

good margin of safety, with doses provided by the Pentrox inhaler being far below those needed to produce any renal or hepatic toxicity, and it is used safely within other health care settings. The inhaler design is simple and would not require adaptation of existing dental clinics for its use. Regarding environmental concerns, the activate carbon chamber should prevent environmental release of the drug. No sedative agent is perfect, however, and the disadvantages discussed here must also be considered. More research needs to be undertaken to establish its efficacy in managing dental pain and anxiety to allow for its use alongside dental treatment. Should it be proven effective, methoxyflurane could be a useful and environmentally friendly alternative to N₂O.

Ethics declaration

The authors declare no conflicts of interest.

Author contributions

Jack Williams and Katherine Wilson both conceived the idea for the opinion paper following reading a published paper regarding methoxyflurane. Jack Williams wrote the paper, with contribution and guidance from Katherine Wilson. Both authors finalised the opinion paper before submission.

References

- Hierons R J, Dorman M L, Wilson K, Averley P, Girdler N. Investigation of inhalational conscious sedation as a tool for reducing anxiety in adults undergoing exodontia. *Br Dent J* 2012; DOI: 10.1038/sj.bdj.2012.839.
- National Institute for Health and Care Excellence. Sedation in children and young people. 2010. Available at <https://www.nice.org.uk/guidance/cg112/evidence/full-guideline-136287325> (accessed April 2024).
- Duane B, Lee M B, White S, Stancliffe R, Steinbach I. An estimated carbon footprint of NHS primary dental care within England. How can dentistry be more environmentally sustainable? *Br Dent J* 2017; **223**: 589–593.
- Duane B, Dixon J, Ambibola G *et al*. Embedding environmental sustainability within the modern dental curriculum – exploring current practice and developing a shared understanding. *Eur J Dent Educ* 2021; **25**: 541–549.
- Davidson E A, Kanter D. Inventories and scenarios of nitrous oxide emissions. *Environ Res Lett* 2014; **9**: 105012.
- Dillow G. Gone to waste, or something to get your teeth into? *Br Dent J* 2005; **199**: 9–12.
- Bawden A. Essex hospital pulls gas and air for pregnant women amid concerns for staff. *The Guardian* (London) 2023 January 25.
- UK Government. Nitrous oxide: legitimate uses and appropriate controls. 2023. Available at <https://www.gov.uk/government/consultations/nitrous-oxide-legitimate-uses-and-appropriate-controls/outcome/nitrous-oxide-legitimate-uses-and-appropriate-controls#:~:text=Some%20of%20these%20harms%20are,Misuse%20of%20Drugs%20Act%201971> (accessed April 2024).
- Pentrox. How to administer. 2023. Available at <https://pentrox.co.uk/wp-content/uploads/2023/04/Pentrox-UK-How-to-Administer-Poster-for-Website.pdf> (accessed April 2024).
- Ruff R, Kerr S, Kerr D, Zalberg D, Stevens J. Occupational exposure to methoxyflurane administered for procedural sedation: an observational study of 40 exposures. *Br J Anaesth* 2018; **120**: 1435–1437.
- Jephcott C, Grummet J, Nguyen N, Spruyt O. A review of the safety and efficacy of inhaled methoxyflurane as an analgesic for outpatient procedures. *Br J Anaesth* 2018; **120**: 1040–1048.
- Ikeda S. The reincarnation of methoxyflurane. *J Anesth Hist* 2020; **6**: 79–83.
- Gaskell A L, Jephcott C G, Smithells J R, Sleight J W. Self-administered methoxyflurane for procedural analgesia: experience in a tertiary Australasian centre. *Anaesthesia* 2016; **71**: 417–423.
- Grindlay J, Babl F E. Review article: Efficacy and safety of methoxyflurane analgesia in the emergency department and prehospital setting. *Emerg Med Australas* 2009; **21**: 4–11.
- Buntine P, Thom O, Babl F, Bailey M, Bernard S. Prehospital analgesia in adults using inhaled methoxyflurane. *Emerg Med Australas* 2007; **19**: 509–514.
- Nguyen N Q, Toscano L, Lawrence M *et al*. Patient-controlled analgesia with inhaled methoxyflurane versus conventional endoscopist-provided sedation for colonoscopy: a randomized multicentre trial. *Gastrointest Endosc* 2013; **78**: 892–901.
- Hartshorn S, Middleton P M. Efficacy and safety of inhaled low-dose methoxyflurane for acute paediatric pain: A systematic review. *Trauma* 2019; **21**: 94–102.
- Abdullah W A, Sheta S A, Nooh N S. Inhaled methoxyflurane (Pentrox) sedation for third molar extraction: a comparison to nitrous oxide sedation. *Aust Dent J* 2011; **56**: 296–301.
- Kingon A, Yap T, Bonanno C, Sambrook P, McCullough M. Methoxyflurane: a review with emphasis on its role in dental practice. *Aust Dent J* 2016; **61**: 157–162.
- British National Formulary. Methoxyflurane. 2024. Available at <https://bnf.nice.org.uk/drugs/methoxyflurane/> (accessed April 2024).
- Electronic Medicines Compendium. Pentrox 99.9%, 3ml inhalation vapour, liquid. 2023. Available at <https://www.medicines.org.uk/emc/product/1939/smpc#about-medicine> (accessed April 2024). ✦

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