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Procedural Sedation

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This session will be recorded

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Please also note:

The information in this presentation and the video recording is up to date as of the date it was recorded on 10/13/2020.

It has not been updated to include any subsequent advances in practice, and the information presented in this video does not replace hospital, health center, or governmental guidelines.



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Disclosures

- Nothing to disclose



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Learning Objectives

By the end of this session, residents should be able to:

- Learn the indications of procedural sedation in the ED
- Learn how to evaluate a patient for procedural sedation
- Discuss the steps in setting up for procedural sedation
- Differentiate between mechanism of action and common side effects of medications used in procedural sedation



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Case 1





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Case 2

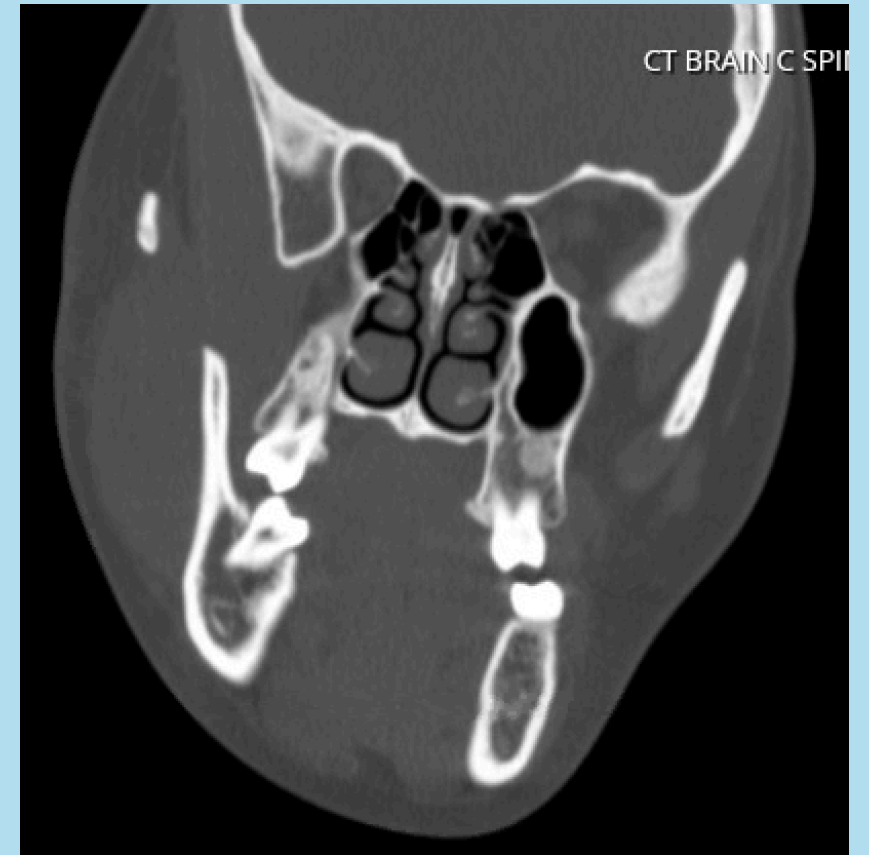
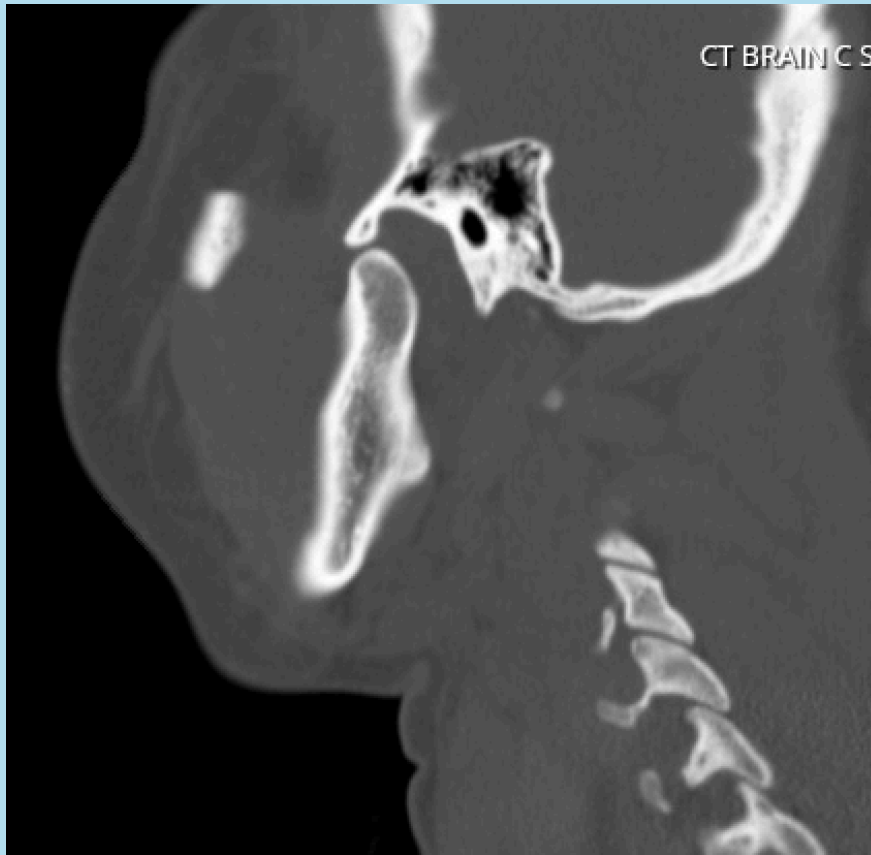




