Nitrous Oxide

It's a Gas !

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Lecture Organized to Follow the Areas of Evaluation on Nitrous CSA Form

OHSU School of Dentistry
Clinical Skills Assessment for Nitrous Oxide/Oxygen Sedation
SoD Competency # 3, 4 and 6

The student must complete 5 N_2O experiences. The fifth attempt may qualify as a CSA in the DS 4 year OMS rotation. This CSA will be completed by the attending OMS faculty.

OMFS Faculty approval signature to challenge CSA : _____

Was the student able to:	Yes	No	Comments
1. Review the medical hx and establish baseline vitals?			
2. Demonstrate the proper set-up for the equipment?			
3. Check cylinder status?			
4. Pre-oxygenate for 5 minutes?			
5. Determine proper flow rate and monitor titration?			
6. Monitor patient during procedure?			
7. Provide post-procedure oxygen for 5 minutes?			
8. Determine patient recovery?			
9. Record post-treatment vitals?			
10. Provide post-op instructions to patient?			
11. Maintain infection control?			

Pass ☐ **No Pass** ☐

Remarks:

Review Med Hx and Obtain Baseline Vitals

- Standard Med Hx work up in OMS adequate.
-
- Give the patient an ASA rating.
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- Document need for nitrous
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- Be able to discuss why this patient is appropriate for nitrous.
  - Not Claustrophobic
  - Not a Severe Behavior Problem.
    - They can follow your directions.
    - They can respond appropriately to your verbal interaction.
  - No Nasal Obstruction/Stuffy Nose.

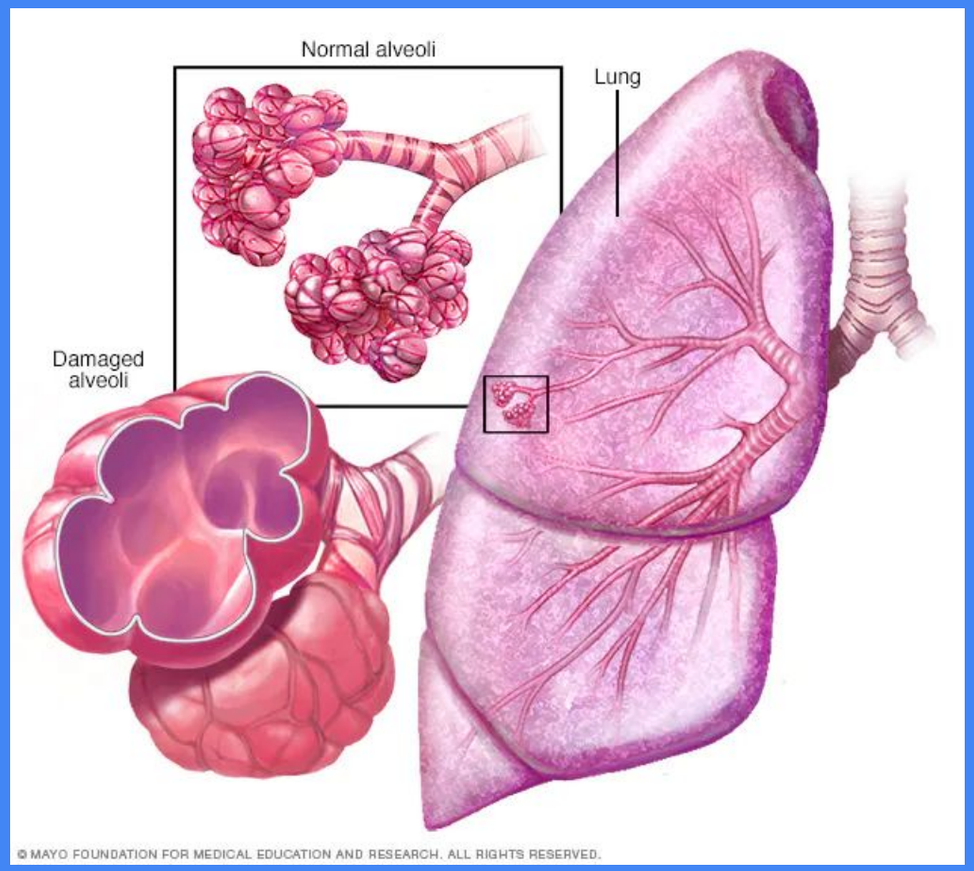
Contraindications to Nitrous

Closed Space Conditions
- In the Lungs
  - Bleomycin
  - Cystic Fibrosis
  - Emphysema

- Blocked Middle Ear
- Recent Pneumothorax
- Recent Vitreous/Retinal Surgery

COPD - Normal respiratory drive of high CO2 is “replaced” by low oxygen being signal to breath.

