IAPD
International Association of Paediatric Dentistry

Nitrous oxide inhalation in Pediatric Dentistry

Foundational Articles and Consensus Recommendations

References

American Dental Association. Guidelines for the use of sedation and general anesthesia by dentists. October 2016. Available at: https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/oral-health-topics/ada_sedation_use_guidelines.pdf Accessed January 19, 2024.

American Academy of Pediatric Dentistry. Use of nitrous oxide for pediatric dental patients. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2023:393-400.

Ashley P, Anand P, Andersson K. Best clinical practice guidance for conscious sedation of children undergoing dental treatment: an EAPD policy document. Eur Arch Paediatr Dent. 2021;22(6):989-1002.

Ashley PF, Chaudhary M, Lourenço-Matharu L. Sedation of children undergoing dental treatment. Cochrane Database Syst Rev. 2018;12(12):CD003877.

National Health Service (NHS). Hospital dentistry: Sedation pathway delivery guide. Available at: https://www.saad.org.uk/index.php/component/edocman/?task=document.viewdoc&id=343&Itemid= Accessed May 6th, 2024.

Rossit M, Gil-Manich V, Ribera-Uribe JM. Success rate of nitrous oxide-oxygen procedural sedation in dental patients: systematic review and meta-analysis. J Dent Anesth Pain Med. 2021;21(6):527-545.

Background

Nitrous oxide/oxygen (N2O/O2) is a gas agent with anxiolytic and sedative effects combined with varying degrees of analgesia and muscular relaxation. It causes central nervous system (CNS) depression and euphoria with little adverse effect on the respiratory system. N2O/O2 inhalation, when used judiciously, is a safe and effective anxiolytic technique that also diminishes pain and enhances effective communication between a patient and health care provider. It may allow the patient to tolerate unpleasant procedures by reducing or relieving anxiety, discomfort or pain.

IAPD Consensus Recommendations

1. Regulations regarding the use of Nitrous Oxide Inhalation sedation varies between countries and healthcare governing bodies. It is the dentist's responsibility to abide by the appropriate regulations of their country or state with regards to patient evaluation, personnel and equipment, training, monitoring, documentation, discharge criteria, and management of emergencies. **(Consensus-based statement; Global agreement: 98%)**

2. Nitrous oxide inhalation sedation may be indicated for behaviour guidance during restorative or minor surgical intervention of anxious or fearful children categorized as American Society of Anesthesiologists (ASA) Class I or Class II, who can effectively communicate (often >3 years) and cope with nasal breathing. **(Consensus-based statement; Global agreement: 96%)**

3. Nitrous oxide may be contraindicated for those with existing upper respiratory infections, sinusitis or other conditions that inhibit nasal breathing, Chronic Obstructive Pulmonary Disease (COPD), treatment with Bleomycin sulphate, recent ear, nose, and throat operations, and B12 deficiency. **(Consensus-based statement; Global agreement: 95%)**

4. The delivery system should have clear flow-meter dosage indicators, emergency air-valve, non-rebreathing face mask, tubes with low breathing resistance and contain a fail-safe device to ensure that nitrous oxide immediately stops if the oxygen level drops or is cut off. Good ventilation in the room and a scavenger system is essential for occupational safety. **(Consensus-based statement; Global agreement: 96%)**

5. All personnel should be adequately trained in nitrous oxide administration and management of complications arising from the sedation, as specified by local regulations. **(Consensus-based statement; Global agreement: 100%)**

6. The titration or rapid induction techniques may be indicated by the clinical scenario and abiding by local regulations. The maximum concentration of nitrous oxide for minimal sedation and anxiolysis is 50% and an absolute maximum concentration is 70%. The oxygen supply may never be less than 30%. **(Consensus-based statement; Global agreement: 85%)**

7. Continuous clinical observation of the patient's responsiveness, skin color & respiratory rate, pulse rate and rhythm and oxygen saturation is recommended. **(Consensus-based statement; Global agreement: 95%)**

8. If nitrous oxide is combined with any pharmacological agent, its effect is potentiated and may result in deeper levels of sedation, and consequently the concentration of nitrous oxide should be adjusted accordingly. Additional training and monitoring equipment is recommended for this deeper form of sedation. **(Consensus-based statement; Global agreement: 91%)**

9. 100% oxygen is advised for at least five minutes post operatively to limit diffusion hypoxia and other adverse effects. **(Consensus-based statement; Global agreement: 98%)**

10. Extended use of nitrous oxide at a higher concentration may lead to nausea/ vomiting, headache, disorientation, distention of the abdomen or bowel and lethargy. Furthermore, nitrous oxide has been associated with environmental concerns because of its potential contribution to the greenhouse effect. **(Consensus-based statement; Global agreement: 93%)**

How to cite: IAPD Foundational Articles and Consensus Recommendations: Nitrous Oxide, 2024. http://www.iapdworld.org/2024_03_nitrous-oxide.