Women and Diversity Health

Santé des femmes et de la diversité

Clinician Practice Support
November 2025

PENTHROX™

For Management of Procedural Pain in CFHS Clinics

1 Overview: What is Penthrox™?

Active ingredient:
Low-dose methoxyflurane
(volatile inhalational analgesic)

Dose:
3 mL

Form:
Single-use inhaled vapor via hand-held device

Indications:
Short-term relief of pain associated with trauma or interventional medical procedures

Benefits:
Easy to use, rapid onset (~5 minutes) and short duration (25-60 minutes)

Approved use:
Conscious, healthy adults aged **18–65**

Contraindicated in:
- History of malignant hyperthermia (personal or family)
- Renal/hepatic impairment
- Allergy to fluorinated anesthetics
- Pregnancy or breastfeeding (insufficient data)

Not for use for chronic or repetitive pain

Aircrew must be advised that they will be grounded following administration of Penthrox™ for a minimum of 72 hours IAW FSG 300-1 para 8(c).

2 Preparation
(See Appendix)

Prepare in a **well-ventilated area** separate from procedure room.

Steps:
1. Tilt device at a **30-45° angle**
2. Remove cap
3. Pour **3 mL** into chamber, rotating device to coat walls
4. Replace caps on device and bottle
5. Provide device to patient

3 Administration
(See Appendix)

Self-administered by the patient
Instruct patient to inhale and exhale **intermittently or continuously** through mouth-piece
- **Intermittent use** = fewer side effects
- Can cover top hole for stronger dose ("boost")

Exhaled vapors **must** pass through mouth-piece and **activated charcoal filter**
After use:
- Replace caps
- Dispose of device and bottle in **sealed plastic bag**
- Place in **regular waste**
- **Do not send home with patient**

4 Side Effects

Generally **mild and short-lived**, but may vary between patients

Common side effects:
Dizziness, drowsiness, somnolence, headache

Other:
Mood changes, sedation, temporary memory problems, changes in concentration and coordination, euphoria

Management:
- Coach patient to take shallow breaths if pungent odor triggers coughing
- Instruct patient: do not drive or operate machinery post-administration

Serious side effects:
Document and report any serious reactions to Health Canada https://hpr-rps.hres.ca/side-effects-reporting-form.php?form=voluntary&lang=en

5 Duration of Action

Median Onset:
5 minutes

Continuous use:
25–30 minutes pain relief

Intermittent use:
Up to 60 minutes of pain relief

6 Protocol for Use

Clinician

Consider completing **DLN course**
Maintain current **CPR/BLS**
To avoid exposure, **supervise patient** in use
- The Penthrox™ inhaler is combined with an activated carbon filter which adsorbs exhaled methoxyflurane to reduce potential occupational exposure to health care providers. Patients should be supervised by a member of the healthcare team to ensure they exhale into the device

Pregnant or breastfeeding healthcare provider - Use caution, safety data is not available

Patient

Dosage limits:
- Max 2 bottles (6 mL) in a single administration or over 48 hours
- Max 5 bottles (15 mL) over 3 months

Vital signs:
Measure pre- and post-administration (BP, HR, RR, Temp, SpO_2)

Post-procedure:
- Observe patient for at least 15-30 min or until effects wear off
- Assess patient's fitness to drive. Evidence suggests psychomotor function returns to baseline approximately 30 minutes after standard 15-minute use. If the patient is alert, coordinated, and free of residual effects, they may resume normal activities, including driving.
- Aircrew are to be grounded for 72hrs post-administration

7 Safety Considerations

Patient-Centered

Contraindicated in patients with:
- Renal/hepatic impairment
- History of malignant hyperthermia (personal or family)
- Allergy to fluorinated anesthetics

Do not use in patients who are:

- Taking CNS depressants (i.e. opioids, sedatives, alcohol, sedating antihistamines)
- Unable to follow instructions or altered Level of Consciousness
- Pregnant/breastfeeding

Nephrotoxicity risk:

- Doses that exceed the recommended therapeutic limit can produce **irreversible nephrotoxicity**. Maximum dosing should be reviewed with patient to ensure they have not exceeded this threshold prior to administration.
- Do not exceed max dose
- Confirm total recent dose with patient

Avoid same day use with medications that affect the kidneys, as concomitant use may be additive (See monograph for details)

- Prior to administration, ask patient if they have taken any possible nephrotoxic medications the same day, including: antibiotics (e.g. tetracycline or gentamycin); recent contrast agents; Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

*****Nephrotoxic risk of NSAID use concomitant with Penthrox™ is largely theoretical. Preferable to use Acetaminophen prior to procedure and NSAIDs after the effects of Penthrox™ have subsided.

