Use of Anesthesia Providers in the Administration of Office-Based Deep Sedation/General Anesthesia to the Pediatric Dental Patient

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Abstract

This best practice provides recommendations for dentists who elect to use anesthesia providers in their office or other non-accredited treatment facilities. The scope of this guidance covers personnel, facilities, quality assurance requirements, and documentation of patient care. Anesthesia providers (dental or medical anesthesiologists, oral and maxillofacial surgeons, certified registered nurse anesthetists, certified anesthesiologist assistants) must be licensed, credentialed, and certified in pediatric advanced life support (PALS) or advanced pediatric life support (APLS). Facilities must meet all local, state, and federal laws, codes, and regulations regarding provision of anesthesia services, controlled drug storage, fire prevention, safety and health, and accommodations for disabled individuals. A framework for patient monitoring and required emergency equipment are described. This best practice includes recommendations for documenting indications for deep sedation/general anesthesia, informed consent, patient/parent instructions, the patient's preoperative health evaluation, a time-based anesthesia record, and recovery notes. Risk management and quality assurance measures are considered essential. Use of in-office anesthesia providers offers alternatives and opportunities for safe, quality compassionate care for pediatric dental patients requiring deep sedation or general anesthesia, especially when access to traditional surgical facilities is limited.

This document was developed through a collaborative effort of the American Academy of Pediatric Dentistry Councils on Clinical Affairs and Scientific Affairs to offer updated information and recommendations to dental practitioners choosing to treat pediatric dental patients in the dental office or other non-accredited ambulatory treatment center using deep sedation/general anesthesia delivered by licensed anesthesia providers.

KEYWORDS: ADOLESCENTS; CHILD; ANESTHESIA, GENERAL; ANESTHESIOLOGISTS; DEEP SEDATION; DELIVERY OF HEALTH CARE; DENTAL OFFICES

Purpose

The American Academy of Pediatric Dentistry (**AAPD**) recognizes that there are pediatric dental patients for whom routine dental care using nonpharmacologic behavior guidance techniques is not a viable approach.[1] Advanced modalities are needed for those who are unable to cooperate due to lack of psychological or emotional maturity and/or mental, physical, or medical conditions.[1] The AAPD intends this best practice to assist the dental practitioner who elects to use a currently-licensed anesthesia provider (**CLA**) for the administration of deep sedation/general anesthesia (**DS/GA**) for pediatric dental patients in a dental office or other facility outside of an accredited hospital or ambulatory surgical center. This document discusses personnel, facilities, documentation, and quality assurance mechanisms necessary to provide optimal, responsible, and safe patient care.

Methods

Recommendations on the use of CLA in the administration of office-based DS/GA were developed by the Clinical Affairs Committee – Sedation and General Anesthesia Subcommittee, adopted in 2001[2], and last revised in 2019[3]. For this revision, literature searches of the PubMed/MEDLINE and Google Scholar databases were conducted using the terms: *office-based general anesthesia*, *pediatric sedation*, *deep sedation*, *sleep dentistry*, and *dental sedation*; fields: all; limits: within the last 5 years, humans, birth through age 18, English, meta-analysis, and systematic reviews. The search returned 66 articles that matched the criteria. The articles were evaluated by title and/or abstract and relevance of selecting anesthesia providers for the delivery of office-based DS/GA. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

ABBREVIATIONS

AAP: American Academy of Pediatrics. **AAPD:** American Academy of Pediatric Dentistry. **APLS:** Advanced pediatric life support. **ASA:** American Society of Anesthesiologists. **BLS:** Basic life support. **CAA:** Certified anesthesiologist assistant. **CLA:** Currently-licensed anesthesia provider(s). **CRNA:** Certified registered nurse anesthetist. **DS/GA:** Deep sedation/general anesthesia. **$EtCO_2$:** End-tidal carbon dioxide. **PALS:** Pediatric advanced life support.

Background

Pediatric dentists seek to provide oral health care to infants, children, adolescents, and persons with special health care needs in a manner that promotes excellence in quality of care and concurrently induces a positive attitude in the patient toward dental treatment. Basic behavior guidance techniques or communication and communicative guidance have allowed most pediatric dental patients to receive treatment in the dental office with minimal discomfort and without expressed fear.[1] Minimal or moderate sedation has allowed others who are anxious or less compliant to receive treatment. Some children and individuals with special health care needs who have extensive oral needs, acute situational anxiety, uncooperative age-appropriate behavior, immature cognitive functioning, disabilities, or medical conditions require DS/GA to receive dental treatment in a safe and humane fashion.[4] Access to hospital-based anesthesia services may be limited for a variety of reasons, including restriction of coverage by third-party payors.[4,5]

