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American Association of Oral and Maxillofacial Surgeons

# White Paper


## EXECUTIVE SUMMARY

## Office-based Anesthesia Provided by the Oral and Maxillofacial Surgeon

### Background and Purpose

The American Association of Oral and Maxillofacial Surgeons (AAOMS) and its Board of Trustees embrace safety as a core value. This white paper reflects this priority and is intended to highlight and summarize key elements of the OMS team approach to anesthesia delivery. AAOMS believes adhering to the principles outlined in this document will provide a solid foundation for the safe, effective and affordable delivery of anesthesia in the office setting – understanding these principles are not set absolute requirements nor do they guarantee specific outcomes.

A Special Committee on Office-based Anesthesia White Paper was appointed in October 2021 by the Board of Trustees to review and revise the 2016 paper. The special committee was tasked with reviewing relevant materials, including the *AAOMS Parameters of Care*, the American Society of Anesthesiologists' Practice Guidelines for Sedation and Analgesia by Non-anesthesiologists, AAOMS white papers and other publications related to anesthesia safety. The committee supplemented this foundation with other evidence-based resources and considered the opinions of experts in office-based anesthesia.

**Note:** Each section of this Executive Summary is linked to its corresponding section of the white paper for those who desire more information on a specific topic. Click the  icon to read more on each topic.

### Oral and Maxillofacial Surgery Residency Education and Training

From the earliest days of the specialty, there has been an emphasis on outpatient anesthesia education, with ongoing updates to formal training requirements aimed at improving patient safety. The current standards for OMS resident anesthesia training provide for a progressive didactic and clinical learning experience. Combined, anesthesia and medical service rotation

assignments are for a minimum of 32 weeks. Of those, at least 20 weeks must be spent on anesthesia service, and at least four weeks should be dedicated to pediatric anesthesia. As with other off-service rotations, the OMS resident must function as at least a Post-Graduate Year-1 (PGY-1) anesthesia resident with commensurate levels of responsibility. A minimum of eight weeks must be allocated toward medical/surgical subspecialty services, with a focus on preoperative risk assessment.

OMS ambulatory anesthesia delivery includes the administration of deep sedation or general anesthesia for procedures performed on pediatric, adult and geriatric patients. The cumulative experience of each graduating resident includes the competent administration of general anesthesia and deep sedation for a minimum of 300 cases, at least 50 of which must involve individuals younger than 13 years old. Training also includes treating children under age 8 using techniques such as behavior management, inhalation analgesia, sedation and general anesthesia.

The clinical experience is supported by a program that incorporates lectures and seminars emphasizing perioperative evaluation of all patients, risk assessment, anesthesia and sedation techniques, monitoring, and the diagnosis and management of complications. These experiences are intended to prepare the graduating resident to ensure favorable outcomes when treating the scope of patients typically seen in OMS offices.

### History of Anesthesia in Oral and Maxillofacial Surgery

The role of oral and maxillofacial surgeons in providing anesthesia in an office-based setting has a long history, emanating from the time of Horace Wells' practice with nitrous oxide in the 1840s to contemporary techniques that utilize multiple agents.



In the mid-1900s, injectable anesthetics became more prominently used by the OMS community, allowing better control of the depth and duration of anesthesia without the need to intubate or otherwise use the oral or nasal pathways for delivery. Methohexital (Brevital), a barbiturate with a short duration of action, was reported in 1940 by Adrian O. Hubble, an OMS who used repeated doses to sufficiently abolish pain and recall in the office setting. From 1945 to the 1960s, techniques started to combine methohexital with meperidine (Demerol) or other opiates, along with an anticholinergic drug, to achieve what became known as balanced anesthesia. The introduction of intravenous benzodiazepines, particularly diazepam (Valium) in 1963, marked the beginning of a broader continuum of anesthesia. As newer sedative agents were developed, many older drugs were replaced with more effective and shorter-acting agents with fewer side effects. For example, methohexital (Brevital) has mostly been replaced with propofol (Diprivan) in addition to diazepam with midazolam (Versed) and meperidine (Demerol) with fentanyl. Low-dose ketamine in combination with other agents is used by many OMSs.

To build on the already impressive safety record of the OMS anesthesia team model, AAOMS encourages its members to participate in the Dental Anesthesia Incident Reporting System (DAIRS), an anonymous, self-reporting registry system to collect and analyze anesthesia incidents.

### OMS Team Model of Anesthesia Delivery

For any team to operate effectively, it must work as a cohesive unit that is trained to recognize potential problems before they arise and respond effectively to any crisis. The OMS team employs a minimum of three individuals: 1) a highly trained OMS, 2) a trained staff member whose sole responsibility is to monitor the patient and 3) a surgical assistant. The team is led by an OMS who has completed a minimum of 12 to 14 years of post-secondary education. The OMS must be certified in Advanced Cardiovascular Life Support (ACLS) in addition to completing the mandatory AAOMS Office Anesthesia Evaluation (OAE) program. The monitor, who must be certified in Basic Life Support (BLS), is responsible for maintaining the patient's head position to ensure a patent airway. They also must observe the patient's vital signs,

EKG, EtCO<sub>2</sub>, pulse oximeter and other important monitoring information. Any deviation from normal is reported immediately. Additionally, certification in anesthesia assistance can be obtained through the Dental Anesthesia Assistant National Certification Examination (DAANCE), a psychometrically validated process. The third team member is the surgical assistant who is, at a minimum, a dental assistant with current certification in BLS.

### Therapeutic Goals and Outcomes

Therapeutic goals revolve around the successful management of anxiety, fear and pain. Equally important is an understanding of expected therapeutic outcomes along with possible anesthesia-related risks and complications. The selection of appropriate techniques for the administration of local anesthesia, sedation, and general anesthesia to meet the specific needs of a given patient and procedure must be determined by the surgeon based on training, experience and an understanding of risks and benefits.

Providers must be trained and skilled in rescuing a patient whose level of anesthesia becomes deeper than originally intended. Following are the recognized levels of anesthesia that may be employed in an effort to manage anxiety, fear and pain:

- **Minimal Sedation (Anxiolysis):** Patient responds normally to verbal commands, although cognitive function and coordination may be impaired. Airway reflexes and ventilatory and cardiovascular functions are unaffected.
- **Moderate Sedation/Analgesia:** Patient responds purposely to verbal commands, either alone or with light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation and cardiovascular function are usually maintained.
- **Deep Sedation/Analgesia:** Patient not easily aroused but responds purposely following repeated or painful stimulation. The ability to independently

maintain airway patency and ventilation may be impaired. Cardiovascular function is usually maintained.

- **General Anesthesia:** Patient not arousable, even with painful stimulation. The ability to maintain ventilatory function independently is often impaired, and patients may require assistance. Cardiovascular function may be impaired.

### Techniques

An individual patient's medical conditions and physiology, responses to medications, the doses administered, and the technique used influence the level of anesthesia. A variety of administration routes can be employed to achieve the desired therapeutic goals, including local, enteral, parenteral and inhalation. The level of anesthesia achieved is independent of the administration method.

Local anesthetics minimize the amount of other anesthetic agents necessary to achieve therapeutic goals. They commonly contain vasoconstrictors to maintain higher drug concentrations at the target site and minimize surgical bleeding. Enteral anesthetic agents typically include benzodiazepines, non-benzodiazepine hypnotics and alpha-2 agonists. Many variables confound the ability to predict the behaviors of drugs when administered via the enteral route. Common parenteral agents include opioids, benzodiazepines, propofol, ketamine, barbiturates and alpha-2 agonists. Parenteral routes include intravenous, intramuscular, and subcutaneous – with the intravenous route providing the most rapid onset and bioavailability. All parenterally administered medications should follow Centers for Disease Control and Prevention (CDC) Safe Injection Practices to Prevent Transmission of Infections to Patients as well as American Society of Anesthesiologists labeling guidelines.

### Anesthesia Risks and Complications

Known risks and complications of the planned anesthetic must be discussed with the patient and family as a part of the informed consent process, with all related questions answered as accurately as possible. For healthy patients, office-based anesthesia has been demonstrated over time to be safe and

effective. There are rare instances where serious complications occur, and the OMS team must be prepared to appropriately recognize, diagnose and manage them. Constant vigilance in patient selection and appropriate anesthetic planning are essential in minimizing and preventing anesthesia-related risks.

### Patient Evaluation

The provision of local anesthesia, deep sedation or general anesthesia involves the administration of agents with potentially significant systemic effects. It is important to identify patients with varying degrees of physical and medical compromise and adjust the anesthetic plan accordingly. Consultation with other healthcare providers and additional diagnostic testing to appropriately risk-stratify the patient may be indicated. At times, it may be appropriate for a patient to be treated in an ambulatory surgical center or hospital operating room.

Patient assessment begins with a thorough medical history that includes specific questions about previous surgical and anesthetic experiences. The initial office visit should include obtaining vital signs such as blood pressure, heart rate and oxygen saturation (SpO<sub>2</sub>), which serves as a surrogate monitor of cardiopulmonary function. All abnormal values should be flagged for review. Based on the above, patients should be classified using the American Society of Anesthesiologists (ASA) physical status system. In an ideal setting, patients within ASA I and II classes are the best candidates for office-based anesthesia.