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Case 3





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Indications

- Painful procedure
- Procedure requiring muscle relaxation
- Patient intolerance
- Concern for patient safety



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Types of Procedural Sedation

	Minimal Sedation (anxiolysis)	Moderate Sedation	Deep Sedation	General anesthesia
Responsiveness	Verbal	Verbal +/- tactile	Painful stimuli	Unresponsive
Ventilation	Unaffected	Unaffected	Possibly impaired	Impaired



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Steps

Step 1 – History (ASA) & Physical

Step 2 – Think about Drug Choice

Step 3 – Consent

Step 4 – Get ready

Step 5 – Monitor your patient



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Step 1

Think about your patient!

PMH:

- Diseases of major organ systems
- Obesity
- OSA
- Congenital syndromes

Extremes of age

Medications/Allergies

Previous experience with analgesia, FHx

Substance use

Last oral intake



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Last Oral intake

- Clear liquids - 2 hours
- Breast Milk - 4 hours
- Non-human milk/formula - 6 hours
- Solid food - 6 hours
- *Pre-procedural fasting has not demonstrated a reduction in risk of emesis/aspiration when administering procedural sedation and analgesia*



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What is the ASA classification?

- ASA I Normally healthy patient
- ASA II Mild systemic disease under control (e.g., Asthma, hypertension)
- ASA III Severe systemic disease from any cause
- ASA IV Severe systemic disease that is a constant life threat, not always correctible by the surgical procedure
- ASA V Moribund patient who is not suspected to survive without the operation
- **ASA III or above - anesthesia consult**



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Step 1 – Part 2

Physical exam

- Vitals
- Breath sounds
- Airway evaluation
 - Can I BVM this patient? - MOANS
 - Can I intubate this patient? - LEMON



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MOANS

- **Mask**
- **Obesity**
- **Age > 55**
- **No teeth**
- **Stiff lungs**



Make sure you have oral and nasal airways



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LEMON

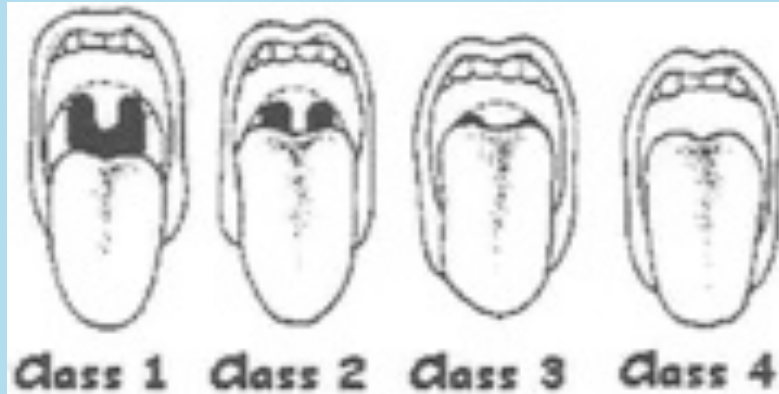
EVALUATION CRITERIA	POINTS
L = Look externally	
Facial trauma	1
Large incisors	1
Beard or moustache	1
Large tongue	1
E = Evaluate the 3-3-2 rule	
Incisor distance-3 finger breadths	1
Hyoid-mental distance-3 finger breadths	1
Thyroid-to-mouth distance-2 finger breadths	1
M = Mallampati (Mallampati score > 3)	1
O = Obstruction (presence of any condition like epiglottitis, peritonsillar abscess, trauma)	1
N = Neck mobility (limited neck mobility)	1
Total	10



