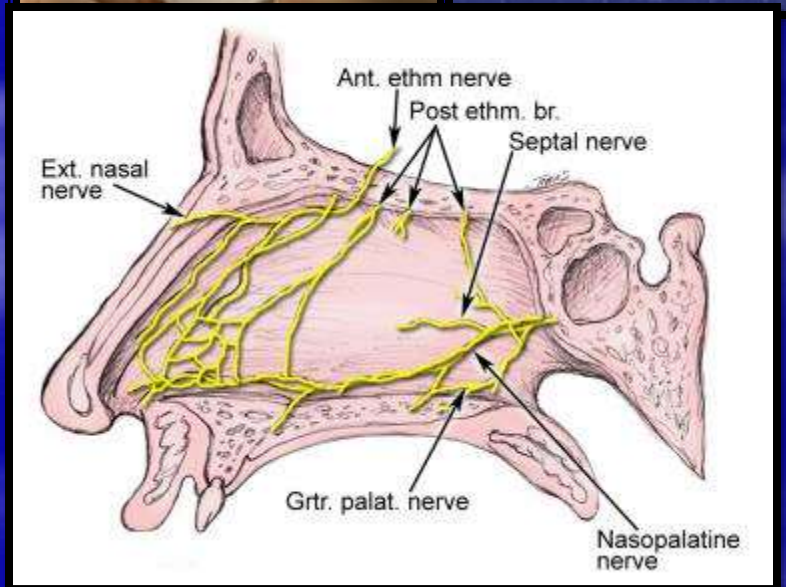
Median time to recovery of normal function was reduced by 60 minutes (50%) in the mandible and by 45 minutes (43%) in the maxilla compared to control. Median time to recovery of normal tongue sensation was reduced by 65 minutes (52%) compared to control. Median time to recovery of normal function was reduced by 60 minutes (50%) in the mandible and by 45 minutes (43%) in the maxilla.

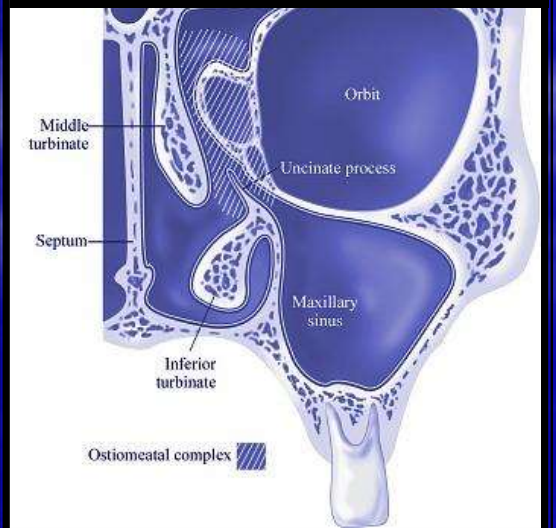


INDICATIONS AND USAGE

OraVerse is indicated for the reversal of soft-tissue anesthesia, i.e., anesthesia of the lip and tongue, and the associated functional deficits resulting from an intraoral submucosal injection of a local anesthetic containing a vasoconstrictor. OraVerse is not recommended for use in children less than 6 years of age or weighing less than 15 kg (33 lbs). In pediatric patients weighing less than 30 kg (66 lbs), the maximum dose of OraVerse recommended is 1/2 cartridge (0.2 mg).

Up your nose with a local anesthetic?





J Dent Res. 2013 Jul;10.

Safety and efficacy of a novel nasal spray for maxillary dental anesthesia.

Ciancio SG, Hutcheson MC, Ayoub F, University at Buffalo

45 healthy adults requiring restoration of one maxillary tooth were randomized in a 1:2 ratio to receive (1) an intra-oral lidocaine-epinephrine injection with buffered saline nasal spray bilaterally, or (2) a tetracaine hydrochloride-oxymetazoline hydrochloride nasal spray bilaterally with sham injection.

Tetracaine hydrochloride-oxymetazoline nasal spray appears to provide adequate and safe anesthesia for the majority of maxillary dental procedures. Based on the results from this Phase 2 study, pivotal trials are warranted to validate these findings in an expanded patient population.

J Am Dent Assoc. 2016 April

Double-masked, randomized, study to evaluate the efficacy and tolerability of intranasal K305 (3% tetracaine plus 0.05% oxymetazoline) in anesthetizing maxillary teeth.

Hersh EV, Pinto A, Saraghi M,

The authors compared the local anesthetic efficacy and safety of an intranasally administered formulation of tetracaine and oxymetazoline (K305) with placebo in adult participants undergoing single dental restorative procedures in teeth nos. 4 through 13 .METHODS: The authors screened and allocated 150 participants in a double-masked, randomized fashion to either K305 or placebo nasal spray. The authors delivered the study drug as two 0.2-milliliter sprays separated by 4 minutes inside the nostril on the side ipsilateral to the tooth being treated. The authors administered a third 0.2-mL spray, if necessary, and administered 4% articaine with 1:200,000 epinephrine by means of injection if anesthesia was inadequate. Safety evaluations included participant reports of adverse events, vital signs, and alcohol sniff tests during the 2-hour study period and at a 1-day follow-up visit. The primary efficacy end point was anesthetic success defined as the completion of the dental procedure without the need for rescue injectable local anesthetic.

RESULTS: The overall success rates were 88.0% (95% confidence interval, 80.0-93.6) and 28% (95% confidence interval, 16.2-42.5) for K305 and placebo, respectively ($P < .0001$). The most frequent adverse effects in the K305 group were rhinorrhea (57.0%) and nasal congestion (26.0%). No serious adverse events occurred during this study.

CONCLUSIONS: K305 was effective and well tolerated during restorative procedures in adult participants.

The Cost:

As would be expected- this product does cost more than our traditional anesthetic. The cost to us is $44 per side- we will be charging $45 per side to our patients that want it. It is completely optional, but for those patients that are interested it is available.

ANESTHESIA DEVICE

DENTAL ADVISOR
2022
TOP AWARD
WINNER

DENTAL ADVISOR

Calaject™
(RØNVIG Dental Manufacturing)

If we can keep a patient numb for 2-3 days after surgery, we can reduce the need for narcotics

If we can keep a patient numb for 2-3 days after surgery, we can reduce the need for narcotics

Why Keep numb for ~ 3 days?

- Major Surgery
- Dry Socket
- Drug seeking patients
- Palliate “hot tooth” until can get in for the endo?
- Reduce the need for opiates, {duh}

New C-Code and D-Code for EXPAREL

Starting January 1, 2019

C9290: For procedures performed in ASCs

The Centers for Medicare and Medicaid Services (CMS) has reinstated a unique, product-specific billing code, or C-code (C9290), for EXPAREL.

Download reimbursement materials for C-code

- Resource Guide
- Biller Postcard

D9613: For dental procedures

In addition, a separate D-code —D9613— defined as the infiltration of sustained-release therapeutic drug (single or multiple sites) was established, which will allow for reimbursement of EXPAREL in oral surgery procedures.

Download reimbursement materials for D-code

- Aetna Dental Fact Sheet
- D9613 Dental Code Announcement

EXPAREL is not recommended to be used in the following patient population: patients <18 years old and/or pregnant patients

J Endod. 2016 Dec;42(12):1707-1712.

Pain Reduction in Untreated Symptomatic Irreversible Pulpitis Using Liposomal Bupivacaine (Exparel): A Prospective, Randomized, Double-blind Trial.

Bultema K[1], *Fowler S*[2]

CONCLUSIONS:

Although liposomal bupivacaine had some effect on soft tissue anesthesia, it did not reduce pain to manageable clinical levels in patients presenting with untreated, symptomatic irreversible pulpitis

Annals of Pharmacotherapy
Volume 57, Issue 1, January 2023, Pages 71-85
Review Article - New Drug Approval

Bupivacaine/meloxicam ER: A New Dual-acting Extended-Release Local Anesthetic for Opioid-Sparing Postoperative Pain Management

Taylor Bourn, PharmD and Sister
Michaela Serpa, PharmD, BCPS

ZYNRELEF™

(bupivacaine and meloxicam)

extended-release solution

Which is true?

A. Leaving behind a portion of a tooth when extracting is good

B. Extracting mandibular 3rd molars improves taste

C. Extracting a tooth, culturing pulp cells and injecting into brain of stroke victim aids recovery

D. Amoxicillin fails to prevent bacteremia ~ 40% of the time

E. Instead of crown lengthening, one can partially extract a tooth, splint in place for awhile, and *voila*

F. The best time to remove 3rd molars is around age 8

G. Nebraska will win the big 10 football title next year

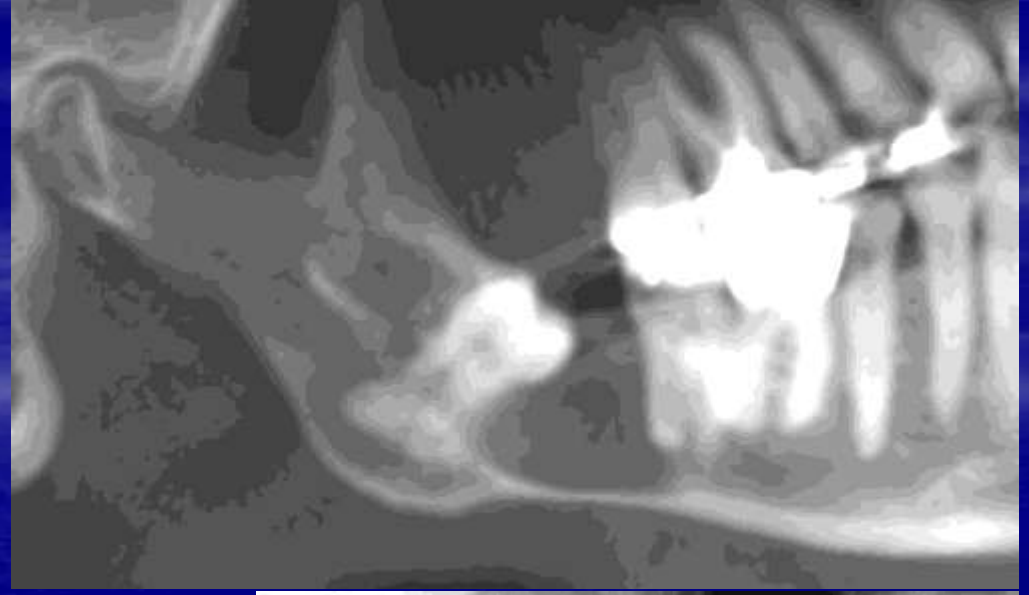
Benefits of Coronectomy in Lower Third Molar Surgery: A Systematic Review and Meta-analysis