Environment/Provider-Centered

Prepare inhaler in **separate room** to avoid potential contamination of exam room if spill occurs

Patient to inhale/exhale through device – reduces occupational exposure

- Have another member of the health care team instruct and assist patient during use

Replace cap after use

Dispose in regular waste (bagged)

Ventilate room after use (leave door open)

Alternate rooms between uses

8 Spill Management

(See Safety Data Sheet for further information)

May be irritating if contact with eyes or skin occurs

- Flush skin/eyes if exposed

Vapors may cause drowsiness or dizziness

If spill occurs:

- Wear **safety goggles**, Polyvinyl Alcohol **(PVA) gloves**
- **Use air purifying respirator** with Type A Organic Vapour filter **IF** unable to ventilate room well
- Cover and absorb with liquid binding material (sand, sawdust, or vermiculite)

Exposure standard:

According to the Safety Data Sheet, there is no established exposure standard for methoxyflurane, standards are based on Halothane which is considered the most studied of the halogenated inhalational anesthetics and is generally accepted as applicable to other agents in this class.

Appendices & Resources

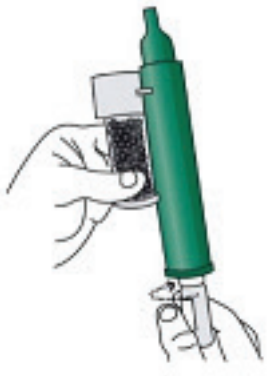
- **Appendix:** Preparation and use diagrams (Product Monograph, pp. 6–7)
- Safety Data Sheet: https://medicaldev.com/wp-content/uploads/2023/08/SDS_0001_R9_SDS_Penthrox.pdf
- Product Monograph (Jan 2025): Monograph PDF
- DLN Course: CFEME Methoxyflurane (Penthrox)

Appendix: Penthrox™ Preparation and Use (Product Monograph: Methoxyflurane, Jan 2025, pages 6 & 7)

Penthrox is a portable, lightweight, non-invasive inhaler for self-administration (single patient use). Instructions on the preparation of the PENTHROX inhaler and correct administration are provided below:

1. Ensure the Activated Carbon (AC) Chamber is inserted into the dilutor hole on the top of the PENTHROX inhaler.

2. Remove the cap of the bottle by hand or use the base of the PENTHROX Inhaler to loosen the cap with a 1/2 turn. Separate the inhaler from the bottle.

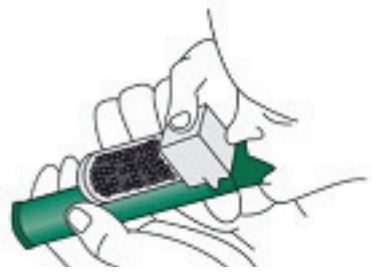


3. Tilt the PENTHROX Inhaler to a 45 angle and slowly pour the total contents of one PENTHROX botle into the base of the inhaler while rotating to ensure wick is adequately saturated. Note that PENTHROX has a fruity scent.

4. Place wrist loop over patient's wrist. Instruct patient to inhale through the pouthpiece of the PENTHROX inhaler to obtain analgesia. First few breaths should be gently. Then, instruct patient to breathe normally through inhaler.

5. Instruct patient to exhale into the PENTHROX inhaler so the exhaled vapor passes through the AC Chamber whick adsorbs any exhaled methoxyflurane.

6. If stronger analgesia is required, instruct patient to cover dilutor hole on the AC chambers with finger during use.



7. Instruct patient to inhale intermittently to achieve adequate analgesia. Continuous inhalation will reduce duration of use. Minimum dose to achieve analgesia should be administered.

8. Replace cap onto PENTHROX bottle. Place used PENTHROX inhaler and used bottle in sealed plastic bag and dispose through normal waste.