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Mallampati



Class I: soft palate, fauces, uvula, pillars

Class II: soft palate, fauces, portion of uvula

Class III: soft palate, base of uvula

Class IV: hard palate only



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Which is a more concerning airway?





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Signs of a concerning airway

- Short/thick neck (neck circumference is most predictive)
- Unable to extend neck or touch chin to chest
- Obesity/OSA (Mallampati)
- Facial hair
- Prominent overbite/underbite
- Large teeth/tongue
- Known airway pathology
- Look for prior cric/trach scar
- 3-3-2 rule



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Step 2

Think about drug choice!

BENZODIAZEPINE

KETAMINE

FENTANYL

KETOFOL

PROPOFOL

ETOMIDATE



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MIDAZOLAM

- MOA: Benzodiazepine, GABA
- Sedation without analgesia
- Dose: 0.05-0.1 mg/kg (0.02 mg/kg if also using fentanyl)
- Onset: 60 sec; Duration: 30-60 min
- Side effect: paradoxical combativeness
- Contraindications: alcoholism
- Reversal: Flumazenil (1 mg q3 min)
 - Caution if patient takes meds that increase norepinephrine level



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FENTANYL

- MOA: Opiate – mu and kappa
- Analgesia
- Dose: 1-2 mcg/kg
- Onset: 3-5 min; Duration: 30-60 min
- Side effects: bradycardia (possible hypotension), rigid chest syndrome or vocal cord rigidity
- Contraindications: alcoholism/opioid use, SSRI/MAOI use
- Reversal: Naloxone (0.4 mg increments)
 - Side effects: pulmonary edema, opioid withdrawal
 - Does not reverse hypotension
 - Rigid chest – usually responds to naloxone and BVM, may need paralysis and intubation



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MIDAZOLAM + FENTANYL

- Not recommended in pediatrics
- Good for moderate sedation
- Not good for deep sedation
 - Lasts too long
 - Higher risk of apnea



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PROPOFOL

- MOA: GABA/glycine, generally unknown
- Sedation without analgesia
- Dose: 1 mg/kg q minute
- Onset: 1 min; Duration: 6-8 min
- Side effects: hypotension, pain with injection, propofol infusion syndrome (pediatrics)
- Contraindications: hypotension, severe HLD, egg/soybean allergy
- Reversal: None
 - To treat hypotension: stop infusion, Trendelenberg, fluids, phenylephrine or epinephrine



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KETAMINE

- MOA: blocks glutamate at NMDA receptor
- Dissociative agent: sedation and analgesia
- Dose: 1-2 mg/kg
- Onset: 1-2 min; Duration: 5-10 min
- Side effects: increased salivation, vomiting, laryngospasm, nystagmus/ataxia, emergence reaction
- Contraindications: intoxication, psychosis, hypertension, glaucoma, oropharyngeal procedures (salivation)
- No longer contraindicated in head trauma
- Reversal: None
 - Laryngospasm: BVM helps
 - Emergence: pre-treat with versed



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KETOFOLO

- 1:1 mixture
- Minimizes hemodynamic adverse effect of propofol
- Minimizes emergence reaction of ketamine

Outcome	Ketofol	Propofol	Absolute Difference	95% CI
Patients	281	292	---	---
Occurrence of Respiratory Adverse Event Requiring Respiratory Intervention	7%	9%	2%	-2 - 6%
Hypotension	1%	8%	7%	4 - 10%
Patient Satisfaction	10/10	10/10	---	---
Severe Emergence Delirium	5%	2%	3%	0.4 - 6%