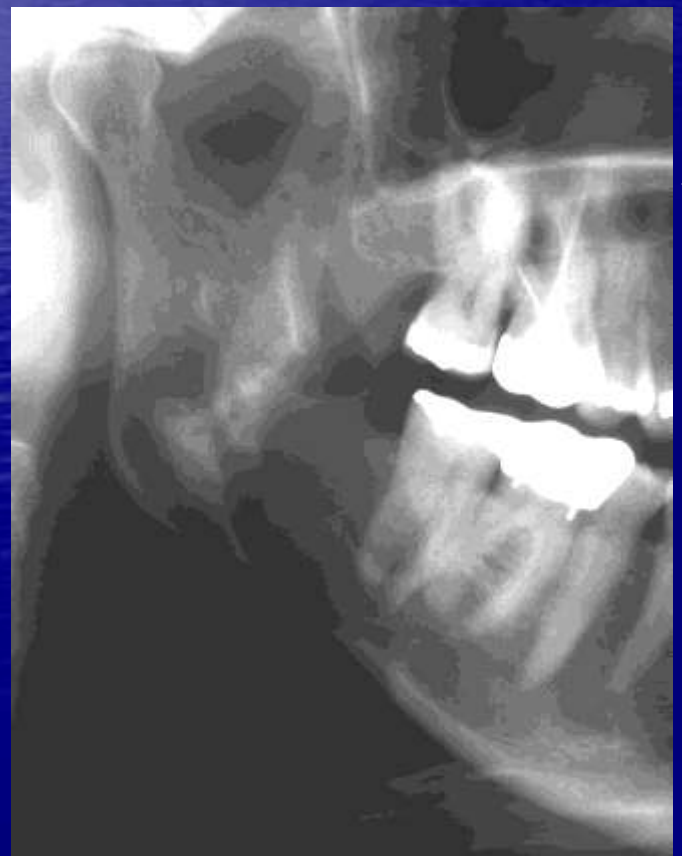
J Oral Maxillofac Surg 2024 Jan;82(1):73-92.

Alexandre de Oliveira Peixoto Andressa Bolognesi Bachesk Marilia de Oliveira et al

Of the 1,017 articles found, after applying the inclusion and exclusion criteria, 42 were included in this study including 3,095 patients from 18 countries.
Conclusions: This study has demonstrated that coronectomy is associated with a decreased risk for IAN injury and decreased pain and localized alveolitis when compared to complete tooth extraction

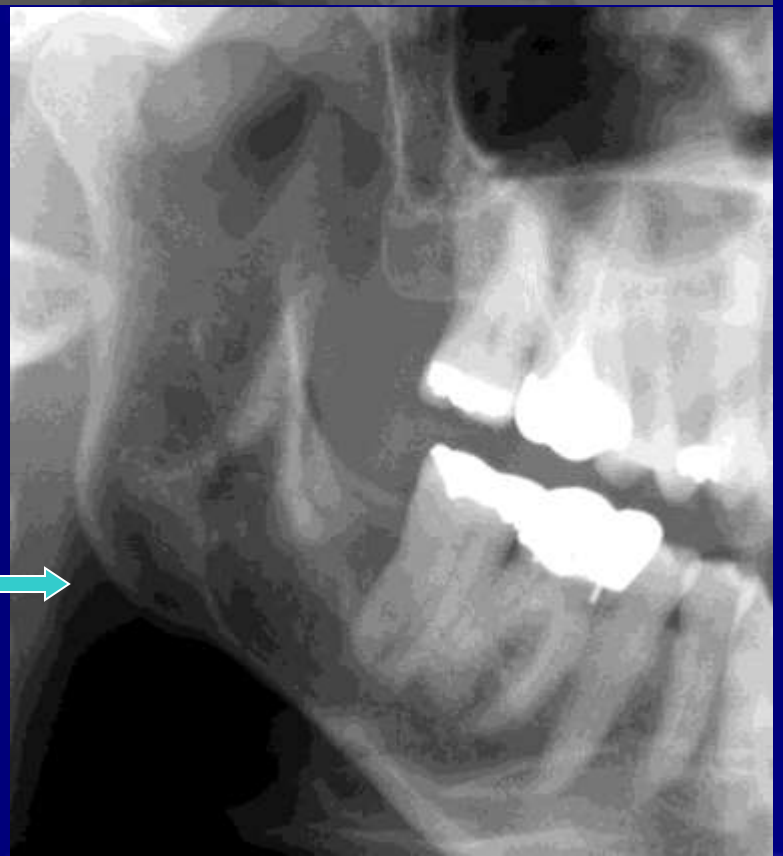
Pre-op (Oral bisphosphonates X 5 years)



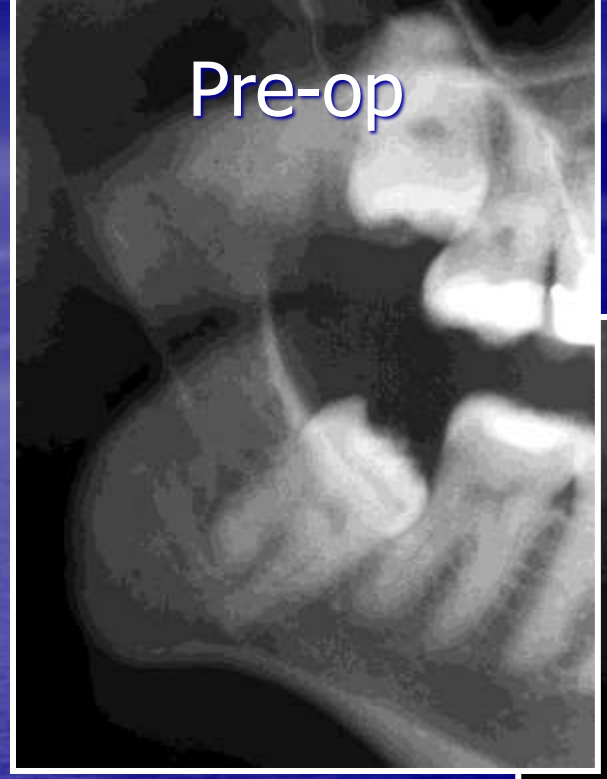


Immed Post

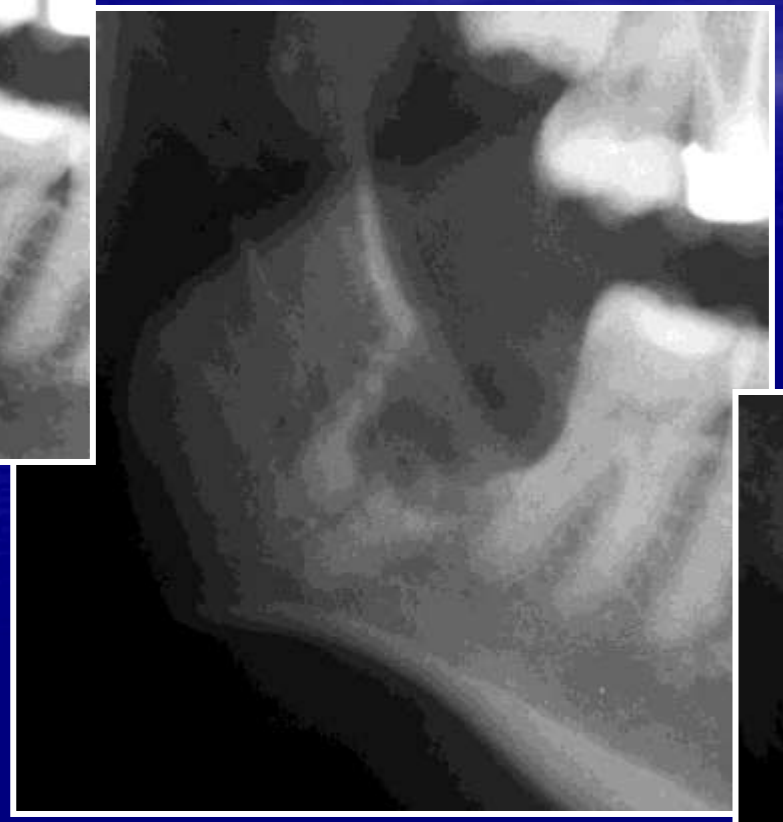
10 month post



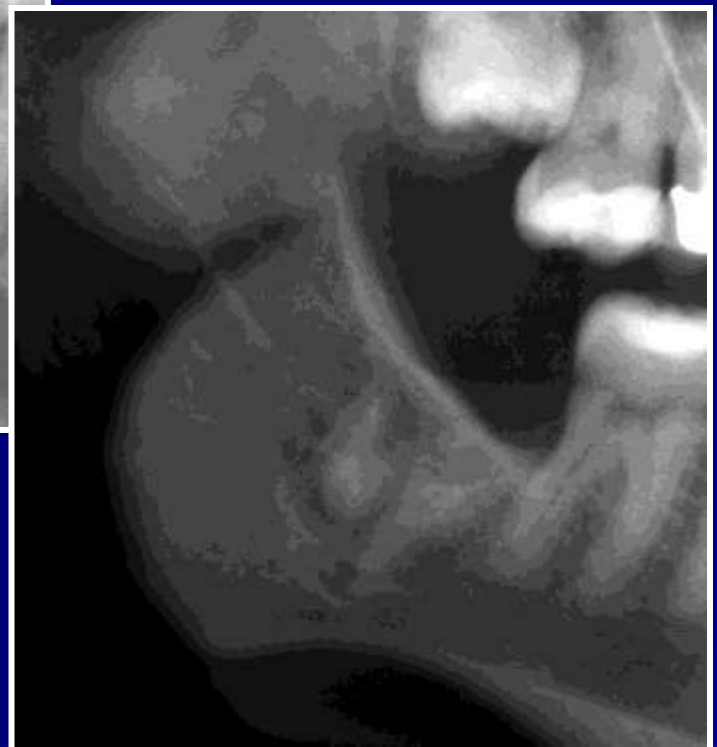
Pre-op



Immed. Post-op



9-month Post



V3 WNL ☺

Leaving behind a portion of a tooth when extracting is good...Part 2

The socket-shield technique: a proof-of-principle report.

Hürzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouilidis N, Fickl S.

J Clin Periodontol. 2010 Sep;37(9):855-62.

Proximal socket shield for interimplant papilla preservation in the esthetic zone.