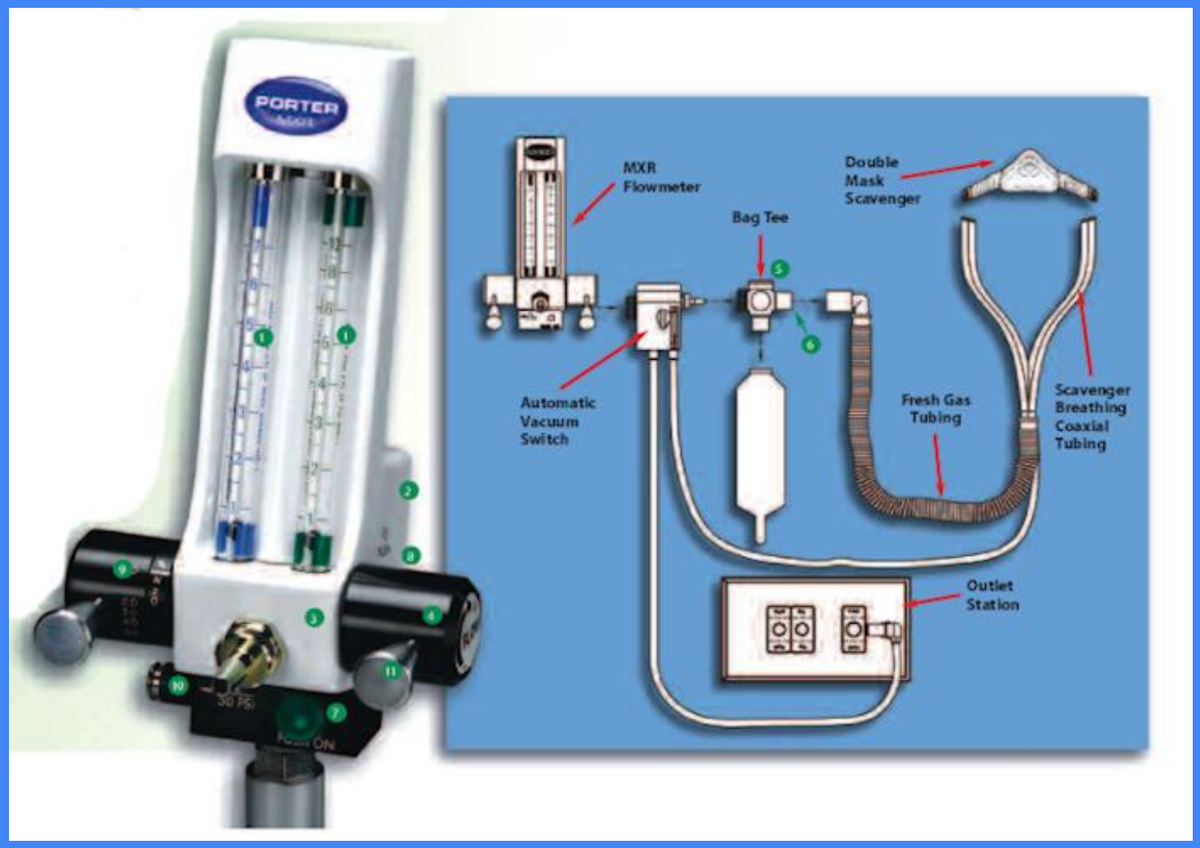
Pregnancy
- Possible toxicity of nitrous to fetal cells undergoing mitosis.
- Implicated in miscarriage/premature delivery.



Demonstrate Proper Set Up of Equipment

Name parts of equipment and what purpose they perform.