Since the ability to establish an airway remains critical, the Mallampati classification is a good tool for predicting difficulty related to establishing and maintaining an airway in addition to intubating patients. BMI also is a useful parameter to help predict anesthesia-related complications, with patients who fall into a normal or overweight category posing limited risk. Challenges related to maintaining a patent airway or establishing one when it is lost are compounded not only by the BMI but also length

and diameter of the neck. Sternomental distance is an important predictor for difficult intubation.

**Cardiac Disease** – A history of cardiac disease may require further evaluation and consultation with the patient’s primary care physician or cardiologist. Important subtypes include the following:

- **Coronary artery disease and myocardial infarction:** Angina or shortness of breath with exercise may suggest ischemic heart disease. Determining functional status using metabolic equivalents (METs) helps assess disease severity, and the use of chronic and episodic vasodilator medications (including nitroglycerine) provides additional insight.
- **Cardiac arrhythmias:** Cardiac arrhythmias can result in significant morbidity during anesthesia. The use of epinephrine-containing local anesthetics, endogenous epinephrine and certain anesthetic agents – such as ketamine and inhalational agents – can result in arrhythmias. Patients with Wolff-Parkinson-White syndrome and those with second-degree Type II or third-degree heart blocks are not ideal candidates for office-based deep sedation or general anesthesia. Atrial fibrillation may predispose to a rapid ventricular rate that can lead to acute decompensation and heart failure. Patients with implanted pacemakers and internal defibrillators warrant cardiac consultation.
- **Congestive failure:** Congestive heart failure is a progressive loss of the normal cardiac output. Symptoms of non-compensated failure may include shortness of breath, peripheral edema or fatigue. The functional status provides valuable insight into disease severity. Patients with moderate to severe congestive heart failure are not candidates for office-based deep sedation or general anesthesia.
- **Valvular heart disease and prosthetic valves:** Patients may be referred for multiple extractions prior to a planned valve replacement. Depending on the complexity of the extractions, individuals may not be suitable for treatment in an office-based setting. Once valve replacement has occurred, patients are typically more stable.

**Respiratory Disease** – One of the major risks of office-based anesthesia delivery is the development

of apnea or hypopnea. Improvements in surveillance with end-tidal carbon dioxide (EtCO<sub>2</sub>) monitors and a precordial stethoscope alert the anesthetic team to the development of apnea in real time. Obese, pediatric or patients with comorbid medical conditions have reduced functional residual capacity and may desaturate relatively rapidly.

**Asthma** – Patients with asthma require particular attention in light of the potential for anesthesia-related complications and should be screened with questions such as: In the past four weeks, has the patient had: 1) Daytime symptoms more than two times per week? 2) Night waking due to asthma? 3) Use of short-acting beta agonists for symptoms more than two times per week? 4) Any activity limitations due to asthma? In general, the patient can be considered well-controlled if he or she answers no to all questions, partly controlled if yes to one or two questions, and uncontrolled if they report yes to three or more. Mild intermittent asthmatics and mild persistent asthmatics are reasonable candidates for office-based deep sedation and general anesthesia. Moderate and severe asthmatics are better managed in an ambulatory surgery center or hospital operating room. Avoidance of known triggers for histamine release such as non-steroidal anti-inflammatory medications (NSAIDs) and morphine is important. Patients with an upper respiratory infection in the previous month are not good candidates for deep sedation or general anesthesia given the increased risk of bronchospasm.

**Hepatic Disease** – Various causes of hepatic disease include viral hepatitis, chronic alcoholism and hepatotoxicity from drugs. Since many anesthetic drugs are bound to plasma proteins that are produced in the liver, hepatic disease may result in increased free-drug within the body's circulation and the potential for enhanced and prolonged drug activity. Since the liver is responsible for metabolism of many agents, there may be an increased half-life and prolonged anesthetic effects.



**Renal Disease** – Urinary excretion is a major mechanism for drug elimination. Therefore, renal disease can result in prolonged drug action, particularly when metabolites also have a therapeutic effect. Since the kidney is responsible for electrolyte and fluid homeostasis, renal disease can result in significant electrolyte abnormalities and fluid shifts, which may decrease cardiovascular reserve as predispose to arrhythmias.

**Pediatric Patients** – Children are not simply small adults. They have many unique and constantly changing anatomic, physiologic, pharmacologic and psychologic differences with their medical and surgical history typically derived completely from the caregiver. Systemic diseases and prescription medications are uncommon, and past anesthetic experiences may be rare. A targeted physical exam should include an airway, heart and lung evaluation. Recent upper respiratory infection, fever, mucopurulent nasal drainage, audible wheezing or a productive cough should prompt further evaluation. Small nares, large tongue and enlarged tonsils or adenoids can cause passive airway obstruction. The pediatric airway is far more reactive to stimuli such as secretions or foreign bodies than an adult airway. As a result, laryngospasm must be anticipated, quickly identified and skillfully managed. Pediatric cardiac output can be maintained over a wide range of preloads without failing, but young patients rely solely on heart rate to maintain blood pressure. As a result, bradycardia must be immediately detected and corrected. Properly sized equipment is vital to the delivery of anesthesia and rescue in the instance of an emergency. Prior to anesthetic administration, calculating emergency dosages of commonly used drugs can facilitate a smooth, coordinated and successful outcome.

**Pregnant Patients** – Although elective surgery can usually be delayed, there are situations in which a pregnant female will require urgent surgery. In addition to maternal safety, anesthetic management must maintain fetal safety, which includes avoiding intrauterine fetal asphyxia and preterm labor. Most local anesthetics are considered safe during pregnancy, and single exposure to the commonly used sedatives (benzodiazepines, opioids and nitrous oxide) have undetermined risk of teratogenicity. Consultation with the practitioner managing the patient's prenatal care

may be helpful in determining appropriate timing for surgery and the optimal perioperative care.

**Obese Patients** – Obese patients present with special anatomic and physiologic problems. Obesity, defined by body mass index, is associated with increased risk for Type 2 diabetes, hypertension and cardiovascular disease relative to normal weight and waist circumference. Airway management may be difficult due the overabundance of soft tissue or anatomic deficiencies. Comorbid conditions, decreased functional residual capacity, complex airways and difficult intravenous access place obese patients at higher risk for complications. Practitioners should be experienced in airway management, including endotracheal intubation and supraglottic device placement. The use of opioids should be considered with caution.

**Geriatric Patients** – It is prudent to consider age, frailty and comorbidities as anesthetic risk factors. Medical consultation may be necessary. Determination of the geriatric patient's mental status is important as postoperative delirium is more common in patients with dementia or preoperative mental status changes. Assessing the level of exercise tolerance can be integral to estimating the patient's ability to tolerate the combined stress of anesthesia and surgery. The anesthetic plan should consider reduced dosing with an expectation for longer elimination half-lives of anesthetic drugs. Medications with anticholinergic effects should be limited and preference should be given to reversible anesthetic agents.

### **Monitoring**

Continuous real-time monitoring should reflect the OMS team model's shared patient safety responsibilities. Monitoring should be started before the administration of anesthesia and continue throughout the procedure and the post-anesthetic recovery period. In addition to diligent surveillance through direct observation, electronic monitors should include EKG, pulse oximetry, blood pressure, and

pulse and end-tidal CO<sub>2</sub>. Pre-cordial and pre-tracheal stethoscopes also may be used as deemed useful. Despite the advancements offered by today's high-tech monitors, the maxim of "treat the patient, not the monitor" should be respected.

### Office Anesthesia Evaluation

The Office Anesthesia Evaluation (OAE) is a unique peer review process that has been in existence since 1975. The OAE was conceived, developed, implemented and mandated by AAOMS through its state societies to benefit the public its members serve. The AAOMS OAE digital app (available on Apple Store or Google Play) can be used to assist with this process. To maintain AAOMS membership, all member oral and maxillofacial surgeons must complete this mandatory program at least every five years. The process involves a thorough inspection of the member's practice locations, team, equipment and patient care skills particularly as they pertain to the delivery of anesthesia and preparedness to manage office emergencies. Inspections are typically conducted by outside surgeons or state dental board designates.

The program consists of four parts: 1) evaluation of office facilities, medications and emergency equipment; 2) management of simulated office emergencies; 3) debriefing; and 4) observation of the anesthesia and surgeries performed in the office, subject to state laws and patient consent. The AAOMS *Office Anesthesia Evaluation Manual* published periodically (9th edition available) guides the process. Among other things, the *OAE Manual* provides sample forms, checklists and a variety of emergency scenarios to guide crisis drills and scrimmages for the anesthetic team.

### Mobile Anesthesia

Mobile anesthesia is a model where a qualified individual delivers services in a facility where the anesthesia provider does not practice or have input into office design or staffing. Anyone involved in the mobile anesthesia model should be aware of applicable state laws, rules and regulations, professional resources, and the scope of their professional training and experience. Mobile anesthesia providers retain the responsibility of providing coordinated and patient-focused care and must maintain the same standards as

someone delivering anesthesia in their home office. This includes, but is not limited to, being responsible for patient selection, the anesthetic plan, monitoring and recovery, emergency preparedness, record-keeping and overall patient safety.

### Emergency Preparedness

Despite the best efforts of all concerned, crisis events can and do occur. It is important to have a process in place to prevent as well as recognize and respond to potential crises. Preparation has two components: systems and practice.