Pediatric dentists and others who treat children may utilize well-trained CLA in their offices or other facilities outside of an accredited hospital or ambulatory surgical center. Office-based DS/GA can provide benefits for the patient and the dental team. Such benefits may include

- improved access to care.
- improved ease and efficiency of scheduling.
- decreased administrative procedures and facility fees when compared to a surgical center or hospital.
- minimized likelihood of patient recall of procedures.
- decreased patient movement which may optimize quality of care.
- use of traditional dental delivery systems with access to a full complement of dental equipment, instrumentation, supplies, and auxiliary personnel.

The use of well-trained CLA to administer DS/GA to pediatric dental patients is an accepted treatment modality.[6-11] DS/GA has inherent associated risks. Peri- and postoperative respiratory adverse events are the most common critical complications that can lead to morbidity.[12] Pediatric respiratory risk decreases with age.[12-15] The pediatric airway evolves dramatically from birth to adolescence.[12] The infant and young child are at increased risk of airway obstruction because of smaller tracheal diameter, relatively large tongue and tonsils, and small mandible.[12] In addition, patients younger than 2 years of age have decreased functional residual capacity and, therefore, limited oxygen reserve.[9,12] If the CLA will be treating patients younger than 3 years of age, it has been recommended that they have focused expertise in pediatric airway management and vascular access.[12]

Pharmacologic behavioral modification is only to be used when the risks of orofacial disease outweigh the benefits of alternative modalities. The AAPD supports the provision of DS/GA when clinical indications have been met and additional properly-trained and credentialed personnel and appropriate facilities are used.[1,9] In many cases, the patient may be treated in an appropriate outpatient facility (including the dental office) because the extensive medical resources of a hospital may not be deemed necessary for delivering routine health care.[6]

Studies suggest pediatric procedures performed outside of the operating room have increased risk, with an elevated critical event rate, compared to a traditional operating room.[12-14] Variables such as patient demographics, office location/set-up, lack of immediately-available backup, and staff emergency-response training may account for the difference.

Recommendations

Clinicians may utilize CLA to provide deep sedation or general anesthesia in the office to facilitate the provision of oral health care. Practitioners choosing to use these modalities must be trained and credentialed in rescue emergency procedures and be familiar with their patient's medical history, as well as the regulatory and professional liability insurance requirements needed to provide this level of pharmacologic behavior management. This best practice does not supersede, nor is it to be used in deference to, federal, state, and local credentialing and licensure laws, regulations, and codes.

Personnel

Together, the American Academy of Pediatrics (**AAP**) and AAPD have recommended that DS/GA techniques in the dental office have separate providers for the dentistry and anesthesia.[9] The singular intraoperative focus of each practitioner can help optimize efficiency and safety, but the dentist must be able to assist the CLA with rescue of a patient who experiences an adverse event.[9] DS/GA techniques in the dental office require the presence of the following individuals throughout the procedure.[9]

- CLA who has experience with specific patient populations being treated and is independent of performing or assisting with the dental procedure
- Operating dentist who has experience and specialized training with skills to treat patients under general anesthesia
- Additional personnel (eg, dental assistant, nurse) certified in basic life support (**BLS**), pediatric advanced life support (**PALS**), or advanced pediatric life support (**APLS**).

The operating dentist, when employing CLA to administer DS/GA, is responsible for verifying and carefully reviewing their credentials and experience. Significant pediatric training, including anesthesia care of the very young, and experience in a dental setting are important considerations, especially when caring for young pediatric and special needs populations.

As permitted by state regulation, the CLA may be one of the following.

- Physician anesthesiologist/dentist anesthesiologist
- Certified registered nurse anesthetist
- An oral and maxillofacial surgeon

To provide anesthesia services in an office-based setting,

- CLA must be a dental or medical practitioner with current state certification to independently administer DS/GA in a dental office. This individual must be in compliance with state and local laws on anesthesia practices. Laws vary from state to state and may supersede any portion of this document.
- if state law permits a certified registered nurse anesthetist (**CRNA**) or certified anesthesiologist assistant (**CAA**) to function under the direct supervision of a dentist, the dentist is required to have completed training in DS/GA and be licensed or permitted for that level of pharmacologic management, appropriate to state law. Furthermore, to maximize patient safety, the dentist supervising the CRNA or CAA would not simultaneously be providing dental treatment. The CRNA or CAA must be licensed with current state certification to administer DS/GA in a dental office. Providers must be in compliance with state and local laws on anesthesia practices. Laws vary from state to state and may supersede any portion of this document.