Kan JY, Rungcharassaeng K.

Int J Periodontics Restorative Dent. 2013 Jan-Feb;33(1):e24-31

The socket-shield technique: first histological, clinical, and volumetrical observations after separation of the buccal tooth segment – a pilot study.

Bäumer D, Zuhr O, Rebele S, Schneider D, Schupbach P, Hürzeler M.

Clin Implant Dent Relat Res. 2015 Feb;17(1):71-82.

Papilla preservation between two implants: a modified socket-shield technique to maintain the scalloped anatomy? A case report.

Cherel F, Etienne D.

Quintessence Int. 2014 Jan;45(1):23-30.

RESULTS BY YEAR

TEXT AVAILABILITY

- [ ] Abstract
- [ ] Free full text
- [ ] Full text

ARTICLE ATTRIBUTE

- [ ] Associated data

ARTICLE TYPE

- [ ] Books and Documents
- [ ] Clinical Trial
- [ ] Meta-Analysis
- [ ] Randomized Controlled Trial
- [ ] Review
- [ ] Systematic Review

PUBLICATION DATE

- ( ) 1 year
- ( ) 5 years
- ( ) 10 years
- ( ) Custom Range

Additional filters

Reset all filters

1 Cite Share

Effectiveness of the **socket shield** technique in dental implant: A systematic review.

Ogawa T, Sitalaksmi RM, Miyashita M, Maekawa K, Ryu M, Kimura-Ono A, Suganuma T, Kikutani T, Fujisawa M, Tamaki K, Kuboki T.

J Prosthodont Res. 2022 Jan 11;66(1):12-18. doi: 10.2186/jpr.JPR_D_20_00054. Epub 2021 Mar 9.

PMID: 33692284 Free article.

The failure rate was low without the complications, although there were some failures due to failed implant osseointegration, **socket shield** mobility and infection, **socket shield** exposure, **socket shield** migration, and apical root resorptio ...

2 Cite Share

Socket shield technique.

Wadia R.

Br Dent J. 2021 Mar;230(6):362. doi: 10.1038/s41415-021-2851-0.

PMID: 33772190 No abstract available.

3 Cite Share

Socket shield technique: A systematic review of human studies.

Sáez-Alcaide LM, González Fernández-Tresguerres F, Cortés-Bretón Brinkmann J, Segura-Mori L, Iglesias-Velázquez O, Pérez-González F, López-Pintor RM, Torres García-Denche J.

Ann Anat. 2021 Nov;238:151779. doi: 10.1016/j.aanat.2021.151779. Epub 2021 Jun 1.

PMID: 34087383 Review.

The aim of this review is to evaluate the medium- and long-term clinical outcomes of the **socket shield** technique in human studies. MATERIAL AND METHODS: This review was conducted according to PRISMA guidelines. ...CONCLUSIONS: Based on the results of this review, it ...

4 Cite Share

The **socket-shield** technique: a critical literature review.

Blaschke C, Schwass DR.

Int J Implant Dent. 2020 Sep 7;6(1):52. doi: 10.1186/s40729-020-00246-2.

PMID: 32893327 Free PMC article. Review.

MATERIAL AND METHODS: This study aims to collect and evaluate the present knowledge with regard to the **socket-shield** technique as described by Hurzeler et al. (J Clin Periodontol 37(9):855-62, 2010). ...Retrospective studies exist in limited numbers but are of incon ...

5 Cite Share

Socket shield technique: An unconventional method for immediate implant placement - A review.

Sharma A, Maheshwari K, Tiwari B, Naik D.

Natl J Maxillofac Surg. 2022 Aug;13(Suppl 1):524-535. doi: 10.4103/njms.NJMS_53_20. Epub 2022 May 5.

PMID: 36393931 Free PMC article. Review.

The aim of this review is to present the currently available studies on the treatment outcome of **socket shield** technique (SST) with an attempt to compare it with the conventional technique for immediate implant placement. ...

6 Cite Share

The **socket-shield** technique: a proof-of-principle report.

Hürzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouilidis N, Fickl S.

J Clin Periodontol. 2010 Sep;37(9):855-62. doi: 10.1111/j.1600-051X.2010.01595.x.

PMID: 20712701

Therefore, the objective of this proof-of-principle experiment was to histologically assess a partial root retention (**socket-shield** technique) in combination with immediate implant placement. ...On the buccal side, the tooth fragment was attached to the buccal bone ...

7 Cite

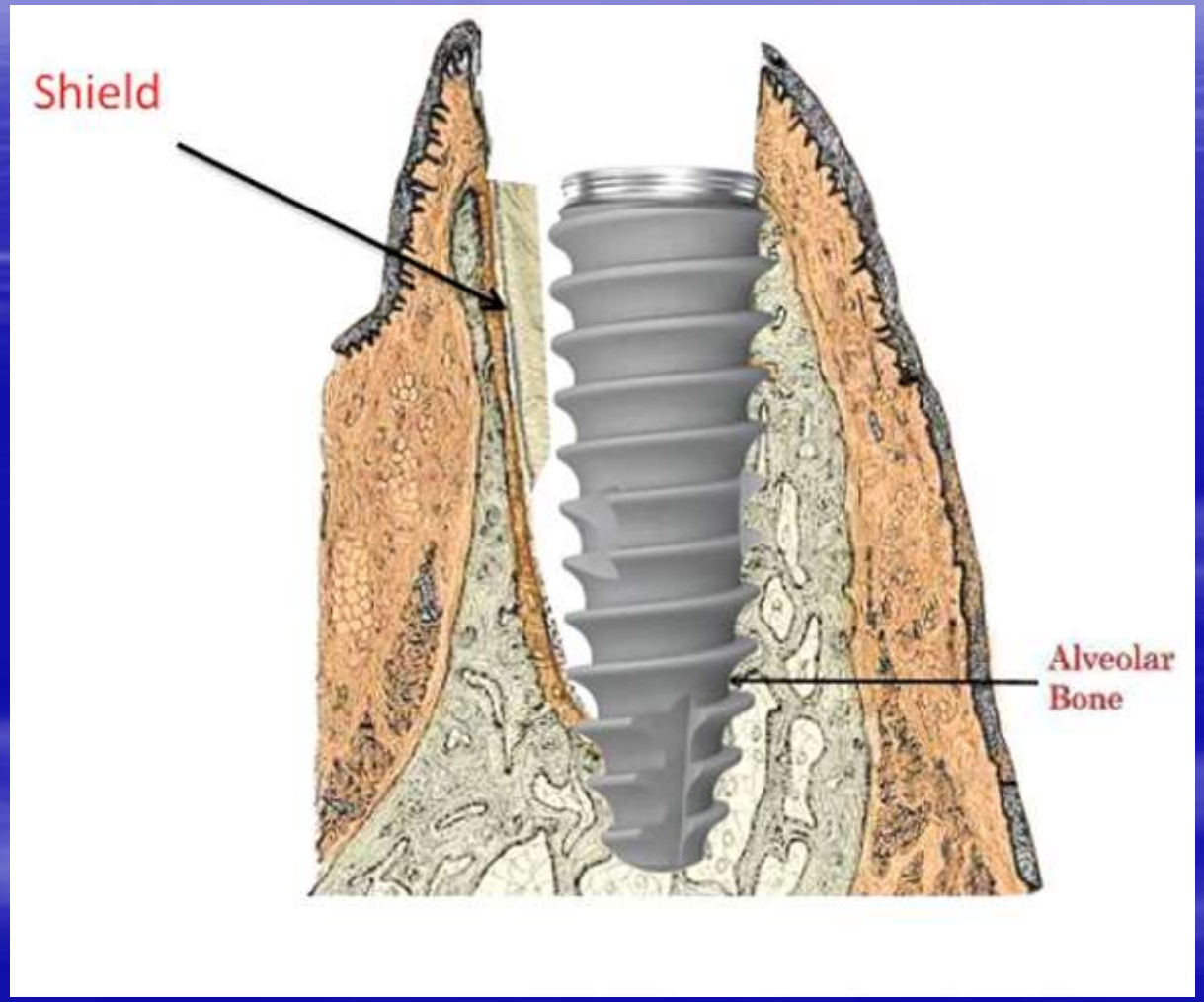
Socket shield technique: Stress distribution analysis.

Neves RG, Lazari-Carvalho PC, Carvalho MA, Carvalho AL, de Souza JB, Torres ÉM.

J Indian Soc Periodontol. 2023 Jul-Aug;27(4):392-398. doi: 10.4103/jisp.jisp_356_22. Epub 2023 Jul 1.

The problem with grafting of sockets, or even placing the implant the same day as the extraction, is the PDL, with its blood supply to the thin labial plate is lost…..ridge resorption still happens.

The socket shield or root membrane technique


Shield
Alveolar
Bone

Extracting mandibular 3rd molars improves taste

Positive Long-Term Effects of Third Molar Extraction on Taste Function **Dane Kim , Richard L Doty Chem Senses. 2021; 46**

We retrospectively examined the whole-mouth taste function of 891 individuals who had received TMEs, on average, more than 2 decades earlier, and 364 individuals who had not. All had been extensively tested for chemosensory function at the University of Pennsylvania. The whole-mouth identification test incorporated 2 presentations each of 5 different concentrations of sucrose, sodium chloride, citric acid, and caffeine. Those with histories of TME to exhibit better overall test scores for all 4 taste qualities than nonoperated controls. The basis of this phenomenon, which requires confirmation from prospective studies, is unknown, but could reflect sensitization of CN VII nerve afferents or the partial release of the tonic inhibition that CN VII exerts on CN IX via central nervous system processes.

Extracting a tooth, culturing pulp cells and injecting into brain of stroke victim aids recovery

- Studies have shown that dental pulp stem cells promote the regeneration of stroke tissue by inhibiting the early inflammatory response after stroke, directly inhibiting the release of axon growth inhibitory factor in the form of paracrine, differentiating into mature neurons and oligodendrocytes, and increasing angiogenesis around infarction

RESULTS BY YEAR

TEXT AVAILABILITY

- [ ] Abstract
- [ ] Free full text
- [ ] Full text

ARTICLE ATTRIBUTE

- [ ] Associated data

ARTICLE TYPE

- [ ] Books and Documents
- [ ] Clinical Trial
- [ ] Meta-Analysis
- [ ] Randomized Controlled Trial
- [ ] Review
- [ ] Systematic Review

PUBLICATION DATE

- ( ) 1 year
- ( ) 5 years
- ( ) 10 years
- ( ) Custom Range

Additional filters

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1 Cite Share

Dental Pulp Stem Cells as a Therapeutic Strategy for Ischemic **Stroke**.