- Flow meter - visually shows percentage of nitrous flowing to pt.
- Mask - Provides a seal to ensure nitrous is delivered to pt.
- Scavenger system - remove excess nitrous from operatory environment.
- Reservoir Bag - Visual reference of breathing. Reservoir of gas mixture if breathing temporarily exceeds gas flow.



Check Cylinder Status

Why Does the Pressure Reading of Nitrous Stays Constant, Till Nearly Empty?

- Blue Steel Cylinders contain nitrous as a liquid.

- Tanks maintain a reading of Approx. 750 psi while there is mostly liquid in the tanks.

- There is some nitrous in gas form, in equilibrium with liquid phase in the tanks at all times. As gas comes out of tank, liquid nitrous converts to gas phase to replace what is used. So level of liquid gradually goes down.

- Liquids do not compress, so tank maintains constant pressure reading of 750 psi, until ⅞ empty of liquid, then pressure reading drops off rapidly.

Preoxygenate for 5 Minutes

- Allows you to set proper flow rate.
- Allows patient time to get accustomed to apparatus.
- Allows patient time to ease into the procedure.

Determine flow rate and monitor titration

- Reservoir bag should be partially inflated and “breathe” in and out to determine best flow rate of gas.
- Operator slowly advances (1 minute intervals) percent of nitrous.
- Operator talks to the patient and gets and maintains feedback from the patient how they are feeling.

Monitor patient during procedure

Monitor Blood Pressure and Pulse

Provider checks in with pt/maintains verbal contact.

Positive signs of nitrous sedation: Feeling calm, tingling, heaviness, relaxed body posture (no clenched fists, etc).

Negative signs are patient experiencing confusion, anxiety, or nausea.

Provide Post op oxygen for 5m after procedure

- Helps Flush out the Nitrous.
- Scavens the Nitrous leaving the patient’s lungs.
- Prevents Diffusion Hypoxia.

Determine Patient Recovery

Nitrous Form in Axium Prompts:

- Return to Baseline BP
- Normal verbal response
- Sit up
- Mucosal Color Normal
- Not Nauseous.

In the future you will not be using Axium. Another way to document in the chart that the patient has returned to baseline is to document the Aldrete Score in the patients chart.

The Aldrete Score assesses 5 categories: respiration, circulation, consciousness, color, level of activity, and assigns a number to the patient for each catagory. Adding the total up/the sum of the numbers for the 5 categories is the patient's Aldrete Score. (See next slide)

Aldrete Scoring System

Parameter	Description of patient	Score
Activity level	Moves all extremities voluntarily/on command	2
	Moves 2 extremities	1
	Cannot move extremities	0
Respirations	Breathes deeply and coughs freely	2
	Is dyspneic, with shallow, limited breathing	1
	Is apneic	0
Circulation (blood pressure)	Is 20 mm Hg > preanesthetic level	2
	Is 20 to 50 mm Hg > preanesthetic level	1
	Is 50 mm Hg > preanesthetic level	0
Consciousness	Is fully awake	2
	Is arousable on calling	1
	Is not responding	0
Oxygen saturation as determined by pulse oximetry	Has level >90% when breathing room air	2
	Requires supplemental oxygen to maintain level >90%	1
	Has level <90% with oxygen supplementation	0

Maximum total score is 10; a score of ≥9 is required for discharge.

Record Post treatment vitals:

Record BP every 15min,

Record pre-op and post op on Nitrous form in Axium.

