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Nitrous Oxide Labor Analgesia:
Inexpensive, Simple, Safe, Helpful &
Congruent with Midwifery & Physiologic Birth

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Nitrous Oxide (N₂O)

- Colorless, odorless, tasteless, inflammable, naturally-occurring gas
- Enters and leaves body through the lungs
- <1% metabolized, 99% exhaled
- Not stored in the body.

5 effects of N₂O on human physiology

1. ↓ hormonal response to stress
2. ↑ release of endogenous endorphins, dopamine and opium peptides
3. can cause pressure changes in the inner ear
4. oxidizes a physiologically active form of vitamin B-12, thus inactivating it
5. ↓ excitability of brain cells

Effects of N₂O that contribute to
helping women cope with labor pain:

- Relaxation, a sense of warmth
- Calmness, reduction in anxiety
- Analgesia
- Sedation
- Euphoria, pleasure
- Sense of detachment from the pain
- Sense of being able to control the pain

Limitations and Possible Negative Effects of Using N₂O During Labor

- Don't like using the mask
- Can't get the hang of the timing
- It doesn't help enough
- Dizziness,
- Headache
- Nausea, vomiting
- Fatiguing if used too long
- Hazy memory of experience while using it

All effects of N₂O are related to dose and time

DOSE = concentration X duration of use.

CONCENTRATION:

parts/100 (%) when use is purposeful and positive

parts/1,000,000 for unintentional occupational exposures

REPETITIVE EXPOSURES = exposure followed by unexposed time and re-exposure, i.e., occupational exposures

RESTITUTION = complete reversal of cellular effects over time

Porter Nitronox N₂O Labor Analgesia System



Nitronox Field Unit (for home births)



Nitronox Demand Valve & Mask



The woman controls the amount of N₂O is in her blood by controlling:

- if and when to use it;
- using it intermittently (only during contractions) or continuously (during and between contractions);
- how often, fast and deeply she inhales.

Occupational risk from exposure to N₂O

- Exposure comes from N₂O in mothers' exhalations.
- N₂O is heavier than air & tends drift towards the floor.
- 1980s studies of female dental assistants in CA and midwives in Sweden found ↑ months to conceive associated with exposure to high occupational exposure to N₂O.
- Ventilation and "Scavenging" the mother's exhalations virtually eliminate the risk. Mother should exhale into the mask during first few breaths after inhaling N₂O at end of each contraction); ventilation ok for occasional home births.
- N₂O does not pose a risk to people visiting a woman who is using it, even children.
- Badges can be used to measure your exposure.

Use of Nitrous Oxide during labor:

Safety and Risks for the Mother

- 50% concentration = low dose, especially if used intermittently.
- Constantly being eliminated from her blood through her lungs—all gone in a few minutes
- No adverse effects on the normal physiology of labor or labor progress; doesn't ↑ risk of any kind of labor complications; intensive monitoring not needed.
- Overlapping effects of opioids & N₂O ↑ risk of oxygen desaturation.
- Risk of falling if walking unassisted while somewhat sedated.

Use of Nitrous Oxide during labor:
Safety for the Fetus and Newborn

- N₂O crosses the placenta but doesn't affect the fetal heart.
- Not lipophilic; doesn't accumulate in baby's body.
- Mother's lungs constantly eliminate it from the fetal blood.
- No significant differences in incidence of meconium-stained amniotic fluid, blood-gas analyses of umbilical cord blood or Apgar scores, no matter how long mother used it.
- Oxygen desaturations in women using N₂O are infrequent, transient, not extreme, and do not cause poor Apgar scores.
- Half-life of N₂O in the newborn is <3 minutes.
- No negative effects on bonding or breastfeeding.
- After 100+ years of use, no reports of any baby being harmed.

**My rules for safe and effective
Administration of N₂O during labor**

1. Unchangeable preset 50%/50% blend of O₂ and N₂O.
2. Self-administration by the woman using the N₂O.
3. No one but the laboring woman may touch her mask.
4. Equipment must have a demand valve to stop supply of N₂O when she is not inhaling it.
5. Equipment must have capacity to provide scavenging (ventilation okay for occasional home births).

Midwives' Role & Responsibilities

1. Assess women for contraindications: untreated Vit. B-12 deficiency, can't hold mask reliably, high level of opioids in her system.,
2. Information needed for consent, possible side-effects, limited effectiveness
3. Teach how to use: no one else can touch the mask, hold the mask to create seal, only during contractions v. continuous, coordinating use with timing with contractions (start inhaling N₂O 30 seconds before next contraction, takes 3-4 contractions to learn), controlling level of N₂O in by how you breathe, based on how you feel blood, exhaling into the mask for scavenging.
4. Monitoring use, continue to provide support, she may need more pain management, may still need transfer if exhausted

N2Oduringlabor listserv

- <http://health.groups.yahoo.com/group/N2Oduringlabor/>