Nito C, Suda S, Nitahara-Kasahara Y, Okada T, Kimura K.

Biomedicines. 2022 Mar 22;10(4):737. doi: 10.3390/biomedicines10040737.

PMID: 35453487 Free PMC article. Review.

Numerous experimental studies have shown that cellular therapy, including the use of human **dental pulp stem** cells, is an attractive strategy for patients with ischemic brain injury. This review describes the basic research, therapeutic mechanism, clinical tri ...

2 Cite Share

Using **Dental Pulp Stem** Cells for **Stroke** Therapy.

Gancheva MR, Kremer KL, Gronthos S, Koblar SA.

Front Neurol. 2019 Apr 29;10:422. doi: 10.3389/fneur.2019.00422. eCollection 2019.

PMID: 31110489 Free PMC article. Review.

Cell-based therapies using **stem** cells, such as **dental pulp stem** cells, are a promising alternative for treatment of neurological diseases, including **stroke**. ...One such candidate population is **dental pulp stem** cells, which r ...

3 Cite Share

Dental Pulp Stem Cells: An Attractive Alternative for Cell Therapy in Ischemic **Stroke**.

Lan X, Sun Z, Chu C, Boltze J, Li S.

Front Neurol. 2019 Aug 2;10:824. doi: 10.3389/fneur.2019.00824. eCollection 2019.

PMID: 31428038 Free PMC article. Review.

Ischemic **stroke** is a major cause of disability and mortality worldwide, but effective restorative treatments are very limited at present. Regenerative medicine research revealed that **stem** cells are promising therapeutic options. **Dental pulp stem** ...

4 Cite Share

Dental pulp stem cell transplantation facilitates neuronal neuroprotection following cerebral ischemic **stroke**.

Gong P, Tian Q, He Y, He P, Wang J, Guo Y, Ye Q, Li M.

Biomed Pharmacother. 2022 Aug;152:113234. doi: 10.1016/j.biopha.2022.113234. Epub 2022 Jun 9.

PMID: 35689857 Free article.

OBJECTIVES: This study aimed to identify and evaluate the intracranial transplantation of **dental pulp stem** cells (DPSCs) as a possible ischemic **stroke** therapy that mitigates neuronal death/apoptosis. MATERIALS AND METHODS: DPSCs were isolated from the ...

5 Cite Share

Dental Pulp Stem Cell Therapy in Ischemic **Stroke**: A Meta-Analysis of Preclinical Studies.

Wang H, Sun M, Sun J, Gong P, Liu N, Wang M.

J Stroke Cerebrovasc Dis. 2022 Jun;31(6):106453. doi: 10.1016/j.jstrokecerebrovasdis.2022.106453. Epub 2022 Mar 31.

PMID: 35367846

OBJECTIVE: More preclinical research evidence has shown that **dental pulp stem** cells (DPSCs) transplantation is expected to promote the recovery of ischemic **stroke** (IS), but it still lacks an evidence-based analysis. ...CONCLUSION: Transplantation of DP ...

6 Cite Share

Current advances in ischemic **stroke** research and therapies.

Barthels D, Das H.

Biochim Biophys Acta Mol Basis Dis. 2020 Apr 1;1866(4):165260. doi: 10.1016/j.bbadis.2018.09.012. Epub 2018 Sep 15.

PMID: 31699365 Free PMC article. Review.

What Is Tooth Banking?

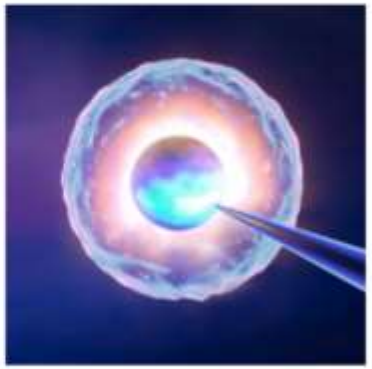
Tooth Banking is the storing of dental stem cells that have the ability to regenerate into various cell types. When your child's tooth or your own is extracted by a dental professional, dental stem cells are harvested from the dental pulp within the tooth. Baby teeth and wisdom teeth are rich in dental stem cells. These cells within the pulp are a valuable source of highly regenerative stem cells. These dental stem cells are preserved indefinitely by being isolated from the dental pulp and cryogenically frozen.

Why Bank Teeth?

Why do we save money for our children's education? So that they can have the best possibilities for a successful career. Why do we spend money on our children's extracurricular activities? So that they can do what they love and experience lifetime memories and accomplishments. Why would we bank our children's teeth? So that they can have the best possible chance at a healthy future. Banking dental stem cells give your children the ability to take advantage of stem cell therapies of today and those that emerge in the future. No parent wants their children to get sick or become disease-stricken. So take advantage of medical benefits today that can provide cutting edge treatments for tomorrow.

What Type Of Stem Cells Are Found In Dental Pulp?

MESENCHYMAL STEM CELLS (MSC)



An extremely rich source for mesenchymal stem cells is the developing tooth bud of the mandibular third molar (wisdom tooth) and baby teeth. While considered multipotent, they have proven to be pluripotent. The stem cells eventually form enamel, dentin, blood vessels, dental pulp, and nervous tissues, including a minimum of 29 different unique end organs. Because of extreme ease in the collection in younger years of age before calcification, and minimal to no morbidity, they constitute a major source for personal banking, research, and multiple therapies. These stem cells have also shown capable of producing hepatocytes, a potential cure for diabetes in the future.

Mesenchymal stem cells have already proven to be a powerful and potent platform for developing treatments. As you are reading this, scientists are studying the role of these amazing cells in treating conditions such as type 1 diabetes, spinal cord injury, stroke, myocardial infarction (heart attack), corneal damage and neurological diseases like Parkinson's, to name just a few.

For the past 22 years, doctors have been using stem cells to treat over 78 diseases and blood oriented diseases. As of date, there are over 2000 clinical trials that have been completed or are underway, demonstrating the use of stem cells to treat diseases, heal injuries, and grow replacement tissues like bone, cartilage, nerve, skin, muscles, and blood vessels.

Quality Resource Guide

Dental Considerations for Patients with a Prosthetic Joint Replacement

Author Acknowledgements

J. BRUCE BAVITZ, DMD

Professor and Chair
Department of Surgical Specialties
University of Nebraska Medical Center
College of Dentistry
Lincoln, Nebraska

Dr. Bavitz has no relevant financial relationships to disclose.

Educational Objectives

Following this unit of instruction, the learner should be able to:

1. Differentiate early from late prosthetic joint infections.
2. Cite current literature regarding the efficacy of antibiotic pre-medication in preventing prosthetic joint infections.
3. Discuss the rationale for obtaining dental clearance prior to patients receiving prosthetic joints.
4. Describe the bacteria commonly cultured from prosthetic joint infections.
5. Compare and contrast hematogenous acquired prosthetic joint infections with bacterial endocarditis.
6. Analyze the tenets of evidence-based dentistry and how they impact antibiotic prescribing decisions.

MetLife designates this activity for **1.0 continuing education credits** for the review of this Quality Resource Guide and successful completion of the post test.

Originally published December 2023. Expiration date: December 2026

Current evidence suggests that the risks associated with giving AP to patients with prosthetic joints outweigh any benefit in reducing the risk of developing PJI, and evidence-based practice recommends that AP should rarely, if ever, be used to prevent PJI following bacteremia inducing dental care.

A potential exception could be a patient with exceptional co-factors (being remarkably immunocompromised, having an orthopedic implant or anatomic anomaly with unusual susceptibility to infection, and undergoing an especially “dirty” invasive procedure such as extracting multiple infected teeth).

For the vast majority of patients, their dental, medical, and pharmaceutical healthcare practitioners should reinforce that conscientious personal oral hygiene procedures and frequent professional visits to minimize bacteremias are the best ways to reduce one’s risk of developing a PJI.

Prosthetic Joint Infection After **Dental Work**: Is the **Correct Prophylaxis** Being **Prescribed**? A **Systematic Review**.

Danilkowicz RM, Lachiewicz AM, Lorenzana *et al*
Arthroplast Today. 2021 Jan 9;7:69-75

"An estimated 46% of organisms may be resistant to amoxicillin."…… "Lower extremity PJI associated with dental procedures is often caused by organisms unlikely to be prevented with amoxicillin."

Streptococcus salivarius Prosthetic Joint Infection following Dental Cleaning despite Antibiotic Prophylaxis

Lyra B Olson , Daniel J Turner *et al*
Case Rep Infect Dis 2019 Apr.

"We present the case of a man with septic arthritis of a prosthetic hip joint due to Streptococcus salivarius one week following a high-risk dental procedure despite preprocedure amoxicillin."

Oral amoxicillin/clavulanate for the prevention of bacteremia following dental extractions.

Diniz Freitas M, Álvarez Fernández M *et al.*
Oral Dis. 2023 Jul;29(5):2272-2276.

"The prevalence of bacteremia in the CG, AMXG, and AMX-CLG was 97%, 50%, and 15%, respectively, at 30 s after completing the extractions, and 67%, 10%, and 4% at 15 min, respectively, after the last extraction."

All of the following are rational reasons for *NOT* premedicating patients with prosthetic joints before providing invasive dental care, except one:

a. Risk of causing pseudomembranous colitis

b. Risk of anaphylactic reactions

c. Risk of a lawsuit, as not pre-medicating goes against the latest ADA guidelines

d. Risk of developing antibiotic-resistant bacteria in the patient and environment

Relative to cost, a 2010 paper estimated the annual fee of providing AP for orthopedic implants in the United States was approximately $59,640,000.

Fully Guided Tooth Bud Ablation in Pigs Results in Complete Tooth Bud Removal and Molar Agenesis

Leigh E Colby, David P Watson *Journal of Oral and Maxillofacial Surgery*
Volume 81, Issue 4, April 2023, Pages 456-466

Fully guided microwave tooth bud ablation has the potential to become a minimally invasive means for managing third molars in adolescent patients. The purpose of this 28-day longitudinal characterization study was to determine if the healing response following fully guided microwave ablation of second molar tooth buds in juvenile pigs would result in the complete removal of targeted tooth bud tissues, molar agenesis, and no significant collateral tissue damage…….all treated tooth bud tissues were replaced with trabecular new bone formation by the end of this study. There was no detectible loss of inferior alveolar nerve function. The thermal dosing strategy used in this study appears to deliver prescribed ablation volumes and-within the context of this animal model-there was no detected collateral tissue damage.