Systems are deliberate strategies to limit risk and enhance outcomes. Examples include written patient assessment protocols, standardized clinical documentation forms or electronic medical record templates, pre-procedure timeout checklists, and crash cart checks to ensure all supplies are available and functioning.

Practice is an effective approach to improving outcomes. It has two components: drills and scrimmages. Drills are used to develop the skills necessary to perform effectively, while scrimmages require the application of knowledge and skills during simulated challenges. Together, they help the team to progress through stages of learning from unconscious incompetence (unable to do something with little idea what needs to be done), to conscious incompetence (understand what needs to be done but unable to do it), conscious competence (aware of what needs to be done and able to do it with conscious effort), and unconscious competence (know what to do and able to act without conscious effort).

Practices should be conducted on a regular basis, be challenging, mimic real-life situations, include constructive feedback, emphasize a growth mindset and incorporate an element of engaging team building.

Scenarios should emphasize the types of patients the office typically treats, including age, medical and



physical status, and procedure types. While focusing on events where anesthetics are most likely to be administered, they also should include other spaces such as the recovery room, waiting room, hallway and bathroom. Algorithms should be creative rather than formulaic and allow for progression through a variety of workable solutions. To make sessions realistic, the team should use a manikin and carry out tasks in a manner that approximates reality, such as performing CPR, managing the airway, connecting IV tubing and drawing up mock drugs. AAOMS members and their offices must conduct quarterly mock crisis drills.

### **Provider Training/Continuing Education**

Active engagement in lifelong learning from multiple sources supports the efficiency and effectiveness of both the OMS and his or her staff. AAOMS supports the OMS team in keeping abreast of the latest knowledge and techniques through the efforts of the AAOMS Committee on Continuing Education and Professional Development and the Committee on Anesthesia. Together, they are responsible for creating high-level contemporary lectures, webinars and symposia on anesthesia topics offered as in-person and online programs. Examples for members include but are not limited to the Anesthesia Update lecture series delivered before the AAOMS Annual Meeting and the AAOMS Anesthesia Patient Safety Conference. Courses intended for members and their staff include Advanced Protocols for Medical Emergencies in the OMS Office, Anesthesia Assistants Skills Lab and the Anesthesia Assistants Review Course.

### **Simulation Training**

AAOMS has created a simulation-based learning experience intended to provide every OMS and their staff training in Office-Based Emergency Airway Management (OBEAM) and Office-Based Crisis Management (OBCM). Modules in the program include didactic and hands-on mastery-based skills training and adult cooperative learning modules that allow participants to learn and update their airway skills as well as improve team dynamics.

### **Ongoing Quality Assessment and Lifelong Learning**

Ongoing quality assessment and lifelong learning are signature elements in practice efficiency, procedural effectiveness, the delivery of high-quality state-of-the-art patient care, and optimized patient safety and emergency response. Given that oral and maxillofacial surgery spans both medicine and dentistry, ongoing quality assessment has been an integral part of the specialty from both process and quality improvement perspectives.

Lifelong learning continues beyond the completion of formal education and results in the growth of important knowledge and skills. The results should be monitored using objective measures. AAOMS and the American Board of Oral and Maxillofacial Surgery fully support this process in tangible ways.

### **Conclusion**

AAOMS expects this white paper will be revised over time as warranted, as is the case where there is ongoing evolution of knowledge, technology and practice preferences. Reality informs AAOMS that there is a necessary balance between what is ideal and what is practical, particularly in communities where resources are limited and access to care is challenged. While it is understood the choice of agents and techniques is dependent upon the experience, training and preferences of individual practitioners, safety can never be sacrificed.



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### Background and Purpose

The American Association of Oral and Maxillofacial Surgeons (AAOMS) and its Board of Trustees embrace safety as one of its core values. Accordingly, anesthesia will always be an important research and educational priority. AAOMS has long recognized the pursuit of safety in anesthesia requires a multi-faceted approach, understanding that more than one approach matters. This white paper was developed with the intent of identifying and summarizing key elements of the team approach to anesthesia delivery.

Topics that were reviewed include the importance of formal (residency) education and lifelong learning, the role of quality assessment programs such as the AAOMS Office Anesthesia Evaluation (OAE) program and the value of implementing systems that promote safety and mock/practice drills to prepare for possible crisis events. Other topics addressed are therapeutic goals and outcomes, the evaluation of factors that affect risks and complications, and principles of patient assessment. Consideration is given to special patient groups, including pediatric, geriatric, pregnant, obese, developmentally disabled, and medically and physically compromised. The essentials of monitoring – both during the procedure and as a part of the recovery process – are reviewed. The importance of emergency preparedness efforts such as procedural routines to limit adverse events, simulation training and mock/crisis management drills is addressed as are challenges inherent with delivering anesthesia using an outside provider.

This document was developed by a Special Committee of oral and maxillofacial surgeons and was approved with input by the AAOMS Board of Trustees. The first stage in the development was to identify a committee of topic experts and task them with reviewing relevant documents, including the *AAOMS Parameters of Care*, The American Society of Anesthesiologists' Practice Guidelines for Sedation and Analgesia by Non-anesthesiologists, previous AAOMS white papers on anesthesia, and documents developed by other organizations that have an interest in outpatient anesthesia. Committee members were expected to supplement this literature base with other evidence-based resources and to consider the opinions of those experienced and experts in office-based anesthesia. Throughout the process, the goal was to offer concise evidence-based information that promotes safety and procedural consistency among clinicians and grows understanding about the elements key to practicing in a manner that limits the risk of adverse outcomes. It is not intended to set absolute requirements and appreciates that following the recommendations set forth does not guarantee a specific outcome. However, it is the belief of AAOMS that adhering to the principles outlined herein provides a solid foundation for the delivery of safe, effective and cost-effective anesthesia in the office setting.

AAOMS expects this document will be revised over time as warranted, as is always the case where there is ongoing evolution of knowledge, technology and practice preferences. While reality informs all that there is a necessary balance between what is ideal and what is practical – particularly in communities where resources are limited and access to care is challenged – and while it is understood that the choice agents and techniques are dependent upon the experience, training and preferences of individual practitioners, safety can never be sacrificed in the interest of excellent care.

**Note:** Click the  icon to return to each corresponding Executive Summary section of this white paper.





## Oral and Maxillofacial Surgery Residency Education and Training

Patient safety in the delivery of anesthesia and surgical care is of critical importance. From the earliest days of the specialty, there has been an emphasis on education and experience in outpatient anesthesia. Over time, there has been some variability in the educational requirements during residency. Changes were always made after much deliberate thought and with the goal of strengthening training and improving patient safety. The AAOMS Committee on Education and Training (CET) remains central to this process.

The CET committee is composed of representatives of differing constituencies of oral and maxillofacial surgery related educational groups. This includes direct appointments of residency-related educational thought leaders and representation from the OMS National Insurance Company (OMSNIC), the OMS Surgery Foundation, the AAOMS OMS Faculty Section, the Oral and Maxillofacial Surgery Commissioner to the American Dental Association, the Commission on Dental Accreditation (CODA) Residency Review Committee, the American Board of Oral and Maxillofacial Surgery (ABOMS), the predoctoral faculty and AAOMS Board liaisons. The committee provides an invaluable service to the development and implementation of the standards by which OMS residency education is defined.

An example of the forward-looking philosophy of the CET is the development of standards directly related to patient safety in OMS residency education. Miller's Pyramid of Assessment provides a framework to assess clinical competencies, defining progressive stages of "Knows (Knowledge)," "Knows how (Competence)," "Shows how (Performance)" and "Does (Action)." Central to this assessment concept, residents receive an ongoing and comprehensive focus on promoting safety and quality improvement through the implementation of training standards.

Residents are exposed throughout training to theoretical and practical means to ensure that consideration of patient safety is routine and consistent. This includes participation in patient safety-focused initiatives such as Crew Resource Management or Root Cause Analysis programs. Safety training is further enhanced by immersing residents at all stages of training in policies, procedures and practices that minimize the risk of harm to patients. Active participation by residents, faculty and appropriate clinical staff in regular safety-focused routines such as mock emergency drills reinforces the theoretical concepts as well as models the attention to patient safety expected of the contemporary surgical team. There must be the regular participation of the faculty, residents and staff in clinic-based mock emergency drills. It also can include the use of high-fidelity simulation in the OMS clinic-based environment. The faculty, residents and staff are expected to always adhere to established emergency preparation protocols, such as those found in the AAOMS *Office Anesthesia Evaluation Manual*.

Additionally, OMS residents must demonstrate the use of other patient safety aids in the outpatient clinical environment. This includes adaptation of pre-procedural timeouts and checklists for preanesthetic preparation as well as procedure readiness verification. Lastly, the use of cognitive aids such as charts or guides for anesthetic or medical emergencies has been adopted. Taken together, the implementation of all the patient safety-focused initiatives has been to improve the routine care of the patients the OMS specialty serves. Ultimately, the educational goal remains to transition the learner (resident) into safe and competent practitioners in all facets of the specialty to serve the public's interest. By fostering patient safety during training, the development of lifelong knowledge and skills in this critical area begins and lays the foundation for the surgeon's career.