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ETOMIDATE

- MOA: GABA
- Sedation without analgesia
- Dose: 0.1 mg/kg
- Onset: 1-2 min; Duration: 15 min
- Side effects: thrombophlebitis and cardiac arrhythmias (propylene glycol), myoclonus
- Contraindications: reduction
- Reversal: None
 - Thrombophlebitis: pre-treat with lidocaine
 - Myoclonus: pre-treat with mag sulfate



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Considerations in Pregnancy

- Benzodiazepines – Category D
 - Midazolam preferred (avoid in 1st trimester) – FDA Category D, TGA Category C
 - Flumazenil – Category C
- Opioids
 - Fentanyl, Morphine – Category C
 - Naloxone – Category B/C
- Propofol – Category B
- Ketamine – Not assigned
- Etomidate – Category C

Viable pregnancy – consider OR instead of deep sedation since patient has high aspiration risk

Medscape www.medscape.com	
A	Controlled studies show no risk.
B	No evidence of risk in humans; the chance of fetal harm is remote.
C	Risk not excluded. Adequate studies lacking. Chance of fetal harm but benefits outweighs risks.
D	Positive evidence of risk. Studies in humans show fetal risk. Potential benefit in pregnant women may outweigh risk.
X	Contraindicated.

Source: Cardiosource © 2007 by the American College of Cardiology Foundation.



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Step 3

Consent the patient!

- Explain risks of sedation
- Possible need for intubation
- Discuss side effects of drugs
- How are you preparing for these risks?
- Some EDs have a video for patients to watch

Give discharge paperwork

Ensure patient has transportation



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Step 4

GET READY!

*By failing to prepare, you are
preparing to fail.*

Benjamin Franklin



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People

- Who is performing the procedure?
- Who is performing the sedation?
- What is your hospital policy?
- How many nurses are available to help?



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Setting the stage





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Drugs

- IV access and fluids
- Your drug of choice
- Reversal agent easily accessible (e.g. Narcan)
- Consider phenylephrine in the room



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Step 5

Monitor your patient

- Vitals every 5 minutes
- End-tidal on the monitor

Goal:

- Vitals stable
- Aldrete score = 10



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Aldrete Score

Activity:

- 2 = moves all extremities
- 1 = Moves 2 extremities
- 0 = No movement

CONSCIOUSNESS:

- 2 = Fully awake
- 1 = Arouses when name called
- 0 = Not responsive

Respiration: Rate = 12-20/minute and:

- 2 = Able to deep breathe & cough freely
- 1 = Limited respiration (dyspnea or splinting)
- 0 = No spontaneous respiration

O₂ SATURATION:

- 2 = O₂ sat > or = 95%, or at pre-procedure level
- 1 = O₂ sat 92-95%
- 0 = O₂ sat < 92%, or < pre-procedure level

CIRCULATION:

- 2 = Systolic BP +/- 20% of pre-procedure level
- 1 = Systolic BP +/- 21-49% of pre-procedure level
- 0 = Systolic BP +/- >50% of pre-procedure level



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Airway Issue?

- Check connection
- Stimulate patient
- Jaw thrust
- Increase O₂
- BVM
- LMA/intubate