The dentist and CLA must be compliant with the AAP's/AAPD's *Guideline on Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures*[9] or other appropriate guideline(s) of the American Dental Association, the American Society of Dentist Anesthesiologists (ASDA), the American Society of Anesthesiologists (**ASA**)[8], and other organizations with recognized professional expertise and stature. The recommendations in this document may be exceeded at any time if the change involves improved safety or is superseded by state law.

The dentist and CLA must collaborate to enhance patient safety. Continuous and effective perioperative communication and appropriately timed interventions are essential in mitigating adverse events or outcomes. The dentist introduces the concept of DS/GA to the parent, justifies its necessity, and provides preoperative instructions and informational materials. The dentist or a designee coordinates medical consultations when necessary and conveys pertinent information to the CLA. The CLA ultimately determines who can safely be treated in an office setting, explains potential risks, and obtains informed consent for sedation/anesthesia. Office staff should understand their added roles and responsibilities and special considerations (eg, loss of protective reflexes) associated with office-based DS/GA.

Both the CLA and the operating dentist must, at a minimum, have appropriate training and up-to-date certification in patient rescue, including drug administration and PALS or APLS.[9] The CLA's sole responsibility is to administer drugs, perform appropriate interventions, and constantly monitor and record the patient's vital signs, depth of sedation, airway patency, and adequacy of ventilation.[9] The CLA must be skilled to establish intravenous access and draw and administer rescue medications. This individual must have the training and skills to rescue a patient with apnea, laryngospasm, airway obstruction, hypotension, anaphylaxis, or cardiopulmonary arrest, including the ability to open the airway, suction secretions, provide constant positive airway pressure (CPAP), insert supraglottic devices (oral airway, nasal trumpet, or laryngeal mask airway), and perform successful bag-valve mask ventilation, tracheal intubation, and cardiopulmonary resuscitation.[9]

The CLA would assume the lead during the management of any perioperative anesthetic emergencies. The dentist must be capable of providing skilled assistance with the rescue of a child experiencing any of the adverse events described above.[9] The CLA is responsible for ensuring the operating dentist and supportive staff can provide skilled support and have an established emergency and transport protocol in the event of an adverse incident.

Personnel experienced in post anesthetic recovery care and trained in advanced resuscitative techniques (eg, PALS) must be in attendance and provide continuous respiratory and cardiovascular monitoring during the recovery period.[9] The CLA shall determine when the patient exhibits respiratory and cardiovascular stability and discharge criteria[9] have been met. The operating dentist must have up-to-date certification in PALS or APLS, and clinical staff must be well-trained in emergency recognition, rescue, and protocols and maintain BLS certification for health care providers.[7,9] Contact numbers for local emergency medical and ambulance services must be readily available, and a protocol for immediate access to back-up emergency services must be clearly outlined.[9]

Emergency preparedness is important.[16] Regularly scheduled emergency training exercises keep the team ready and improve outcomes[17,18] (see Table). In addition to being prepared, the team needs to communicate effectively. A closed-loop approach to communication is recommended so that tasks are not missed during the emergency.[17]

Table. CONSIDERATIONS IN FREQUENCY OF CONDUCTING EMERGENCY EXERCISES[18]

Changes in plans	Changes in the emergency response plan need to be disseminated and practiced.
Changes in personnel	New staff members need training in their emergency response roles. Emergency roles left by former staff members need to be filled.
Changes in property	Infrastructure changes can affect how the plan is implemented. New equipment may require training for their use.
Foreseen problems	Protocols for newly identified problems must be established, practiced and implemented.

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Available at: "https://apps.who.int/iris/bitstream/handle/10665/207054/9789290614791_eng.pdf?sequence=1&isAllowed=y". Accessed February 28, 2023.

Facilities

Facilities utilized for office-based DS/GA must meet all applicable local, state, and federal laws, codes, and regulations. This includes, but is not limited to, compliance with controlled drug storage, fire prevention, building construction and occupancy, accommodations for the disabled, occupational safety and health, and disposal of medical waste and hazardous waste.[9] Because patients may drift across the sedation continuum from wakefulness and the intended level of sedation to a deeper level or, in the case of intended deep sedation, to general anesthesia, the facilities must have the capability to support a deeper level of sedation than planned.[9,19] When CLA are utilized for office-based administration of deep sedation or general anesthesia, the treatment room must accommodate the dentist and auxiliaries, the patient, the CLA, the dental equipment, and all necessary anesthesia delivery equipment along with appropriate monitors and emergency equipment. Expeditious access to the patient, anesthesia machine (if present), and monitoring equipment should always be available.