## History of Anesthesia in Oral and Maxillofacial Surgery

The administration of anesthetic agents to prevent pain, suppress awareness and recall, and eliminate anxiety and fear during surgery was first introduced by Hartford, Conn., dentist Horace Wells at Harvard Medical School in 1845. Wells discovered that nitrous oxide – a gas still used in dental and medical practice today – could induce a

state of unconsciousness and suppress pain and recall during surgery. The next year, another dentist, William Morton, introduced the use of a more potent anesthetic agent, diethyl ether.

The use of potent nonflammable inhalation anesthetic agents such as halothane, introduced in 1951, replaced inhalation agents that were flammable. Similar halogenated hydrocarbons included enflurane (1972) and isoflurane (1979), which had significant hepatic and cardiotoxic effects. In 1990, sevoflurane and, in 1993, desflurane – with fewer cardiac and hepatic complications – replaced halothane and enflurane. The use of potent inhalation agents for anesthesia was complicated by the need to intubate the patient in order to accurately regulate anesthetic doses and to keep operating room personnel from being affected by the gases and vapors. Sevoflurane is still in common use as an inhalational agent for selected cases in OMS offices and ambulatory surgical centers.

The development of injectable intravenous anesthetics allowed more control in the depth and duration of anesthesia without the need to intubate or otherwise use the mouth and nose as pathways to deliver inhalation agents. An example was methohexital (Brevital), a barbiturate with a short duration of action, first reported in 1940 by Adrian Hubble, an oral and maxillofacial surgeon. Hubble used repeated doses of methohexital to maintain anesthesia sufficient to abolish pain and recall of tooth extractions in the office setting. From 1945 to the 1960s, other OMSs developed and published techniques using methohexital combined with meperidine (Demerol), or another opiate, and an anticholinergic drug to achieve what became known as balanced anesthesia. The introduction of intravenous benzodiazepines, particularly diazepam (Valium) in 1963, marked the beginning of a broader continuum of anesthesia than previously possible. The term “sedation” was coined to describe a state of depressed consciousness well-suited for many patients undergoing oral and maxillofacial surgery procedures in the outpatient office setting. OMSs were the first to employ the use of what is now called ambulatory surgery and general anesthesia for their short duration procedures in the office setting.

As newer sedative agents were developed, many of the older drugs were replaced in the practices of oral and maxillofacial surgeons with more effective and generally shorter-acting agents with fewer side effects. Methohexital has mostly been replaced with propofol (Diprivan), and diazepam with midazolam (Versed). Meperidine has mostly been replaced with fentanyl and other short-acting opioids. Low-dose ketamine in combination with midazolam is used by many OMSs, often to eliminate the opioid component of balanced anesthesia.

Contemporary anesthesia practices in oral and maxillofacial surgery are based primarily on intravenous delivery of one or more agents to produce balanced moderate sedation or deep sedation/general anesthesia. The additional use of local anesthetic blocks and infiltrations is nearly universal practice, reducing the need for higher doses of the sedative agents, promoting rapid return of consciousness and controlling postoperative pain. The first local anesthetic was the naturally occurring alkaloid cocaine, used in the United States as early as 1884 for minor procedures. Cocaine, which was highly addictive, was replaced in 1905 with procaine (Novocaine). Procaine was widely used in dentistry until around 1944 when lidocaine (Xylocaine) was introduced. Lidocaine, when combined with epinephrine, provided better local anesthesia without the potential allergic reactions experienced with procaine. Lidocaine remains in widespread use today. Local anesthetics rely on tissue pH for effective passage across nerve membranes to cause blockage of pain and other sensations. Infection at or near a surgical site will create low tissue pH and prevent effective action of local anesthetics. Historically, many teeth were extracted because of underlying infection, making local anesthesia ineffective.

The development of safe and affordable procedural sedation by OMSs has provided countless patients the ability to experience anxiety-free and pain-free treatment for a variety of pathologic conditions of the mouth, face and jaws.

In 1970, the OMS team concept of anesthesia delivery was introduced in California, with formal requirements for the composition of the anesthesia team, training standards, and requirements for the infrastructure and monitors needed for safe administration of deep sedation and general anesthesia. Membership in the Southern California Society of OMS required compliance, and mandatory on-site office inspections were conducted by teams of OMSs. OMS anesthesia teams for deep sedation/general anesthesia are composed of a minimum of three personnel: 1) a trained surgeon/anesthesiologist, 2) a monitor whose duties include maintenance of the patient's airway by appropriate head positioning and observation of the monitoring equipment for any deviation from normal values, and 3) a surgical assistant who suctions the surgical field and assists with the surgery. Didactic training programs are offered by AAOMS and other groups for OMS anesthesia assistants with a certification of successful completion available through the Dental Anesthesia Assistant National Certification Examination (DAANCE).

In 1975, AAOMS adopted similar requirements for OMS anesthesia teams and mandatory office inspections of its members throughout the United States. As technology advanced, the AAOMS infrastructure requirements for office-based moderate sedation and deep sedation/general anesthesia evolved to require state-of-the-art monitoring, including electrocardiograph, noninvasive blood pressure, pulse oximetry and capnography in addition to the use of traditional approaches such as pre-tracheal and pre-cordial auscultation that supplement careful observation of the patient.

The OMS team is led by the surgeon-anesthesiologist who has completed a minimum of 12 to 14 years of post-secondary education. During the four to six years of OMS residency, he or she has trained full-time in a hospital-based medical anesthesiology residency program for a minimum of five to six months, followed by an additional 30 months of training in applying these skills to patients using the OMS Team Model of Anesthesia Delivery in outpatient settings. OMS residents must complete and maintain active certification in the American Heart Association's Advanced Cardiac Life Support and Pediatric Advanced Life Support programs before graduation.

The second team member is the monitor. The monitor maintains the patient's head position to ensure the patient is breathing normally and observes the displays showing the patient's vital signs and other important safety information. Any deviation from normal is reported to the surgeon immediately.

AAOMS standards recommend that monitors complete a minimum of six months of on-the-job training in an OMS office where moderate sedation and deep sedation/general anesthesia are routinely performed before being enrolled in a focused didactic educational program in Oral and Maxillofacial Surgery Team Model anesthesia assisting. Monitors must be certified in basic cardiac life support. Note: the AAOMS Dental Anesthesia Assistant National Certification Examination (DAANCE) is a psychometrically validated examination. The third team member is the surgical assistant who is, at a minimum, a dental assistant with current certification in basic cardiac life support.

The OMS Anesthesia Team Model has been in widespread use for more than 50 years. During calendar years 2018 to 2021,\* office-based dental anesthesia services were delivered to 24,194,239 individuals insured by private dental insurance in the United States. Of all the moderate and deep sedation/general anesthesia cases performed in 2018-2021 (a total of 8,894,182), oral and maxillofacial surgeons performed 6,929,439 – or 78 percent – of the total case load. In children ages 8 to 12 requiring deep sedation/general anesthesia, OMSs provided 80 percent of the procedures. For children ages 1 to 7 requiring procedural sedation, OMSs provided 41 percent of these services. The availability for patients to receive OMS-provided anesthesia care is clearly critical to providing access to compassionate dental care.

*\*Statistics calculated by AAOMS using data from the U.S. Census Bureau and information provided by FAIR Health based on its privately insured dental claims data for calendar years 2018-2021.*



## Definitions

For consistency and clarity, definitions of the anesthesia-related terms are listed below. Additional anesthesia-related terminology will be defined in specific sections of this white paper.

**Airway Techniques** – There are numerous techniques for managing the airway during an anesthetic.

- **Open Airway Technique:** Common in the OMS Anesthesia Team Model, this technique involves constant and vigilant attention to the airway by the oral and maxillofacial surgeon and the trained surgical assistant, both of whom are in direct and continual control of the patient’s airway. A throat screen or throat pack is used along with constant suctioning to keep the posterior oral cavity dry and free of debris. The team maintains the open airway by positioning of the patient’s head, neck, tongue and mandible. Nasopharyngeal or oropharyngeal airways are sometimes useful adjuncts. Supplemental oxygen is used, and end-tidal CO<sub>2</sub> is constantly monitored with capnography to ensure ventilation and oxygenation. A third trained anesthesia assistant continually monitors the patient.
- **Supraglottic Airway Technique:** This technique can be used for routine anesthetics with an inhalation agent and an anesthesia machine. It also can be very useful in establishing an emergency airway. Laryngeal Mask Airways (LMAs) and other similar devices are readily available and easy to use.
- **Endotracheal Intubation Airway:** This method is most useful for longer, more extensive surgical procedures and in patients where the potential loss of the airway is a greater concern. It is used with an anesthesia machine. It also can be used as an emergency airway.

**Anesthesia Provider** – An oral and maxillofacial surgeon, dentist anesthesiologist, physician anesthesiologist, anesthesia assistant (a new category of trained anesthesia provider), or certified registered nurse anesthetist (CRNA) who is trained, licensed and permitted by a state to perform specific types of anesthesia services.

**Anesthesia Routes of Administration** – Various methods used to administer anesthetic medications. Parenteral techniques include intravenous, subcutaneous, intramuscular, transdermal and transmucosal administrations. Enteral techniques include oral and rectal. Inhalation techniques and intranasal administrations are additional routes.