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Case 1





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Case 2

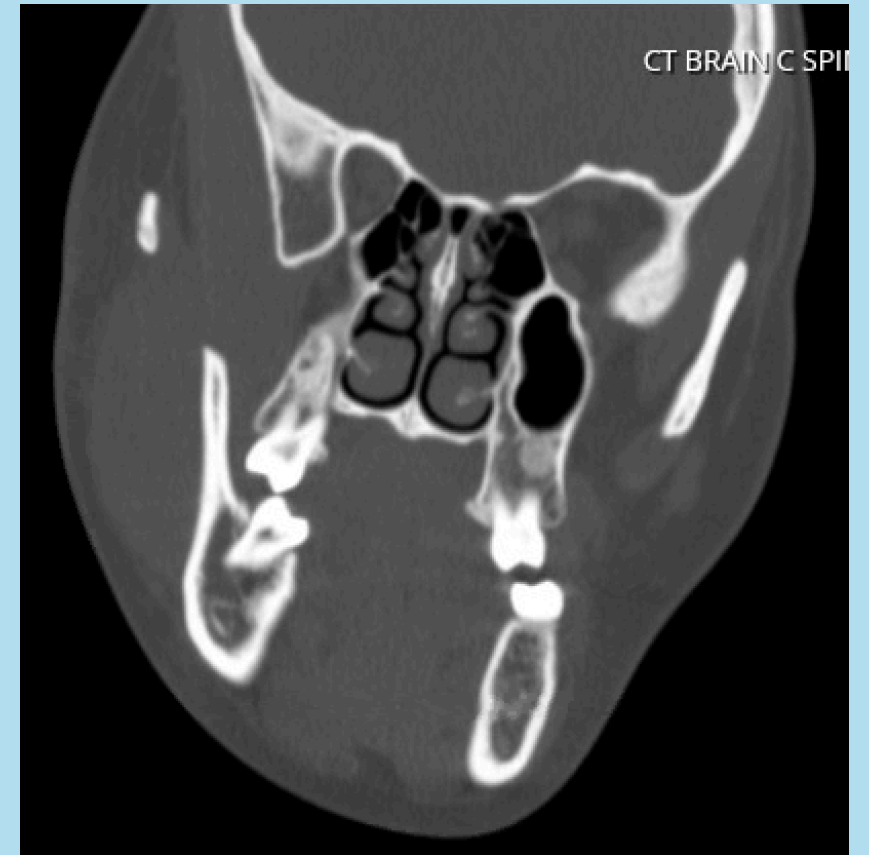
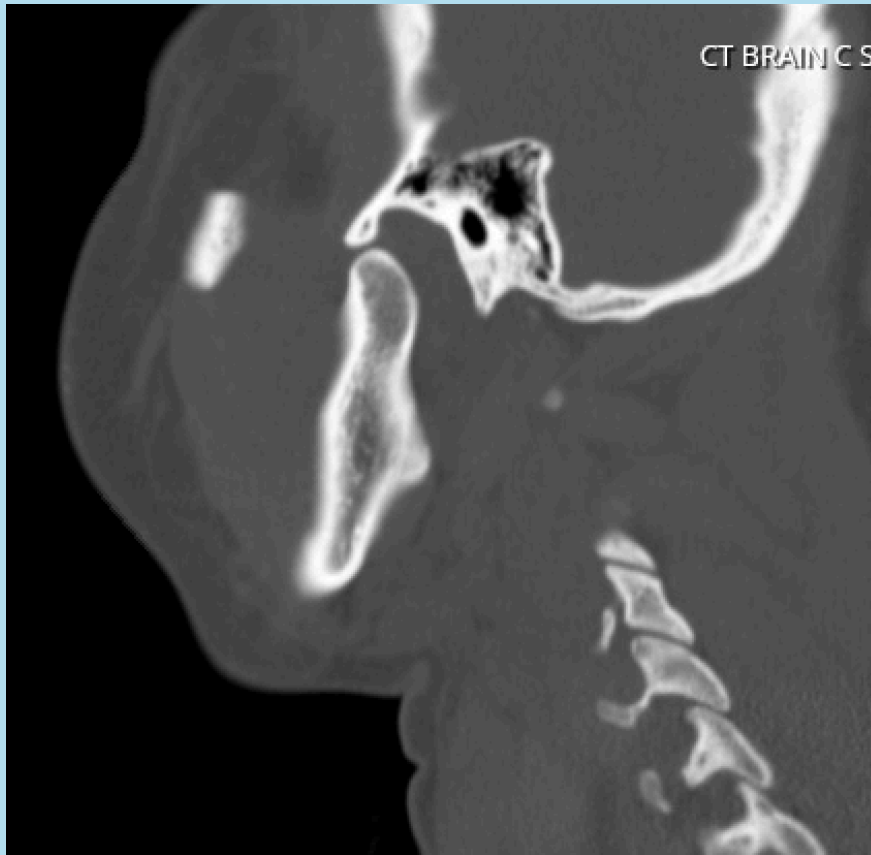




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Case 3





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Take home points

- Follow the 5 Steps
 - Think about your patient
 - Think about your drugs
 - Consider their side effects and how you would correct
 - Consent
 - Prepare (as if you were going to intubate!)
 - Monitor



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Thank You

Any Questions?

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