TRIAGENICS

Learn How To Invest | Home | About Us | What We Do | Our IP Position | Wisdom Teeth Economics | Newsroom | Contact Us

TriAgenics' revolutionary Zero3™ TBA (3rd Molar Tooth Bud Ablation) is a one-minute treatment designed to prevent wisdom teeth from ever forming.*

Learn How To Invest

Pro Forma Website

This is a pro forma website based solely upon animal study data. TriAgenics' Zero3™ 3TBA procedure is not approved for human use.

Designed For Safety*

TriAgenics' Zero3™ TBA 60 – 90 second treatment is designed to gently warm just the center of the developing wisdom tooth buds.

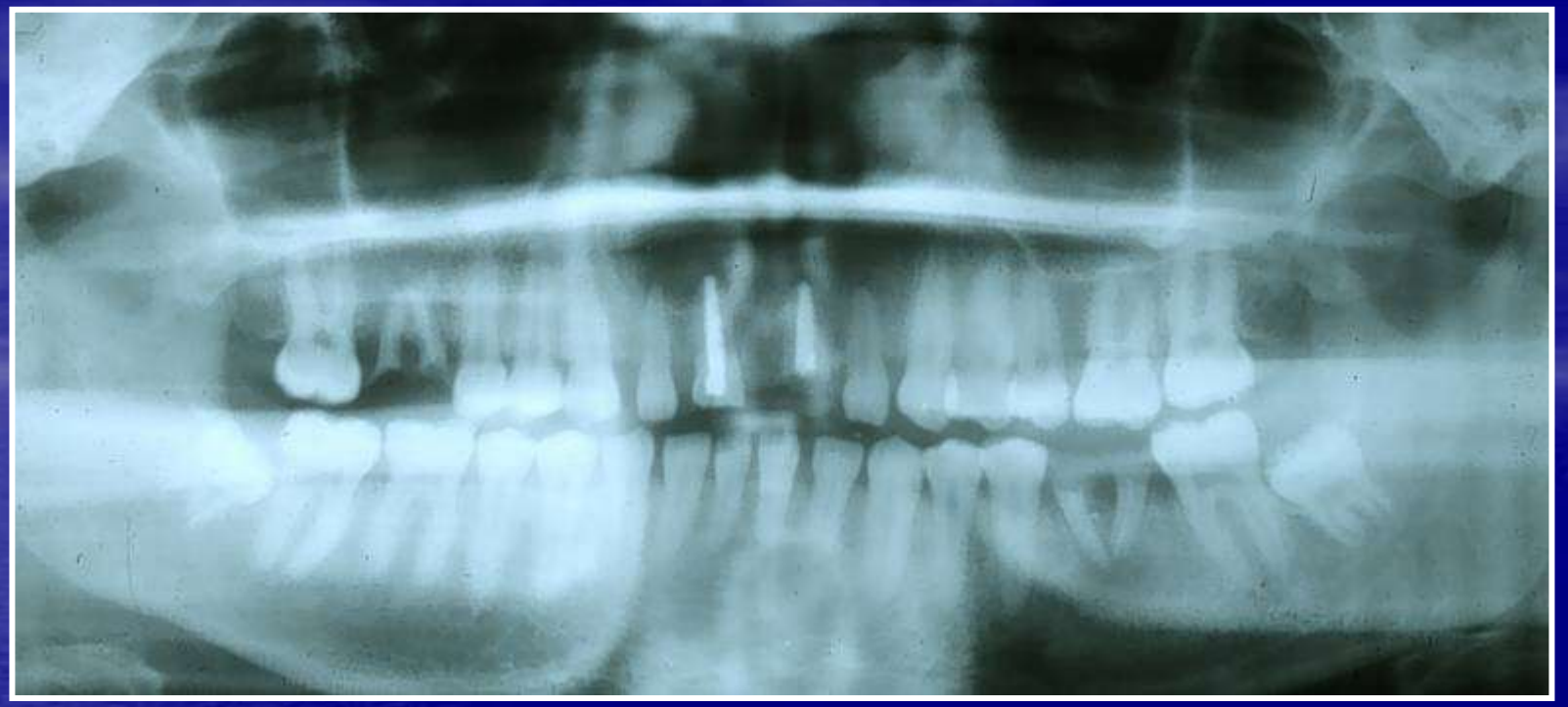
In multiple live animal trials to date there has been no observed adverse outcomes other than one post-op infection.

Does Saline Irrigation at Different Temperatures Affect Pain, Edema, and Trismus After Impacted Third Molar Surgery: A Clinical Trial

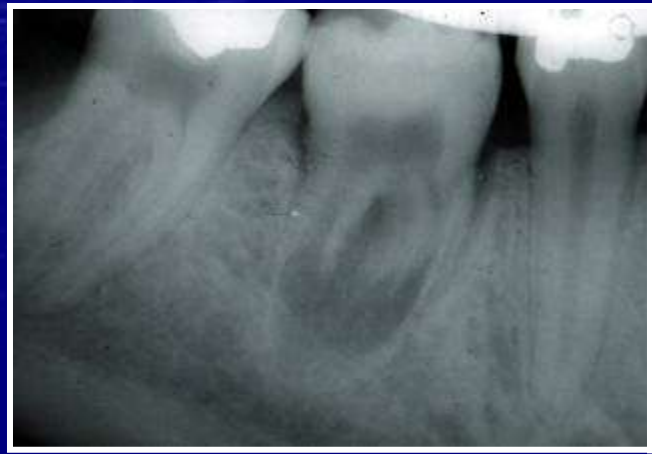
Gülfeşan Çanakçi, Nilay Er *et al*

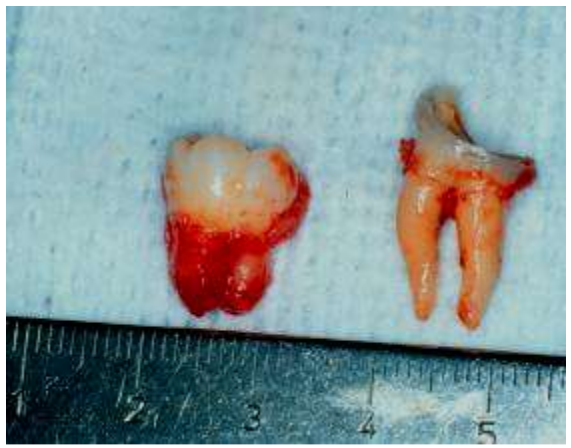
J Oral Maxillofac Surg **2023 Jan;81(1):88-94.**

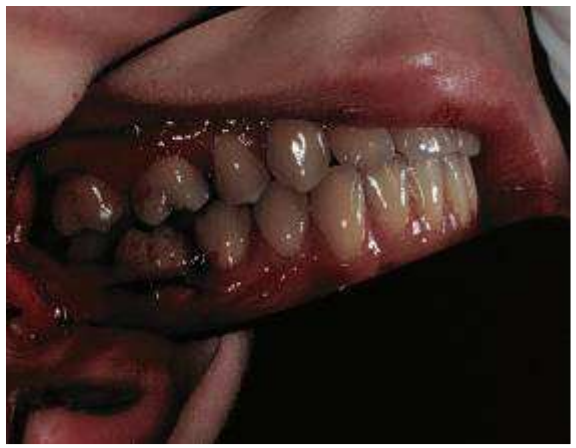
…compare the intensity of postoperative morbidity (pain, facial swelling, and trismus) following third molar surgery performed using saline irrigation at different temperatures (4, 10, or 25 °C. (48 patients) Significant differences were found between the test groups in VAS values and the number of analgesics taken ($P < .001$). Also, the lowest trismus and facial swelling values were detected in the 4 °C test group at all time points



Tooth Transplant







Outcome of tooth transplantation: survival and success rates 17-41 *years* post treatment.

Czochrowska EM, Stenvik A, Bjercke B, Zachrisson. *Am J Orthod Dentofacial Orthop.* 2002 Feb;121(2):110-9.

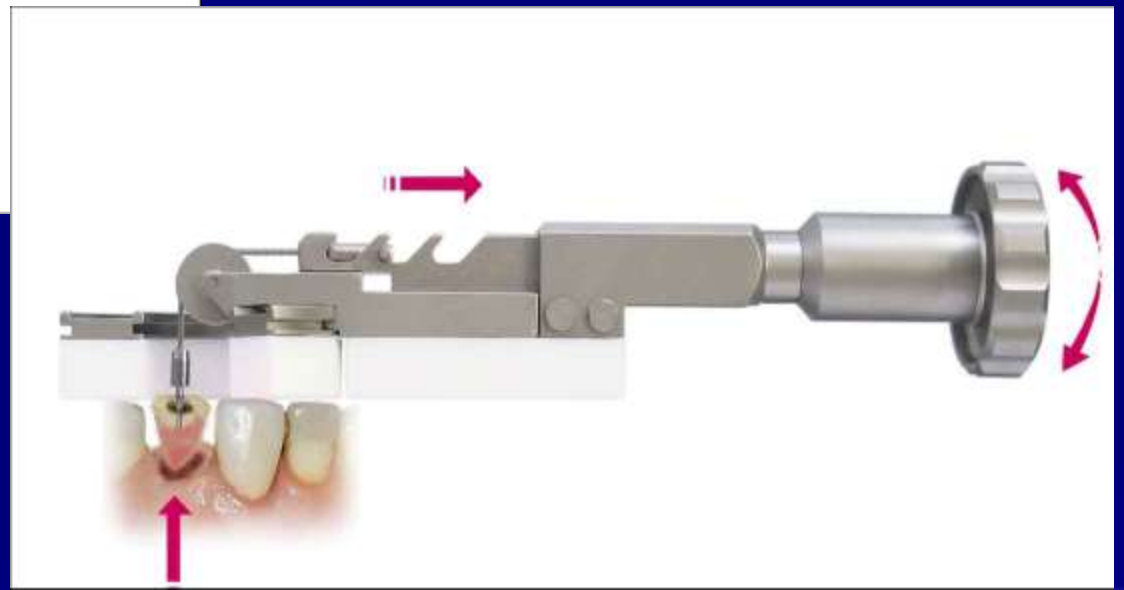
The mean age at surgery was 11.5 years, and the mean observation period was **26.4** years (range, 17-41 years). Of the 33 teeth transplanted in the 28 patients, 3 teeth were lost after 9, 10, and 29 years, respectively. Therefore, the 30 teeth in the 25 patients we examined yielded a survival rate of 90%. The success rate was 79% because 2 transplants had ankylosed, and 2 others failed to fulfill the proposed criteria. The patients generally responded very favorably regarding their perception of the treatment. Their only hesitation was related to some discomfort during surgery. **It was concluded that survival and success rates for teeth auto transplanted when the root is partly developed compare favorably in a long-term perspective with other treatment modalities for substituting missing teeth.**

Autotransplantation of Teeth: A Procedure that Gets no Respect, Bavitz JB *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology*, accepted Mar, 2010

Autotransplants have no implant companies or dental laboratories advocating their use, but for young patients with nonrestorable molars and impacted wisdom teeth at one-third to seven-eighth root development, autogenous transplants are not only the most cost-effective treatment option, but arguably the best. Just as the late great comedian Rodney Dangerfield finally got the respect he deserved towards the end of his career, I hope more clinicians consider autotransplantation when giving their patients the requisite risks, benefits and alternatives to all tooth replacement options.