**ASA Physical Status Classification System** – Commonly used system for assessing and communicating a patient’s pre-anesthesia medical co-morbidities. When used along with other clinical perioperative and patient factors, it can help to predict perioperative risks. A summary of the ASA PS Classification System includes the following (with a more detailed document on the ASA website):

- ASA PS I – A normal healthy patient who is a non-smoker with no or minimal alcohol use.
- ASA PS II – A patient with mild diseases only, with no substantive functional limitations.
- ASA PS III – A patient with severe systemic disease and substantive functional limitations.
- ASA PS IV – A patient with severe systemic disease that is a constant threat to life.
- ASA PS V – A moribund patient who is not expected to survive without the operation.

**DAANCE** – Dental Anesthesia Assistant National Certification Examination, a two-part continuing education program comprised of approximately 36 hours of self-study material and quizzes and a standardized, computer-based exam. The course is designed for oral and maxillofacial surgery assistants or assistants employed by other dental professionals with valid anesthesia permits. The course and examination cover five major areas: Basic Sciences, Evaluation and Preparation of Patients with Systemic Diseases, Anesthetic Drugs and Techniques, Anesthesia Equipment and Monitoring, and Office Anesthesia Emergencies. This comprehensive training helps oral and maxillofacial surgeons maintain high levels of safety in their offices for patients.



**Dental Anesthesia Assistant** – Trained dental assistant who has additional training and experience in helping an oral and maxillofacial surgeon or other anesthesia provider with monitoring a patient under sedation or general anesthesia and with airway or emergency management.

**Dental Anesthesia Incident Reporting System (DAIRS)** – An anonymous, self-reporting system used to collect and analyze anesthesia incidents in order to improve the quality of dental anesthesia care. All dental anesthesia providers are encouraged to report events related to the delivery of anesthesia. Incidents reported to DAIRS are maintained as privileged and confidential data. For more information, visit [AAOMS.org/DAIRS](http://AAOMS.org/DAIRS).

**Levels of Anesthesia** – Sedation and general anesthesia levels are a broad continuum with significant variability. An individual patient's medical conditions and physiology, their responses to medications and the doses administered, and the anesthesia techniques used are all factors that can determine the level of anesthesia that occurs. Level of sedation is entirely independent of the route of administration. Moderate and deep sedation or general anesthesia may be achieved via any route of administration. Every anesthesia provider intending to produce a specific level of anesthesia should be trained and skilled in rescuing a patient whose level of anesthesia becomes deeper than originally intended. It is inappropriate to continue a procedure at an unintended level of sedation. More detailed information on Levels of Anesthesia can be found on the ASA website. The following are the recognized levels of anesthesia:

- **Minimal Sedation (Anxiolysis):** A drug-induced state during which patients respond normally to verbal commands. Cognitive function and coordination may be impaired. Airway reflexes, ventilatory functions and cardiovascular functions are unaffected.
- **Moderate Sedation/Analgesia:** A drug-induced depression of consciousness during which patients respond purposely to verbal commands, either alone or accompanied by light tactile stimulation (but not a reflex withdrawal from a painful stimulus). 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 purposely following repeated or painful stimulation (but not a reflex withdrawal from a painful stimulus). 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 maintain ventilatory function independently 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.

## Therapeutic Goals and Outcomes

Knowledge of the therapeutic goals of sedation and general anesthesia is an essential part of providing office-based anesthesia services to patients. Equally important is a clear understanding of expected therapeutic outcomes along with possible anesthesia-related risks and complications. The *AAOMS Parameters of Care* and the *AAOMS Office Anesthesia Manual* are resources to help oral and maxillofacial surgeons and their staff in these areas.

The therapeutic goals for office-based anesthesia revolve around the management of anxiety, fear and pain. Most patients have such concerns about their proposed surgical treatment. All three must be addressed during the perioperative period to allow safe and successful completion of the needed surgical procedure. The selection of the best technique for controlling anxiety, fear and pain for a specific patient and procedure must be determined



by the surgeon based on training, experience and an understanding of risks and benefits.

The *AAOMS Parameters of Care* outlines the following:

#### General Therapeutic Goals for Anesthesia in Outpatient Facilities

- Full recovery within a reasonable period of time.
- Appropriate understanding by patient and family of treatment and anesthesia options and acceptance of treatment plan.
- Appropriate understanding and acceptance by patient and family of favorable outcomes and known risks and complications.

#### General Factors Affecting Risk During Anesthesia in Outpatient Facilities

- Degree of patient's and/or family's understanding of the origin and natural course of the condition and/or disorder and the knowledge of the patient's and/or family's medical history
- Presence of coexisting systemic disease (e.g., diseases that increase a patient's ASA PS Classification to II, III or IV)
- Age of the patient
- Use of prescribed or over-the-counter medications and/or herbal medications or vitamins
- Current or past use of illicit drugs or alcohol
- History of or current use of tobacco
- Degree of patient's and/or family's understanding of the therapeutic goals and acceptance of the proposed treatment, resulting in the patient's and family's cooperation and compliance with perioperative anesthetic instructions
- Conditions that promote airway obstruction
- Conditions that impede ventilation and/or intubation of the hypopneic/apneic patient
- Family history of problems related to anesthesia
- Diagnosed obstructive sleep apnea (OSA) or elevated Body Mass Index (BMI)
- Presence of infection
- Pregnancy

#### General Favorable Therapeutic Outcomes for Anesthesia in Outpatient Facilities

- Recovery of the patient from the anesthetic effects, returning to his/her preanesthetic physiologic and psychologic state within an appropriate time after the cessation of the administration of the anesthetic drugs.
- Agreement that the anesthetic experience was satisfactory by the surgeon, patient and family.
- Recovery from the administration of sedatives, anesthetic agents and other adjunctive medications.
- Patient and family acceptance of procedure and understanding of outcomes.

## Techniques

An individual patient's medical conditions and physiology, responses to medications, the doses administered, and the technique used influence the level of anesthesia. A variety of administration routes can be employed to achieve



the desired therapeutic goals, including local, enteral, parenteral and inhalation. Local, enteral, parenteral and inhalation routes of administration are utilized by the practitioner. It should be noted that the level of anesthesia achieved is independent of the administration method. OMSs may personally administer medications and may delegate the administration of medications by some routes to trained staff members under direct, continuous supervision, as permitted by state regulations.

- **Local Anesthetics:** Ester and amide local anesthetics reversibly block sodium (Na<sup>+</sup>) channels, ultimately denying nerve impulse propagation. Vasoconstrictors are often used in combination with local anesthetics in order to maintain higher drug concentrations at the target site and minimizing surgical bleeding. Local anesthetics minimize the amount of other anesthetic agents necessary to achieve therapeutic goals.
- **Enteral Anesthetic Agents:** Typically include benzodiazepines, non-benzodiazepine hypnotics, and alpha-2 agonists. There are many variables that confound the ability to accurately predict the pharmacokinetic and pharmacodynamic behavior of drugs when administered via the enteral route.
- **Parenteral Anesthetic Agents:** Include opioids, benzodiazepines, propofol, ketamine, barbiturates, and alpha-2 agonists. Parenteral routes include intravenous, intramuscular, and subcutaneous injection sites. The intravenous route provides the most rapid onset and 100 percent bioavailability. However, all medications administered via the parenteral routes should follow the guidelines of the Centers for Disease Control and Prevention (CDC) Safe Injection Practices to Prevent Transmission of Infection to Patients and labelling guidelines set by the American Society of Anesthesiologists.
- **Inhalation Agents:** The final route of administration is inhalation of volatile gases. Inhalation agents include nitrous oxide, sevoflurane, isoflurane and desflurane. The large surface area of the lungs allows for rapid access of the agent to the systemic circulation.

## Anesthesia Risks and Complications

Known risks and complications of the planned anesthetic for a procedure must be discussed with the patient and family preoperatively as a part of the Informed Consent Process, and all questions should be answered. Fortunately, for reasonably healthy patients, office-based anesthesia is very safe. However, there are rare instances where serious complications occur, and the anesthetic team must be prepared to recognize, diagnose and treat them. Successful management of complications requires the entire office staff to function as a well-trained team. Regular practice sessions for simulated emergencies are essential and prepare the entire team to manage a real emergency. The AAOMS *Office Anesthesia Evaluation Manual* is an comprehensive resource for this training.

Anesthesia complications include the following:

- Syncope
- Nausea and vomiting, possible pulmonary aspiration
- Venipuncture complications: hematoma, extravasation, phlebitis, intra-arterial injection
- Medication overdose, allergic response, anaphylaxis
- Hypoglycemia, hyperglycemia
- Dental injury related to anesthesia administration
- Oral or nasal injuries related to anesthetic administration
- Airway complications: obstruction, laryngospasm, bronchospasm, foreign body displacement into upper airway or bronchus



- Respiratory complications: hypoventilation, prolonged hypoxia or hypercarbia, respiratory arrest, inability to ventilate, inability to intubate
- Cardiovascular complications: hypotension, hypertension, arrhythmias, acute coronary syndrome, cardiac arrest/myocardial infarction
- Seizures
- Peripheral or central neurologic deficits
- Ocular injuries
- Local anesthetic systemic toxicity (LAST)
- Thromboembolic events
- Malignant hyperthermia
- Unplanned hospital admission
- Organ failure related to anesthesia administration
- Death

In summary, the oral and maxillofacial surgeon must continually stay focused on therapeutic goals and therapeutic outcomes related to sedation and general anesthesia. Additionally, constant vigilance in patient selection and appropriate anesthetic planning are essential in minimizing and preventing risks and complications related to anesthesia.

