

# **American Dental Society of Anesthesiology**



## **College of Sedation in Dentistry**

### **Study Guide for Master Examination**

This examination is intended for dentists who have completed training in the safe and effective use of enteral, inhalation and intravenous sedation. The examination consists of 100 multiple choice questions that address the following topics and objectives. A bibliography of suggested learning resources is also provided.

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# Topics and Objectives

## **General concepts of sedation and general anesthesia**

1. Distinguish the classic ether stages of general anesthesia introduced by Guedel from the more contemporary definitions based on the concept of three general anesthesia components.
2. Distinguish the clinical signs and the respiratory and cardiovascular changes that accompany minimal, moderate and deep sedation, and those that accompany general anesthesia.
3. Describe essential aspects of preoperative medical assessment and evaluation including the ASA risk categories and the Mallampati airway classifications.
4. Identify anatomical and physiological characteristics unique to pediatric and geriatric patients that must be considered when planning enteral or parenteral minimal or moderate sedation.

## **Pharmacological considerations**

5. Explain basic principles of pharmacodynamics including mechanisms of action, effects, drug potency versus efficacy, and potential additive effects when combining more than one sedative agent.
6. Define and explain basic pharmacokinetic processes distinguishing those following PO, IM and IV administration.
7. Explain the mechanism of action, adverse effects and the principal pharmacokinetic features for medications commonly used for enteral and parenteral moderate sedation:

Benzodiazepines: diazepam, midazolam, lorazepam, triazolam

Antihistamines: diphenhydramine, hydroxyzine, promethazine

Opioids: fentanyl, meperidine, nalbuphine

8. Explain essential pharmacological features of nitrous oxide, including principles of gas uptake, distribution and minimum alveolar concentration (MAC).
9. Describe the function of each component of a nitrous oxide inhalation machine.
10. Discuss the abuse potential, occupational hazards, contraindications and any respiratory or cardiovascular influences for nitrous oxide and other sedative agents.
11. Explain the actions, effects and patterns of clearance for local anesthetics, epinephrine and levonordefrin including cardiovascular influences and proper dosage calculations.

## **Patient monitoring and records**

12. Describe fundamental physiological principles of respiration and circulation.
13. Describe physiological and technical considerations for monitoring ventilation, oxygenation and perfusion.
14. Describe appropriate patient education, discharge criteria and appropriate sedation records for patients receiving moderate sedation.

## **Managing complications**

15. Describe the recognition and management of possible complications associated with inhalation, minimal and moderate sedation, including anatomical and foreign body obstruction, laryngospasm, respiratory depression, delirium, nausea, vomiting and aspiration.
16. Describe the recognition and management of possible medical emergencies such as bradycardia/hypotension, acute hypertensive episodes, allergic reaction, acute coronary syndromes, and stroke.

## **Intravenous technique and complications**

17. Describe the components of an intravenous infusion including principal features that distinguish various intravenous solutions.
18. Explain advantages of intravenous catheters over rigid-needle devices for intravenous access.
19. Describe the proper selection of appropriate sites for an intravenous infusion including locations to avoid.
20. Describe the recognition and management of local complications associated with intravenous drug administration including extravasation, phlebitis, and inadvertent intraarterial injection.

## **Learning Resource List**

**All sedation providers should be familiar with the characteristics and influences of various sedation levels and general anesthesia.<sup>†</sup>**

	Minimal Sedation (Anxiolysis)	Moderate Sedation/Analgesia (Conscious Sedation)	Deep Sedation/Analgesia	General Anesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful* response to verbal or tactile stimulation	Purposeful* response after repeated or painful stimulation	Unarousable, even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained	May be impaired

\* Reflex withdrawal from a painful stimulus is not considered a purposeful response.

*Minimal Sedation (Anxiolysis)* \_ a drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

*Moderate Sedation/Analgesia (Conscious Sedation)* \_ a drug-induced depression of consciousness during which patients respond purposefully\* to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

*Deep Sedation/Analgesia* \_ a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully\* following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained.

*General Anesthesia* \_ a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

Because sedation is a continuum, it is not always possible to predict how an individual patient will respond. Hence, practitioners intending to produce a given level of sedation should be able to rescue patients whose level of sedation becomes deeper than initially intended. Individuals administering *Moderate Sedation/Analgesia (Conscious Sedation)* should be able to rescue patients who enter a state of *Deep Sedation/Analgesia*, while those administering *Deep Sedation/Analgesia* should be able to rescue patients who enter a state of general anesthesia.

<sup>†</sup> American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Practice guidelines for sedation and analgesia by non-anesthesiologists. *Anesthesiology* 2002;96:1004-17

## **Textbook**

Malamed SF. Sedation: A Guide to Patient Management. Philadelphia: Elsevier Saunders.

## **The following articles are available for download from ADSA website.)**

Becker DE. Preoperative Medical Evaluation: Part 1: General principles and cardiovascular considerations. Anesth Prog 2009;56(3):92-102.

Becker DE. Preoperative Medical Evaluation: Part 2: Pulmonary, endocrine, renal and miscellaneous considerations. Anesth Prog 2009;56(4):135-144.

Becker DE. Pharmacokinetic Considerations for Moderate and Deep Sedation. Anesth Prog 2011;58(4):166-173

Becker DE. Pharmacodynamic Considerations for Moderate and Deep Sedation. Anesth Prog 2012;59(1):28-42.

Becker DE, Reed KL. Local anesthetics: Review of Pharmacological Considerations. Anesth Prog 2012;59(2):in press.

Becker DE, Rosenberg M. Nitrous oxide and the inhalation anesthetics. Anesth Prog 2008;55(4): 124-31.

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Casabianca AB, Becker DE. Cardiovascular Monitoring: Technical and Physiological Considerations. Anesth Prog 2009;56(2):53-60.

Becker DE. Fundamentals of ECG interpretation. Anesth Prog 2006;53(2):53-64

Becker DE. Nausea, vomiting and hiccups: A review of mechanisms and treatment. Anesth Prog 2010;57(4):150-57.

Becker DE, Haas DA. Recognition and management of complications during moderate and deep sedation. Part 1: Respiratory Considerations. Anesth Prog 2011; 58(2):82-92

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Donaldson M, Gizzarelli G, Chanpong B. Oral Sedation: A primer on anxiolysis for the adult patient. Anesth Prog 2007;54:118-129.