What should you buy that

Dentist who has everything ?



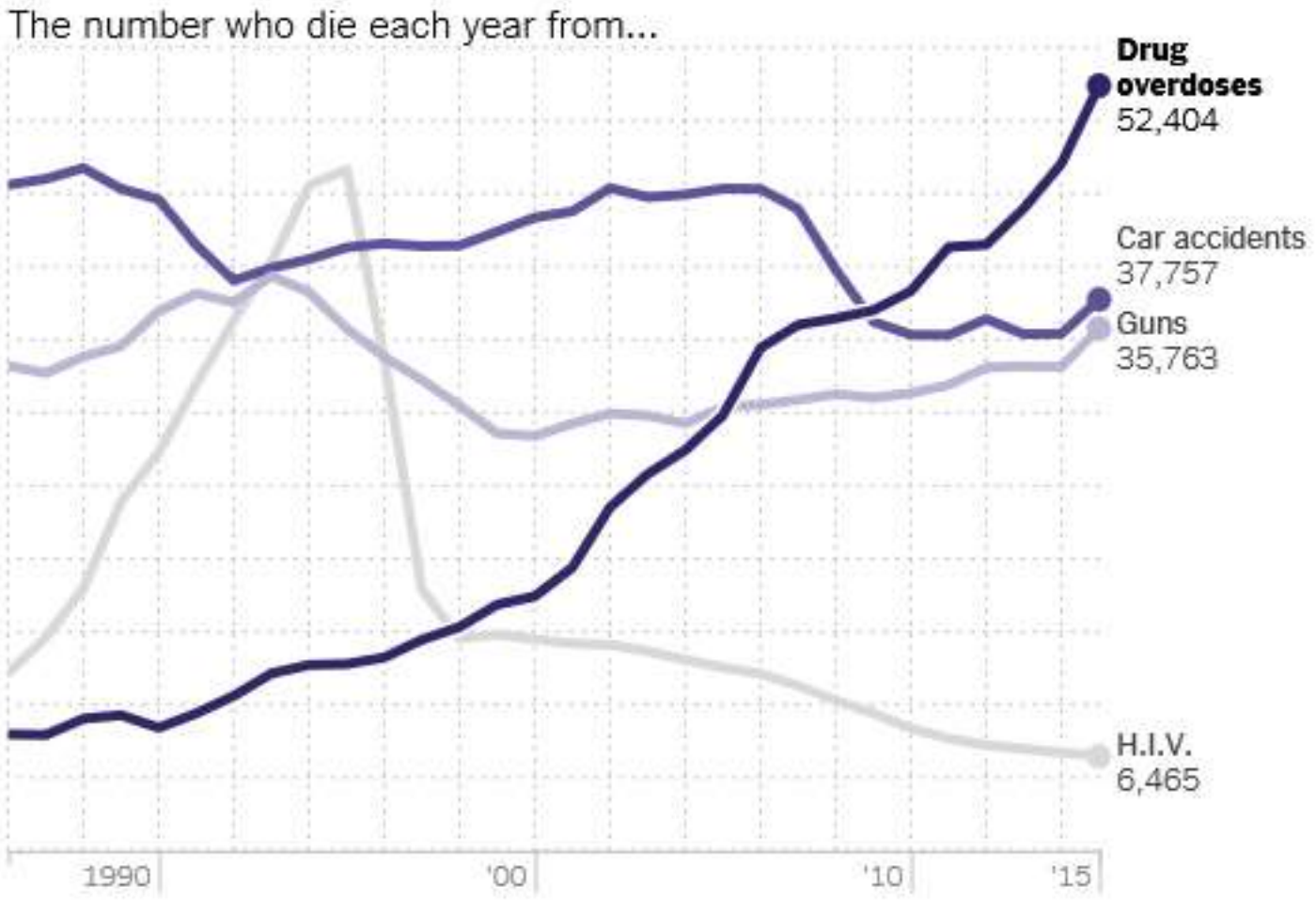
Forced surgical extrusion using an axial tooth extraction system as a practicable technique for preserving severely destroyed teeth? - Clinical outcomes up to 4.8 years

J Esthet Restor Dent 2023 Oct;35(7):1152-1161.

Tobias Graf, Michael Stimmelmayr Pauline Gutmann *et al*

Nine patients, each with an iso- or subgingival fractured tooth, were retrospectively examined. Treatment of the damaged tooth comprised an atraumatic forced surgical extrusion performed with an axial tooth extraction system and a more coronal positioning within the socket. The teeth were initially splinted and subsequently restored. The follow-up period averaged 36.5 months. The radiographically measured mean extrusion distance was 3.4 (SD: ±1.0) mm, so that a sufficient prosthetic ferrule could be reestablished. Saving hopeless teeth by this relatively predictable and feasible procedure has hardly any disadvantages for patients, and in case of failure, an implant or fixed partial denture are still an option.

Forced orthodontic extrusion to restore extensively damaged anterior and premolar teeth as abutments for single-crown restorations: Up to 5-year results from a pilot clinical study.
Bruhnke M, Beuer F, Böse MWH, Naumann M. J Prosthet Dent. 2023 Jan;129



The opioid epidemic has not fallen equally on all races or regions. Like an infectious disease, drug overdoses have emerged in clusters around the country.

News > Medscape Medical News > Business of Medicine

Physicians React: Are They Taking Right Path Now With Pain Management and Opioids?

Jon McKenna December 30, 2022

"I think the government's crackdown on physicians...has actually worsened" the opioid crisis, Now, people are more often going to the streets and are getting fentanyl-laced drugs, resulting in accidental deaths. It's a big problem. Discouraging legal prescriptions doesn't cure opioid use disorder," he argued. Other doctors and I are afraid to prescribe opioids, which is a boon to the illegal drug trade. Opioid prescriptions have been nearly cut in half in 10 years due to the new guidelines and rules, but overdoses and illegal opioids have nearly doubled."

What Year?

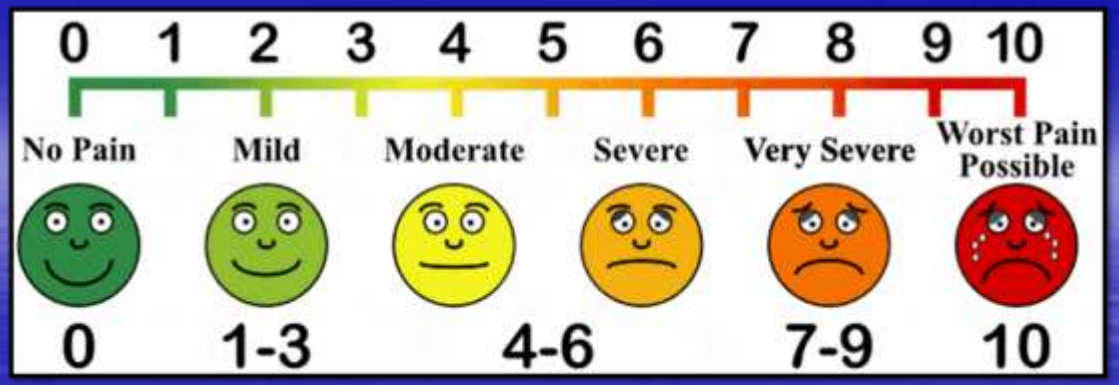
The *New York Times* published a statistic: *"Of all the nations of the world, the United States consumes the most habit-forming drugs per capita."*

….published in *1911*, quoting the US Opium Commissioner, Hamilton Wright…he also said

"Opium is the most pernicious drug known to humanity." Despite this warning, more than 100 years later, the United States is reeling with more than 70,000 Deaths from drug overdose per year, with more than 67% of these attributable to opioids.

JAMA Surg. 2019 Aug 14. /jamasurg.2019.2104.
When a Vital Sign Leads a Country Astray-The Opioid Epidemic.
Chidgey BA, McGinigle KL, McNaull PP

Minimize pain (scar), not eliminate it



There are four primary vital signs which are standard in most medical settings:

1. Body temperature
2. Heart rate or Pulse
3. Respiratory rate
4. Blood pressure

5. ???? Pain is considered a standard fifth vital sign in some organizations, such as the U.S. Veterans Affairs. Pain is measured on a 0-10 pain scale based on subjective basis

CDC Clinical Practice Guideline for Prescribing Opioids for Pain — United States, 2022

Recommendations and Reports / November 4, 2022 / 71(3);1–95

Deborah Dowell, MD[1]; Kathleen R. Raga MSPH[1]; Christopher M. Jones, PharmD, DrPH[2]; Grant T. Baldwin, PhD[1]; Roger Chou, MD[3] (VIEW AUTHOR AFFILIATIONS)