## Patient Evaluation

The care of the patient involves two considerations: the planned surgical procedure and the appropriate management of the discomfort and anxiety that will accompany that procedure. Office-based surgeries are typically minimally invasive with a low potential for significant blood loss and hemodynamic changes. However, the provision of local anesthesia, deep sedation or general anesthesia all involve the administration of agents with potentially significant systemic effects. The responsibility of the oral and maxillofacial surgeon is to ensure the patient can tolerate not only the surgical procedure but also, more importantly, the local and general anesthesia.

The provision of local anesthesia, sedation as well as deep and general anesthesia in any patient is not without risk. The very essence of risk stratification is to identify patients with varying degrees of anesthesia risk and adjust the anesthesia plan accordingly. Most patients are relatively healthy and will require no modification to the anesthesia plan. Other patients will require substantial modifications. This may include the choice of local anesthetic, anesthesia medications, drug doses, duration of anesthesia and post-anesthesia recovery. On occasion, it also will necessitate that a patient be treated in an ambulatory surgical center or hospital operating room to optimize patient safety.

It also is understood that individual patient variability to medication is significant. The provision of anesthesia needs to appreciate some patients will have profound responses to even minimal doses of medications that can lead to acute respiratory compromise. The ability to rescue patients from unintended deeper levels of sedation requires not only the skills of the anesthesia team but a patient who has the appropriate anatomy to provide supplemental oxygenation. Patients also will vary in the amount of time they will tolerate hypoxemia and hypercarbia before decompensation occurs. Therefore, these two factors – individual patient anatomy and patient reserves – need to be considered when determining who can be treated in an office setting.





The five key elements to enable appropriate risk stratification for office-based anesthesia include:

- American Association of Anesthesiology Physical Status
- Functional Status (METs)
- Mallampati Classification
- Body Mass Index (BMI)
- Airway access in event of airway compromise

Patient evaluation begins with a thorough medical history that includes specific questions about previous surgical and anesthetic experiences. The initial consultation with a patient provides the opportunity to obtain a thorough medical, social and surgical history as well as perform an anesthesia-focused physical examination. This allows the OMS to identify the appropriate surgical plan as well as comorbid medical conditions that allow risk stratification prior to determining the most ideal anesthetic technique. On occasion, this will require that the OMS consult with the patient’s other healthcare providers and/or request additional diagnostic testing to appropriately risk stratify the patient.

It is ideal if patients can complete their medical history intake forms at home prior to presenting to the office. This allows the patient to gather the information at home prior to the consultation. Furthermore, the documents can be submitted electronically ahead of time to facilitate an initial review of the patient’s medical history.

The initial office visit should include obtaining vital signs, including blood pressure and heart rate. It may also be advantageous to record the oxygen saturation (SpO2) that serves as a good surrogate monitor of cardiopulmonary function. Staff who records these vital signs should have basic training in the recognition of abnormal rhythms, including bradycardia, tachycardia and irregular rhythms. All abnormal values should be flagged for review by the OMS. A review the patient’s past medical and surgical history will allow the patient to be classified using the American Society of Anesthesiologists (ASA) physical status guidelines (Table 1).

**Table 1. American Society of Anesthesiologists Physical Status Guidelines**

ASA PS Classification	Definition	Explanation
ASA I	Normal healthy patient	No smoking and moderate alcohol
ASA II	Patient with <i>MILD</i> systemic disease	Mild disease without functional limitations
ASA III	Patient with <i>SEVERE</i> systemic disease	Severe disease with functional limitations
ASA IV	Patient with <i>SEVERE</i> systemic disease that is a constant threat to life	Severe disease (e.g., recent myocardial infarction [MI], cerebrovascular accident [CVA] or transient ischemic attack [TIA], acute coronary syndrome [ACS], severe valvular heart disease, sepsis)
ASA V	Moribund patient who will not survive without the operation	N/A
ASA VI	Brain-dead patient having organs harvested	N/A

In an ideal setting, patients within ASA I and II classes are the best candidates for office-based anesthesia as they have acceptable cardiovascular and pulmonary reserves to undergo deep sedation and general anesthesia. Office-



based deep sedation and general anesthesia should be approached with caution for ASA III patients. This may require modifications to the anesthesia plan to further reduce the potential risk of adverse cardiovascular and pulmonary complications.

Contemporary pre-anesthetic evaluation has greatly reduced the need for routine laboratory testing. Significant information about pulmonary and cardiovascular reserve can be determined by determining the patient’s Metabolic Equivalents (METs). This reflects the patient’s exercise tolerance with one MET equivalent to 3.5 mL of oxygen per kilogram consumed per minute (3.5 mL O<sub>2</sub>/ kg/ minute). METs offer the best insight into a patient’s ability to withstand changes in pulmonary and cardiovascular function that may occur during anesthesia. Low METs or a recent decline in METs should alert the OMS to the potential for adverse anesthesia-related complication that requires further work-up and risk stratification. Patients who report a functional status of less than 4 METs are not candidates for an office-based deep sedation or general anesthesia due to their lack of cardiac and respiratory reserve (Table 2).

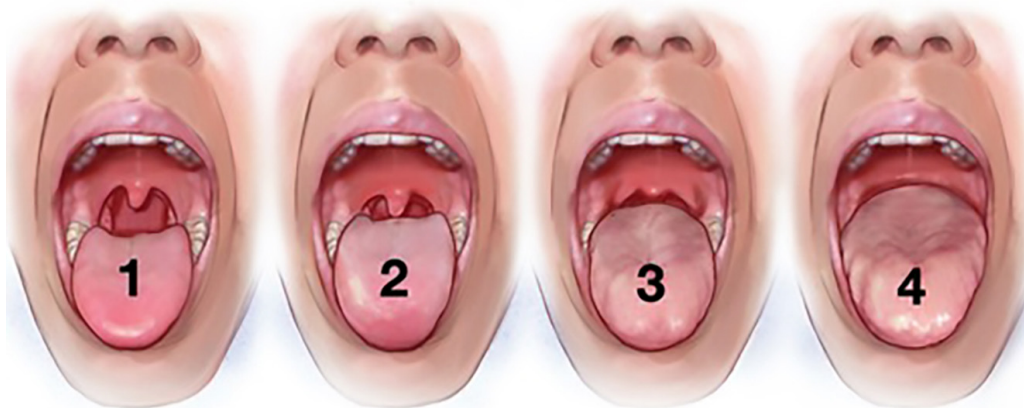
**Table 2. Functional Status Assessment (METs) Examples**

Excellent (>7 METs)	Moderate (4 – 7 METs)	Poor (≤ 4 METs)
Squash Tennis Jogging Cleaning floors	Cycling Climbing a flight of stairs Walking 4 mph Yardwork	Walking 2 mph Activities of Daily Living

Adapted From: Hlatky MA, Boineau RE, Higginbotham MB, Lee KL, Mark DB, Califf RM, et al. A brief self-administered questionnaire to determine functional capacity (the Duke Activity Status Index). *Am J Cardiol.* 1989;64:651–4.

The ability to establish an airway remains critical to office-based anesthesia. The Mallampati classification is a tool for predicting difficulty related to establishing and maintaining an airway in addition to intubating patients. Although it is not possible to adjust a patient’s Mallampati score, the anesthesia plan should be modified according to the relative airway risk associated with different scores (Figure 1).

**Figure 1. Mallampati Classification (1 – 4)**



The BMI is a useful parameter to help predict anesthesia-related complications (Table 3). It is calculated by dividing the patient weight (kg) by his/her height (m<sup>2</sup>). Patients who fall into a normal or overweight category pose little anesthetic risk. A BMI that places a patient in the underweight category increases the anesthesia risk due to electrolyte abnormalities and cardiac arrhythmias. A BMI that places a patient in the obese and morbidly obese categories also places the patient at increased risk due to the potential for loss of airway; decrease Functional Residual Capacity (FRC) and difficulty with establishing and airway or intubation. Adjusting



the anesthesia regime by avoiding apnea-producing drugs may be beneficial.

**Table 3. Body Mass Index**

< 18.5	Underweight
18.5 – 24.9	Normal
25 – 29.9	Overweight
30 – 40	Obese
> 40	Morbidly Obese

Challenges related to maintaining a patent airway or establishing one when it is lost are compounded not only by the BMI but also by the length and diameter of the neck. The sternomental distance extends from the sternal notch to the menton with a distance of less than 12.5 cm having a positive predictive value of 82% for a difficult intubation (Figure 2).