Delineating equipment necessary for the provision of DS/GA is beyond the scope of this document, but equipment must be appropriate for the technique used and consistent with the guidelines for CLA, in accordance with governmental rules and regulations. Because laws and codes vary from state to state, *Guidelines for Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures*[9] should be followed as the minimum requirements.

For DS/GA, monitoring of the patient's level of consciousness and responsiveness, heart rate, blood pressure, respiratory rate, expired end-tidal carbon dioxide (**$EtCO_2$**) values, and oxygen saturation must be continuous.[9] When adequacy of ventilation is difficult to observe using capnography, use of an amplified, audible precordial stethoscope is encouraged.[9] In addition, an electrocardiographic monitor and a defibrillator capable of delivering an attenuated pediatric dose are required for DS/GA.[9] Emergency equipment must be readily accessible and should include Yankauer suction, drugs necessary for rescue and resuscitation (including 100% oxygen capable of being delivered by positive pressure at appropriate flow rates for up to 1 hour), and age-/size-appropriate equipment to resuscitate and rescue a nonbreathing and/or unconscious pediatric dental patient and provide continuous support while the patient is being transported to a medical facility.[8,9] The licensed practitioners are responsible for ensuring that medications, equipment, and protocols are available to treat malignant hyperthermia when triggering agents are used.[20] Recovery facilities must be available and suitably equipped. Backup power sufficient to ensure patient safety should be available in case of emergency power outage.[9]

Documentation

Prior to delivery of DS/GA, patient safety requires that appropriate documentation shall address rationale for DS/GA, anesthesia and procedural informed consent, instructions to parent, dietary precautions, preoperative health evaluation, and any prescriptions along with the instructions given for their use.[9] Because laws and codes vary from state to state, *Guidelines on Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedure*[9] should be followed as minimum requirements for a time-based anesthesia record.

- Vital signs: Pulse and respiratory rates, blood pressure, heart rhythm, oxygen saturation, and $EtCO_2$ must be continuously monitored and recorded on a time-based record throughout the procedure, initially every 5 minutes and then, as the patient awakens, at 10- to 15-minute intervals until the patient has met documented discharge criteria.[9]
- Drugs: Name, dose, route, site, time of administration, and patient effects (eg, level of consciousness, patient responsiveness) of all drugs, including local anesthesia, must be documented.[2] When anesthetic gases are administered, inspired concentration and duration of inhalation agents and oxygen shall be documented.[9]
- Recovery: The condition of the patient, that discharge criteria have been met, time of discharge, and into whose care the discharge occurred must be documented. Requiring the signature of the responsible adult to whom the child has been discharged, verifying that this individual has received and understands the postoperative instructions, is encouraged.[9]

Various business/legal arrangements may exist between the treating dentist and the CLA. Regardless, because services were provided in the dental facility, the dental staff must maintain all patient records, including time-based anesthesia records, so they may be readily available for emergency or other needs. The dentist must assure that the CLA also maintains patient records and that they are readily available.

Risk management and quality assurance

Dentists who utilize office-based CLA must take all necessary measures to minimize risk to patients. Knowledge, preparation, and communication between professionals are essential. Prior to DS/GA, the patient must undergo a preoperative health evaluation by an appropriate medical or anesthesia provider.[7,9] High-risk patients should be treated in a facility properly equipped and staffed to provide for their care.[7,9] The dentist and CLA must communicate during treatment to share concerns about the airway or other details of patient safety. Furthermore, they must work together to develop and document mechanisms of quality assurance.

The ASA Physical Status Classification was designed to preoperatively assess a patient's systemic health and medical comorbidities.[21] When coupled with factors such as type/length of surgery, frailty, and deconditioning, it may serve as a proxy in perioperative risk assessment.[21] The team should minimize risk and maximize benefit through medical optimization.[9,12,21] When preforming a preoperative evaluation, vigilance to both modifiable and nonmodifiable risk factors associated with

respiratory complications must be considered. Understanding risk factors reduces morbidity and mortality.[12,14,21]

As part of their *Guidelines for Office-Based Anesthesia*, the ASA recommends participation in ongoing risk management and continuous quality improvement.[8] Untoward and unexpected (adverse) outcomes must be documented and reviewed to maintain a desired level of quality and safety in services provided. Open discussion and evaluation of critical events improve the quality of care for the pediatric dental patient.[9] Providers should be knowledgeable about state board requirements associated with adverse outcomes.

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