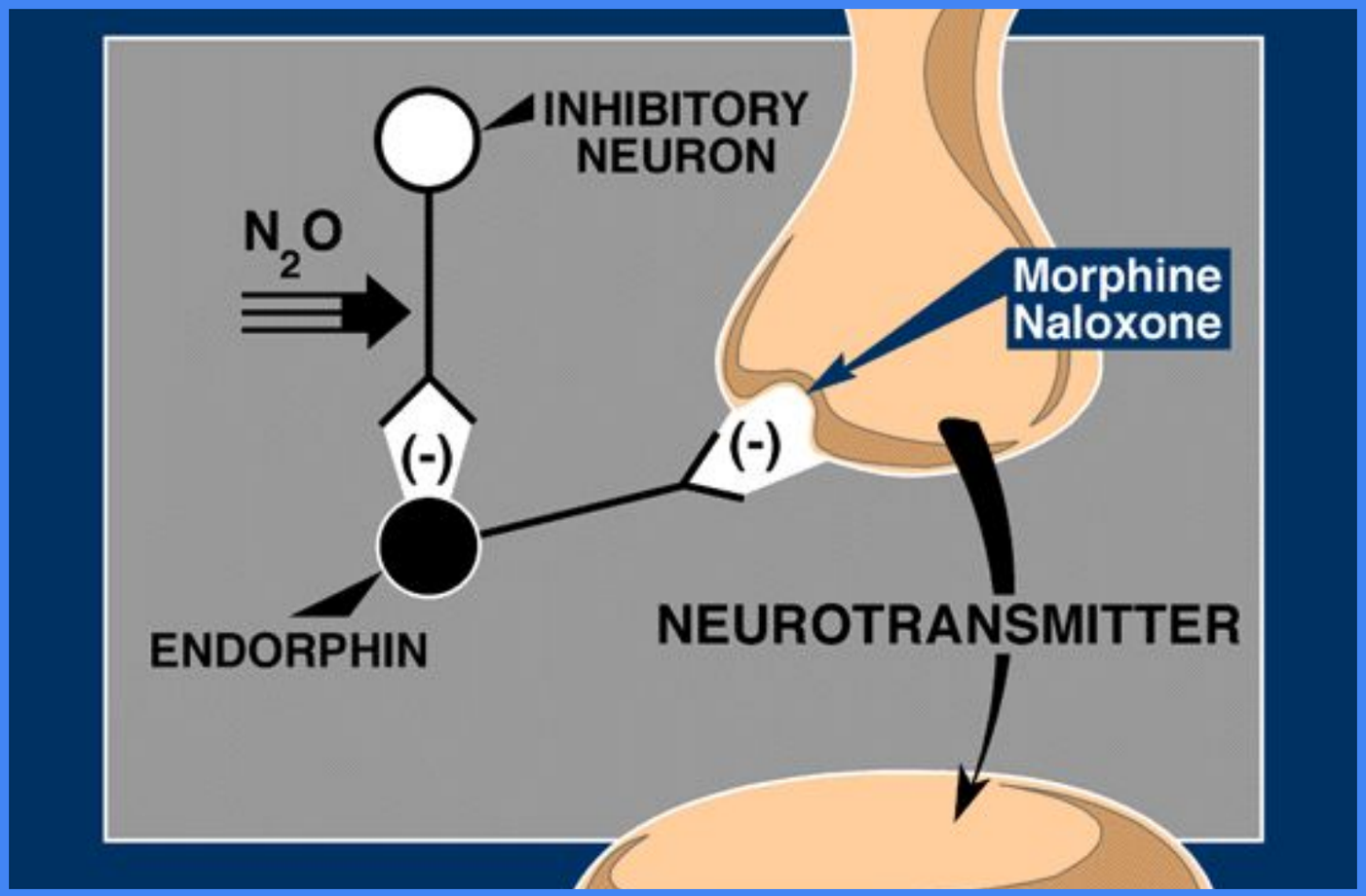
Maintain Infection Control:

Clean hoses and mask for each patient.

Wipe down appropriately after each use.

Other Questions About Nitrous

What is the Mechanism of Action?



Similar pathway as the opioids. Binding at Opioid receptors, stimulates Inhibitory Neurons that decrease flow of signal up and down Pain Neural Pathways

What are the Safety Mechanisms of the Equipment?

- Alarms - Low oxygen alarm.
- Color coded tanks.
- Diameter Indexing of oxygen and nitrous hose fittings.
- Emergency Air Inlet - Flow/pressure of Oxygen falls below a certain value, the flow of nitrous stops.

What Happens to the Nitrous in Our Bodies?

- Absorbed without change.
- Eliminated within 5 minutes
- Excreted/Eliminated Unchanged/Unmetabolized.

There are regulations about how to provide nitrous once you are out of school. The regulations reflect best practices for providing nitrous to our patients. Take a look at the regulations on the Oregon Board of Dentistry website.

- http://www.oregon.gov/Dentistry/