The checklist for patient evaluation for office-based anesthesia should include:

- Blood pressure, heart rate and rhythm
- Height and weight (Body Mass Index)
- Past medical, social, surgical and anesthesia history
- Current medications including recent changes in medications
- Allergies
- Risk factor evaluation for obstructive sleep apnea
- Salient laboratory result review
  - a. ECG for patients with cardiac disease (within 6-12 months)
  - b. Blood glucose levels and Hemoglobin A1C for diabetics (Type I and Type II)
  - c. INR reports for patients taking warfarin (within five days of planned surgery) or suspected hepatic disease
  - d. SpO2 on room air for patients with respiratory disease
- Recording of ASA status
- Recording of METs level

There are specific aspects of the patient physical examination that are critical for office-based anesthesia. These include:

- Focused airway examination
  - a. Mallampati score recorded
  - b. Maximum incisal opening
  - c. Risk factors that contribute to difficulty with positive pressure ventilation, including facial hair, edentulism, short and thick neck, increased BMI
- Auscultation of lungs
- Observation of extremities for venipuncture sites



**Figure 2. Sternomental Distance**



It remains controversial whether pregnancy testing is appropriate for females of childbearing age who undergo office-based deep sedation or general anesthesia. The *AAOMS Parameters of Care* does not endorse routine testing for pregnancy. Exceptions may be indicated if there is an equivocal history of sexual activity with a possibility of pregnancy due to an uncertainty regarding the time of the last menstrual period. A point of care (POC) urine testing kit for pregnancy is available and usually positive within 14 days of conception. Minors (< 18 years of age) can be offered a urine pregnancy test in the office after dismissing the parents from the treatment room. The anesthetic should be postponed if the test is positive.

## **Body Systems and Disease**

### **CARDIAC DISEASE**

A history of cardiac disease will require further evaluation to appropriately risk stratify the patient. Many patients who are good historians can provide adequate information about their status to allow the OMS to determine what further information and/or tests are needed for review. Consultation with the patient's primary care physician or cardiologist may be indicated.

### **CORONARY ARTERY DISEASE AND MYOCARDIAL INFARCTION**

The OMS should inquire about angina or shortness of breath (SOB) with exercise that may suggest Ischemic Heart Disease (IHD). Determining the functional status of the patient using METs is particularly important to assess disease severity. The use of chronic and episodic vasodilator medications, including nitroglycerine, also will provide insight. A history of myocardial infarction (MI) requires additional information. A history of an MI within the last six weeks is a contraindication to all elective surgery. An MI that occurred more than six weeks ago and that is not associated with reduced functional status can usually proceed. However, the longer the time period since the MI, the less the risk related to adverse cardiac events. Many patients with a recent MI undergo Percutaneous Coronary Angioplasty (PCA), which has significantly reduced mortality and morbidity. Following PCA most patients are treated with dual anti-platelet therapy (DAPT). This involves the use of aspirin and either a glycoprotein IIb/IIIa inhibitor (e.g., abciximab, eptifibatide) or an ADP antagonist (e.g., clopidogrel). The glycoprotein IIb/IIIa inhibitor or ADP antagonist should be continued for a minimum period of 14 days, 30 days and typically three months for balloon angioplasty, bare metal stents and drug eluting stents, respectively. ECG monitoring is indicated and by using a modified V5 lead (move the left arm lead to the mid axillary position and set the machine to monitor lead I), a higher sensitivity for ST segment changes can be noted. Even with treatment with just local anesthesia, supplemental oxygen with/w/o nitrous oxide may benefit the patient as well.

### **CARDIAC ARRHYTHMIAS**

Cardiac arrhythmias can result in significant morbidity during anesthesia. The use of epinephrine containing local anesthetics, endogenous epinephrine and certain anesthetic agents – such as ketamine and inhalational agents – can result in arrhythmias. Patients with Wolff Parkinson White syndrome, second-degree Type 2 and third-degree heart blocks are not candidates for office-based deep sedation or general anesthesia. Atrial fibrillation (AF) is common arrhythmia that should be recognized relatively easily upon taking vital signs. The use of medications such as warfarin or other direct acting oral anticoagulants (DOACs) may provide further information regarding the potential for AF. Concerns with AF relate to the potential for a rapid ventricular rate (RVR) that can lead to acute decompensation and heart failure. The anesthetic plan should limit use of epinephrine and avoid excessive fluid replacement. Patients with chronic AF and a rate greater than 90 BPM should be considered for cardiology referral to achieve optimal rate control. Patients with implanted pacemakers and internal defibrillators (ICDs) warrant cardiac consultation and anesthesia should be considered in an ambulatory surgical center or hospital OR.



## CONGESTIVE HEART FAILURE

Congestive Heart Failure (CHF) is a progressive loss of the normal cardiac output. Symptoms of non-compensated heart failure may include shortness of breath, peripheral edema and/or fatigue. The functional status (METs) provides valuable insight into disease severity. Many individuals cannot tolerate acute changes in heart rate or blood pressure, and the anesthetic plan should include monitoring of the patient's blood pressure and lead II ECG even if treatment with just local anesthesia is considered. Patients with moderate to severe CHF are not candidates for office-based deep sedation or general anesthesia.

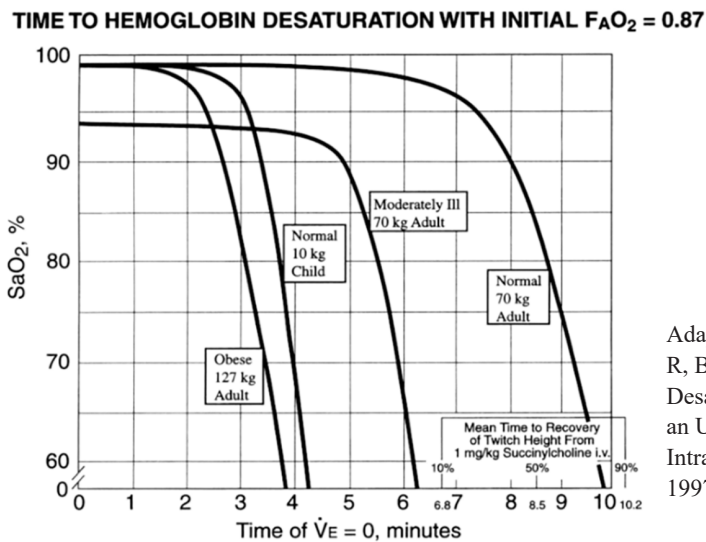
## VALVULAR HEART DISEASE AND PROSTHETIC VALVES

A patient may be referred for multiple extractions prior to a planned valve replacement and, depending on the complexity of the extractions, may not be suitable for treatment in an office-based setting. Consideration should be given to scheduling multiple appointments. Once valve replacement has occurred, patients are typically more stable. Anticoagulant therapy will be continued after valve replacement when the valve is alloplastic. Xenograft (porcine) valves typically only require anticoagulation for six months. Consultation with the cardiologist as well as the patient's functional status will enable risk stratification and an appropriate anesthesia plan to be determined.

## RESPIRATORY DISEASE

One of the major risks of an office-based anesthesia is the development of apnea/hypopnea due to the anesthetic medications. The improvement in monitoring with end tidal carbon dioxide (ETCO<sub>2</sub>) monitoring and a precordial stethoscope will alert the OMS to the development of apnea in real time. The time from the development of apnea until the oxygen saturation declines depends on several factors, including pre-oxygenation and the functional residual capacity (FRC). Obese patients, pediatric patients and those with comorbid medical conditions have reduced FRC and will desaturate relatively rapidly (Figure 2).

**Figure 2. Time to Desaturation**



Adapted from: Benumof JF, Dagg R, Benumof R: Critical Hemoglobin Desaturation Will Occur before Return to an Unparalyzed State following 1 mg/kg Intravenous Succinylcholine Anesthetics. 1997;87(4):979-982

## HEPATIC DISEASE

There are various causes of hepatic disease, including viral hepatitis, chronic alcoholism and hepatotoxicity from drugs. Many anesthetic drugs are bound to plasma proteins that are produced in the liver. Therefore, hepatic disease may result in increased free drug within the circulation with the potential for enhanced and prolonged drug activity. Additionally, as the liver is responsible for metabolism of many drugs including opioids and



benzodiazepines, hepatic disease may result in an increased half-life and prolonged anesthetic effects. Rapidly redistributed drugs such as propofol may be a better choice in these patients. Consultation with the primary care physician or hepatologist as well as a comprehensive metabolic panel is required prior to risk stratifying the patient.

## RENAL DISEASE

Renal disease presents another set of anesthesia challenges. Urinary excretion of drugs remains a major mechanism for drug elimination. Drug elimination will be reduced with renal disease that can result in prolonged drug action, particularly when drug metabolites also have a therapeutic effect. Additionally, the kidney is responsible for electrolyte and fluid homeostasis. Renal disease can therefore result in significant electrolyte abnormalities and fluid shifts. This can result in a decreased cardiovascular reserve as well as cardiac arrhythmias. Consultation with the primary care physician or nephrologist together with a comprehensive metabolic panel is required to enable risk stratification.

## ASTHMA

The most common chronic respiratory disease that the OMS will encounter is asthma. The patient with asthma requires particular attention in order to classify the asthma severity and control, hence the potential for anesthesia-related complications (Table 3).