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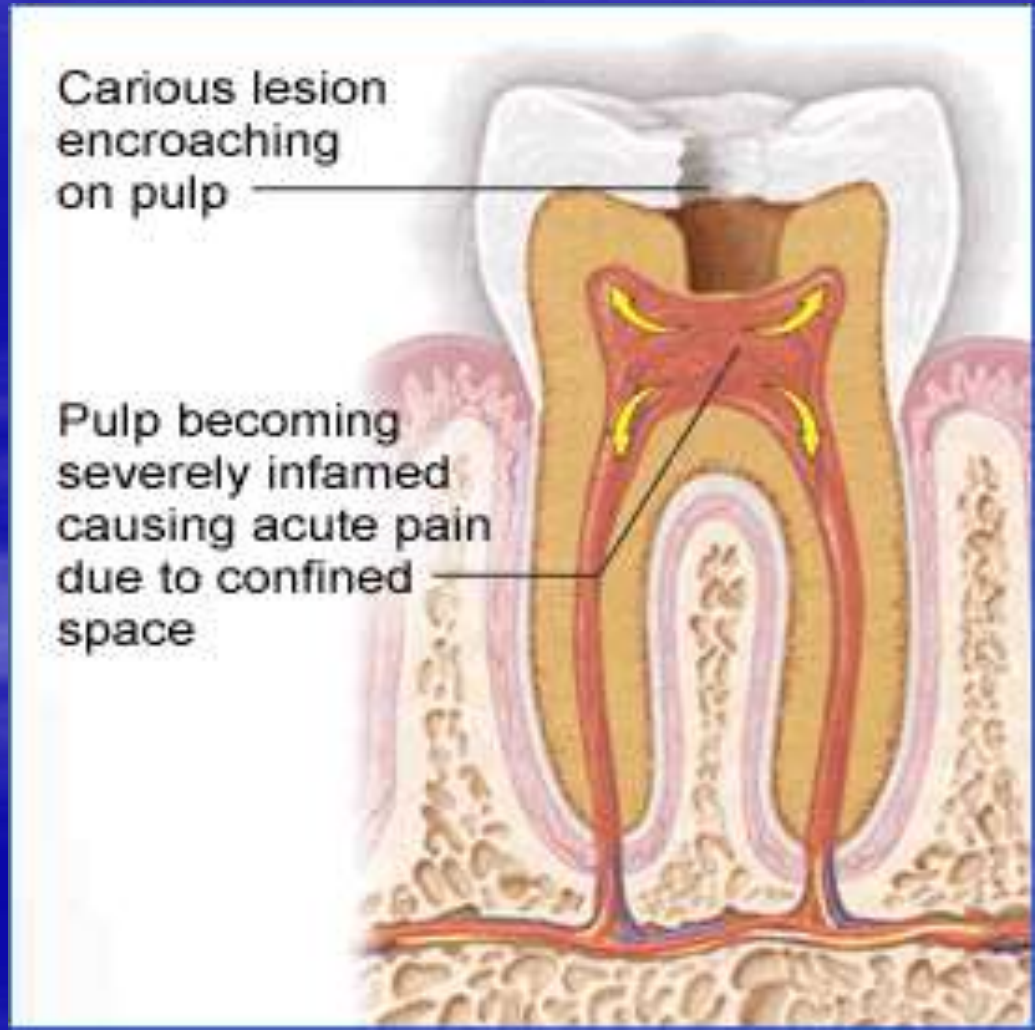
Dentistry

In dentistry, the most common chronic pain patients are those with temporomandibular disorders, but be aware of neuralgias and patients with atypical facial pain…Never treat chronic pain with narcotics.

Got Both?

Patients with irreversible pulpitis are thought to have an acute exacerbation of a chronic problem, making them the especially challenging to manage



What the heck am I supposed to use for pain control?

Minimizing opioids should not mean inadequately treated pain

Multimodal analgesia is based on the premise that the concurrent use of primarily nonopioid analgesics can have additive, if not synergistic, effects that produce superior analgesia while decreasing opioid use and opioid-related side effects.

Regional anesthesia has been advocated as Adjunct to a multimodal analgesia regimen.

Preemptive analgesia refers to the administration of one or more analgesic(s) prior to a noxious event (e.g., surgery) in an attempt to prevent peripheral and central sensitization, minimizing post-injury pain

RECOMMENDATION 1A: The perioperative team should be consulted to form a treatment plan that addresses the various aspects that would be necessary for best outcomes in this patient population.

Figure 7: Medication Is One of Five Treatment Approaches to Pain Management

Anesth Pain Med 2019 Apr 20;9

Non-Pharmacological Methods and Post-Operative Pain Relief: An Observational Study

Marcus Komann , Claudia Weinmann , Matthias Schwenkglenks , Winfried Meissner

Background: Non-pharmacological methods (NPMs) like cold packs, acupuncture, meditation or distractions are supposed to ease acute post-surgical pain.

Conclusions: Some NPMs are widely used while others are rarely applied. Their association with pain relief is doubtful. These findings add to a rather contradictory literature. Advantages and disadvantages of applying NPMs solely for pain relief should thus be considered carefully

Available online at www.sciencedirect.com

ScienceDirect

British Journal of Oral and Maxillofacial Surgery 57 (2019) 4–11

BRITISH Journal of Oral and Maxillofacial Surgery

www.bjoms.com

Review

Management of postoperative pain in maxillofacial surgery

S.W. Evans, R.A. McCahon *

Nottingham University Hospitals NHS Trust, Queen's Medical Centre Campus, Derby Road, Nottingham, NG7 2UH

Accepted 14 November 2018
Available online 27 December 2018

Abstract

In this review we describe the evidence base for postoperative analgesia after maxillofacial surgery. We discuss the implications of poorly managed pain, risk factors for the development of severe pain, and pharmacological and non-pharmacological analgesic strategies to manage it.

Table. Analgesic Options for Multimodal Analgesia

Class of Analgesic Agent/ Technique	Advantages	Disadvantages
Acetaminophen	↓ Pain, opioid-sparing effect, nonopioid analgesia	Liver toxicity
α-2 agonists (eg, clonidine and dexmedetomidine)	↓ Pain, opioid-sparing effect, nonopioid analgesia	Hypotension, bradycardia, sedation
Gabapentinoids (eg, gabapentin and pregabalin)	↓ Pain, opioid-sparing effect, nonopioid analgesia	Dizziness, sedation, peripheral edema, renally excreted, potential respiratory depression
IV lidocaine	↓ Pain, facilitates return of gastrointestinal function	Optimal dosage regimen uncertain
N-methyl-D-aspartate antagonists (eg, ketamine, magnesium, and dextromethorphan)	↓ Pain, opioid-sparing effect, nonopioid analgesia	Optimal dosage regimen uncertain
NSAIDs (eg, ibuprofen, ketorolac, meloxicam, and celecoxib)	↓ Pain, opioid-sparing effect, nonopioid analgesia	Platelet dysfunction, gastrointestinal irritation, renal dysfunction
Regional anesthesia/analgesia	↓ Pain, opioid-sparing effect, nonopioid analgesia	Failure of technique, local anesthetics: hypotension, motor block. Opioids: pruritus, potential respiratory depression
Steroids (eg, methylprednisolone and dexamethasone)	↓ Pain, ↓ length of recovery room stay	↑ Serum glucose levels (controversial)
Wound infiltration (local anesthetics)	Fast and simple technique, minimal risk	Duration of analgesia limited to duration of action of local

Abbreviations: IV, intravenous; NSAID, nonsteroidal anti-inflammatory drug.

So what should I recommend/prescribe for pain?

J Am Dent Assoc. 2013 Aug;144(8):898-908.
Combining ibuprofen and acetaminophen for acute pain management after third-molar extractions: translating clinical research to dental practice.
Moore PA[1], Hersh EV.

Table 3
Number needed to treat (NNT) to achieve at least 50% reduction in maximal postoperative pain (moderate or severe) over 4–6 hours.[21] NNT of 2–5 is considered useful.

Single dose analgesic		NNT (95% CI)
Ibuprofen 400 mg + Paracetamol 1000 mg	BEST	1.5 (1.4 to1.7)
Ibuprofen 200 mg + Paracetamol 500 mg		1.6 (1.5 to1.8)
Paracetamol 1000 mg + Oxycodone 10 mg		1.8 (1.6 to2.2)
Diclofenac potassium 100 mg		1.9 (1.7 to 2.3)
Diclofenac potassium 50 mg		2.1 (1.9 to2.5)
Ibuprofen 400 mg		2.1 (1.9 to2.3)
Paracetamol 1000 mg + Codeine 60 mg		2.2 (1.8 to2.9)
Ibuprofen 400 mg + Oxycodone 5 mg		2.3 (2.0 to2.8)
Naproxen 500 mg		2.7 (2.3 to 3.3)
Paracetamol 1000 mg		3.6 (3.2 to4.1)
Tramadol 100 mg		4.6 (3.6 to6.4)
Tramadol 50 mg		9.1 (6.1 to19)
Codeine 60 mg	WORST	12 (8.4 to18)

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https://www.cdc.gov/opioids/healthcare-professionals/prescribing/guideline/at-a-glance.html

Determining Whether or Not to Initiate Opioids for Pain

All patients with pain should receive treatment that provides the greatest benefits relative to risks.

Recommendations 1 and 2 address determining whether or not to initiate opioids for pain

Recommendation 1

Nonopioid therapies are at least as effective as opioids for many common types of acute pain.

Clinicians should **maximize use of nonpharmacologic and nonopioid pharmacologic therapies** as appropriate for the specific condition and patient and only consider opioid therapy for acute pain if benefits are anticipated to outweigh risks to the patient.

Before prescribing opioid therapy for acute pain, **clinicians should discuss with patients the realistic benefits and known risks of opioid therapy**.

Nonopioid therapies include:

- Nonopioid medications such as acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), and selected antidepressants and anticonvulsants
- Physical treatments (e.g., heat therapy, acupressure, spinal manipulation, remote electrical neuromodulation, massage, exercise therapy, weight loss)
- Behavioral treatment (e.g., cognitive behavior therapy, mindfulness-based stress reduction)

Recommendation 3

When starting opioid therapy for acute, subacute, or chronic pain, clinicians should prescribe immediate-release opioids instead of extended-release and long-acting (ER/LA) opioids. Immediate-release opioids: faster acting medication with a shorter duration of pain-relieving action. Examples include morphine, oxycodone, or hydrocodone.

Recommendation 6

When opioids are needed for acute pain, clinicians should prescribe no greater quantity than needed for the expected duration of pain severe enough to require opioids.

Recommendation 9

When prescribing initial opioid therapy for acute, subacute, or chronic pain, and periodically during opioid therapy for chronic pain, clinicians should review the patient's history of controlled substance prescriptions using state prescription drug monitoring program (PDMP) data to determine whether the patient is receiving opioid dosages or combinations that put the patient at high risk for overdose.

..there is an important role for opioid therapy for moderate-to-severe acute pain when NSAIDs and other therapies are contraindicated or are unlikely to be sufficiently effective (e.g., for severe traumatic injuries or major surgeries)

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ALERT: Ibuprofen US Boxed Warning

Serious cardiovascular thrombotic events:

Nonsteroidal anti-inflammatory drugs (NSAIDs) cause an increased risk of serious cardiovascular thrombotic events, including myocardial infarction, and stroke, which can be fatal. This risk may occur early in treatment and may increase with duration of use.

Ibuprofen is contraindicated in the setting of coronary artery bypass graft (CABG) surgery.

Serious gastrointestinal bleeding, ulcerations, and perforation

NSAIDs cause an increased risk of serious gastrointestinal (GI) adverse events including bleeding, ulceration, and perforation of the stomach or intestines, which can be fatal. These events can occur at any time during use and without warning symptoms. Elderly patients and patients with a prior history of peptic ulcer disease and/or GI bleeding are at greater risk for serious GI events.

Nonsteroidal anti-inflammatory drugs (NSAIDs) have been associated with a variety of adverse drug reactions (ADRs), including hypersensitivity reactions. In a retrospective cohort study of 62,719 patients prescribed NSAIDS, 1.7% of the patients had an ADR; **18.3%** of the ADRs were hypersensitivity reactions. Reported hypersensitivity reactions included rash, angioedema/swelling, urticaria/hives, itching, shortness of breath, wheezing or asthma, anaphylaxis, and hypotension. Identified risk factors included history of hypersensitivity reactions, female sex, autoimmune disease, and high NSAID dose (Blumenthal 2017).

Med Hypotheses. 2013 Aug;81(2):343-6.

NSAIDs can have adverse effects on bone healing.

van Esch RW, Kool MM

Interactions occur between prostaglandin metabolism, inflammatory proteins and bone metabolism. Systemic as well as local sources of inflammation appear to be actively involved in both bone formation and resorption. Non Steroidal Anti-Inflammatory Drugs (NSAIDs) can play a detrimental role in bone fractures, opposing the aim of the intervention, and can have such a negative impact on the synthesis of prostaglandins that they could even promote bone resorption. When used for a prolonged time, NSAIDs can also cause the development of an inflammatory cascade starting from the gastro-intestinal system, possibly resulting in bone resorption. Several studies show that the use of either selective or non-selective NSAIDs are intimately related to disturbances in immunological allostasis, bone metabolism and the inhibition or impediment of bone healing.

Socket Healing, Bone Grafts, Implants?

I can't take ibuprofen doctor, because I…..

A. Have ulcers
B. Have kidney disease
C. Am allergic to Aspirin
D. Have a **patent ductus arteriosus**
E. Am at high risk of heart attacks

OTC Ibuprofen Label Information on CV Risk

Warnings

Allergy alert: Ibuprofen may cause a severe allergic reaction, especially in people allergic to aspirin. Symptoms may include:

- hives
- facial swelling
- asthma (wheezing)
- shock
- skin reddening
- rash
- blisters

If an allergic reaction occurs, stop use and seek medical help right away.

Stomach bleeding warning: This product contains an NSAID, which may cause severe stomach bleeding. The chances are higher if you

- are age 60 or older
- have had stomach ulcers or bleeding problems
- take a blood thinning (anticoagulant) or steroid drug
- take other drugs containing prescription or nonprescription NSAIDs [aspirin, ibuprofen, naproxen, or others]
- have 3 or more alcoholic drinks every day while using this product
- take more or for a longer time than directed

Heart attack and stroke warning: NSAIDs, except aspirin, increase the risk of heart attack, heart failure, and stroke. These can be fatal. The risk is higher if you use more than directed or for longer than directed.

Do not use

- if you have ever had an allergic
- right before

Ask a doctor before use if

- you have problems or serious sic
- pain relievers or fever reducers
- the stomach bleeding warning applies to you
- you have a history of stomach problems, such as heartburn
- you have high blood pressure, heart disease, liver cirrhosis, kidney disease, asthma, or had a stroke
- you are taking a diuretic

Ask a doctor or pharmacist before use if you are

- taking aspirin for heart attack or stroke, because ibuprofen may decrease this benefit of aspirin
- under a
- taking any

When using this produ

- take with food or milk

Stop use and ask a doctor if

- chest pain
- trouble breathing
- weakness in one part or side of body
- slurred speech
- leg swelling
- pain gets worse or lasts more than 10 days
- fever gets worse or lasts more than 3 days
- redness or swelling is present in the painful area
- any new symptoms appear

Do not use

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- right before or after heart surgery

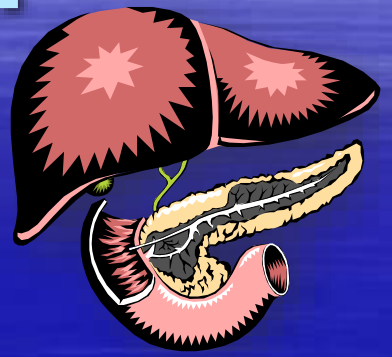
Ask a doctor or pharmacist before use if you are

- taking aspirin for heart attack or stroke, because ibuprofen may decrease this benefit of aspirin
- under a doctor's care for any serious condition
- taking any other drug

FDA recommends avoiding use of NSAIDs in pregnancy at 20 weeks or later because they can result in low amniotic fluid

On October 15, 2020, FDA warned that the use of nonsteroidal anti-inflammatory drugs (NSAIDs) around 20 weeks or later in pregnancy may cause rare but serious kidney problems in an unborn baby. This can lead to low levels of amniotic fluid surrounding the baby and possible complications. NSAIDs are commonly used to relieve pain and reduce fevers. They include medicines such as aspirin, ibuprofen, naproxen, diclofenac, and celecoxib. After around 20 weeks of pregnancy, the unborn babies' kidneys produce most of the amniotic fluid, so kidney problems can lead to low levels of this fluid. Amniotic fluid provides a protective cushion and helps the unborn babies' lungs, digestive system, and muscles develop.

The # 1 cause in the U.S. of acute liver failure is?



4,000 mg per day has been associated with acute liver failure

Acetaminophen-induced acute liver failure: results of a United States multicenter, prospective study.

Larson AM, Polson J,

Acetaminophen hepatotoxicity far exceeds other causes of acute liver failure in the United States. Susceptible patients have concomitant depression, chronic pain, alcohol or narcotic use, and/or take several preparations simultaneously. Education of patients, physicians, and pharmacies to limit high-risk use settings is recommended.

•Published: 25 September 2015

Paracetamol overdose secondary to dental pain: a case series

•H. Mahmood & R. Mohammed-Ali

British Dental Journal volume 219,

Results One hundred and sixteen admissions were identified specifically for unintentional paracetamol overdose. Dental pain accounted for 48 (41%) of all cases

Key Points

•Highlights the significant morbidity experienced by patients admitted to hospital after paracetamol overdose secondary to dental pain.

•Highlights the barriers experienced by patients in accessing timely dental care for acute dental pain.

•Suggests the majority of paracetamol overdose cases secondary to dental pain could have been prevented and managed before analgesia overdose.

I would argue that we still need to occasionally prescribe narcotics to achieve the best possible outcomes, but how much?

ELSEVIER

Drug and Alcohol Dependence

Volume 168, 1 November 2016, Pages 328-334

Full length article

Unused opioid analgesics and drug disposal following outpatient dental surgery: A randomized controlled trial

Brandon C. Maughan [a, b, d], Elliot V. Hersh [c], Frances S. Shofer [d], Kathryn J. Wanner [d], Elizabeth

We enrolled 79 patients, of whom 72 filled opioid prescriptions. On average, patients received 28 opioid pills and had 15 pills (54%) left over, for a total of ***1010*** unused pills among the cohort. Dentists and oral surgeons could potentially reduce opioid diversion by moderately reducing the quantity of opioid analgesics prescribed after surgery.

Informed Consent for Opioid Use

I have agreed to use opioids as part of my treatment to manage dental related chronic or post operative pain. I understand that these drugs are useful in managing my pain, but have a high potential for addiction and/or dependency. I understand that I can discuss possible alternatives for this opioid prescription with my dental prescriber and have furnished a complete and accurate medical history (including pregnancy, if applicable) and list of the medications I currently am taking or have taken in the last 6 months, including information about mental history and drug and/or alcohol use by me and members of my family. Because my dental provider is prescribing such medication to manage my pain, I acknowledge that I have been made aware of the following information and agree to the following conditions:

1. I am responsible for my pain medications and agree to take the medication not more frequently than as prescribed and only if needed to manage pain. I understand that increasing my dose without my dentist's knowledge could lead to a drug overdose causing severe sedation and respiratory depression and possibly death.
2. Without prior disclosure to my dental provider, I will not request or accept controlled substance medication from any other healthcare provider or individual while I am receiving such medication from my dental provider.
3. There are side effects with opioid medications, which may include, but not be limited to, skin rash, constipation, sexual dysfunction, sleeping abnormalities, sweating, edema, sedation, confusion, depression, increased sensitivity to pain or the possibility of impaired motor ability. As a result, when I take these medications, it may not be safe for me to drive a car, operate machinery, or take care of other people.
4. I have been made aware that I may become addicted to these medications (opioids) and may require addiction treatment. Overuse of this class of medication can lead to physical dependence and the experience of withdrawal sickness if I stop use or cut back too quickly. Withdrawal symptoms
feel like having the fl u and may include: abdominal pain, nausea, vomiting, diarrhea, sweating, body aches, muscle cramps, runny nose, yawning, anxiety and sleep problems.
5. I understand that the opioid prescription I have been given is for my own use and attest that I will not give or sell any portion of the prescription to another individual.

_____ _____

Patient, Parent or Guardian Signature Date

Developed by the Nebraska Dental Association | 8/2018

CLINICAL FEATURES OF OVERDOSE

History — The clinician should attempt to identify the specific drug, dose, and formulation to which the patient was exposed, the presence of nonopioid co-exposures, and the individual's prior history of opioid use. One review found the "typical" heroin death to involve experienced users in their 20s to 30s using coingestants . Recently released prisoners are at higher risk of opioid overdose in the post-release period because of lost tolerance during incarceration

The classic signs of opioid toxicity include:

- Depressed mental status
- Decreased respiratory rate
- Decreased tidal volume
- Decreased bowel sounds
- Miotic (constricted) pupils

The best predictor of opioid toxicity is a respiratory rate <12/minute, which predicted response to naloxone in virtually all patients. The clinician should measure the respiratory rate and pay close attention to chest wall excursion, as subtle changes in respiratory effort are often not identified using triage vital signs.

Administer naloxone, a short-acting opioid antagonist, preferably by the intravenous route. The apneic patient and patients with extremely low respiratory rates or shallow respirations should be ventilated by bag-valve mask attached to supplemental oxygen prior to and during naloxone administration Apneic patients should receive higher initial doses of naloxone (0.2 to 1 mg).

Naloxone may be given nasally, subcutaneously, or intramuscularly if there is a delay in securing intravenous access. When given by these routes, there is slower absorption and delayed elimination, making the drug much more difficult to titrate.

Questions?

jbavitz@unmc.edu