**Table 3. Asthma Severity Classification (>12 years old)**

<b>Components of Severity</b>	<b>Intermittent</b>	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>
<i>Symptoms</i>	< 2 days per week	> 2 days per week but not daily	Daily	Several times per day
<i>Nocturnal awakenings</i>	< 2x per month	3-4x per month	> 1x per week but not nightly	Often 7 nights per week
<i>SABA use for symptom control (not for prevention of exercise induced bronchospasm)</i>	< days/week	> 2 days per week but not daily	Daily	Several times per day
<i>Interference with normal activity</i>	None	Minor limitation	Some limitation	Extremely limited
<i>Lung function Measured by FEV1 (% predicted)</i>	> 80%	> 80%	60-80%	< 60%
<i>Exacerbations requiring use of oral steroids</i>	0-1 / year	> 2x per year	> 2x per year	> 2x per year
<i>Likely Medications</i>	SABA as needed	Low dose ICS, LTRA	Medium dose ICS, +/- LABA, LTRA	High dose ICS + LABA or LAMA, LTRA, daily oral corticosteroids* Biologic agents**

\*LABA: Long acting  $\beta$  agonist; SABA: Short acting  $\beta$  agonist; ICS: Inhaled Corticosteroids; LTRA: Leukotriene Receptor Antagonist; LAMA: Long-acting muscarinic agent

\*\*Biologic medications are injectable or intravenous monoclonal antibodies targeting a specific axis in asthma either IgE, IL-5, IL-5 Receptor, IL-4/IL-13 Receptor based on asthma phenotype (allergic, eosinophilic). Available agents include omalizumab (Xolair), mepolizumab (Nucala), reslizumab (Cinquinair), benralizumab (Fasenra), dupilumab (Dupixent). Note: This is a field with many new agents due to come to market in coming years. Thus, this list will grow.



It also is important to assess asthma control using the following screening tool as poorly controlled asthma is a contraindication to office-based deep sedation or general anesthesia.

- In the past four weeks, has the patient had:
  - a. Daytime symptoms more than 2x per week?
  - b. Any night waking due to asthma?
  - c. SABA reliever use for symptoms more than 2x per week?
  - d. Any limitation of activity due to asthma?

*Well-controlled Asthma:* Report “no” to all of above questions.

*Partly Controlled Asthma:* Report “yes” to 1-2 of these questions.

*Uncontrolled Asthma:* Report “yes” to 3-4 of these questions.

Mild intermittent asthmatics and mild persistent asthmatics are reasonable candidates for office-based deep sedation and general anesthesia. Moderate and severe asthmatics are better managed in an ambulatory surgical center or hospital OR where complications such as bronchospasm are more readily managed. The avoidance of known triggers for histamine release such as non-steroidal anti-inflammatory medications (NSAIDs) and morphine is important. Patients with a recent ( $\leq 4$  weeks) Upper Respiratory Infection (URI) are not good candidates for deep sedation or general anesthesia given the increased risk of bronchospasm. There is also some evidence that asthmatic patients are at increased in post-anesthetic respiratory adverse events (PRADEs).

## Geriatric Patients

Geriatric patients provide a unique set of challenges that must be anticipated. The function of all organ systems decreases with advancing age. It becomes even more important to risk stratify geriatric patients to reduce anesthesia related morbidity. Geriatric patients may have reduced cardiovascular, pulmonary, renal, hepatic and cognitive function.

### *General*

- ↓ Lean muscle mass
- ↑ Fat stores
- ↓ Blood volume

### *CNS*

- Cerebral atrophy with cognitive impairment, confusion and dementia
- Autonomic dysfunction with labile BP, impaired thermoregulation and delayed gastric emptying

### *Cardiovascular*

- Congestive heart failure and coronary heart disease
- Atrial fibrillation
- Hypertension
- Increased circulatory time

### *Pulmonary*

- Diminished Functional Reserve Capacity (FRC)



- Blunted response to  $\uparrow\text{CO}_2$  or  $\downarrow\text{O}_2$
- Loss of protective cough and swallow reflexes

### *Renal*

- $\downarrow$  Glomerular Filtration Rate
- Fluid and electrolyte imbalance
- $\downarrow$  Capacity to excrete drugs and metabolites

### *Hepatic*

- $\downarrow$  Blood flow to the liver
- $\downarrow$  Ability to metabolize drugs
- $\downarrow$  Albumin and protein binding

The number of medical comorbidities associated with the geriatric patient also results in an increased number of medications in this population. The combination of altered physiological responses and medications will attenuate and blunt the usual pulmonary and cardiovascular responses to anesthesia. Furthermore, the medications are often the source of potential drug interactions resulting in the need to carefully evaluate the choice of anesthesia drugs.

It is always advantageous to manage geriatric patients with local anesthesia alone to reduce the potential for anesthesia complications. Geriatric patients who require deep sedation to complete a surgical procedure should be carefully risk stratified to ensure the planned anesthesia is appropriate and safe. Patients are generally encouraged to maintain their regular medications with the exception of diabetic medications that require cessation or adjustment. It is prudent to avoid drugs that tend to result in postoperative delirium. Accordingly, it is reasonable to avoid benzodiazepines and ketamine where possible. Additionally, narcotics should be used judiciously following weight-based guidelines. The combined use of fentanyl and propofol works well with few side effects and little likelihood of apnea or cardiovascular changes. The following loading doses are considered conservative but may be a reasonable starting point:

- Fentanyl 0.25 – 0.5  $\mu\text{gms/kg}$  (approximately 20 – 40  $\mu\text{gms}$ )
- Propofol 0.25 – 0.4  $\text{mgs/kg}$  (approximately 15 – 30  $\text{mgs}$ )

This should be followed by judicious titration to ensure vital signs and cardiovascular parameters remain stable. The prolonged circulatory time in the geriatric patient does require that a longer time pass following injection of anesthetic medications before deeming a dose inadequate.

## **Special Considerations**

### **CONSIDERATIONS FOR PEDIATRIC ANESTHESIA IN OUTPATIENT FACILITIES**

It is important to appreciate that children are not simply “small adults” – rather they have many unique and constantly changing anatomic, physiologic, pharmacologic and psychologic differences. The anesthetic goals for the pediatric patient are safety, cooperation, elimination of pain, reduction of anxiety and control of behavior to allow completion of the planned intervention.

The initial evaluation of the pediatric patient is unique in several ways. The history is derived almost completely from the caregiver. Systemic diseases and prescription medications are uncommon, and past anesthetic experiences may be rare. Instead, a family history of allergies and systemic disease can be of great importance. A targeted physical exam should consist of an airway, heart and lung evaluation. Recent upper respiratory infection, fever, mucopurulent nasal drainage, audible wheezing or a productive cough should prompt further





evaluation. Congenital cardiac defects or the presence of a new cardiac murmur should be evaluated completely prior to proceeding.

Children have unique anatomical and physiologic characteristics that must be considered during anesthesia. Their small nares, large tongue and enlarged tonsils/adenoids can cause passive airway obstruction. Lower airway differences can hamper direct laryngoscopy and present significant challenges during airway management. The pediatric airway is far more reactive to stimuli such as secretions or foreign bodies than an adult airway. As a result, laryngospasm must be expected, quickly identified and skillfully managed. Pediatric cardiac output can be maintained over a wide range of preloads and rates without failing, but young pediatric patients rely almost solely on heart rate to maintain blood pressure. As a result, bradycardia is an ominous sign during any pediatric anesthetic and must be immediately detected and corrected.

Pharmacologic considerations demand a thorough knowledge of anesthetic and analgesic agents. Many routes of administration are available to the oral and maxillofacial surgeon providing pediatric anesthesia. All pediatric patients should be weighed prior to drug dose selection. Intraoperative and postoperative monitoring is instrumental in early detection of complications and corrective interventions. Because of the constantly changing morphology of the pediatric patient, appropriately sized equipment is vital to the delivery of anesthesia and rescue during an emergency. Also, prior to anesthetic administration, calculations of emergency dosages of the most commonly used drugs can facilitate a smooth, coordinated and successful outcome.

Safety is paramount to pediatric anesthetic care. Therefore, the age of the patient, preoperative evaluation, difficulty of the planned procedure, and the training and experience of the practitioner should guide the oral and maxillofacial surgeon as to the choice of technique and most suitable environment to provide anesthetic care.

## **CONSIDERATIONS FOR ANESTHETIC MANAGEMENT OF THE PREGNANT PATIENT IN OUTPATIENT FACILITIES**

Although elective surgery can usually be delayed until postpartum, there are situations in which a pregnant female will present to the office requiring urgent surgery. The consequences of not providing essential care may present a greater risk than surgical intervention. The anesthetic goals in treating the pregnant patient include the ability to control pain and anxiety. In addition to maternal safety, anesthetic management must maintain fetal safety, which includes avoiding intrauterine fetal asphyxia and preterm labor.

A thorough knowledge pharmacologic agents is required. Most local anesthetics are considered safe during pregnancy. Single exposure to the commonly used sedatives, benzodiazepines, opioids, and nitrous oxide have undetermined risk of teratogenicity. The oral and maxillofacial surgeon also should counsel the patient about analgesics, including over-the-counter medications, because certain medications may not be acceptable during specific stages of pregnancy. Also, consultation with the practitioner already managing the pregnant patient's prenatal care may be helpful in determining the most appropriate timing for surgery and the optimal perioperative anesthetic care.

## **CONSIDERATIONS FOR ANESTHETIC MANAGEMENT OF THE OBESE PATIENT IN OUTPATIENT FACILITIES**

The obese patient presents with special anatomic and physiologic problems that must be addressed when providing outpatient anesthesia. Obesity can be defined by Body Mass Index (BMI) and is classified as Class I (BMI 30 – 34.9), Class II (BMI 35 – 35.9) and Class III (BMI >40). These classes are associated with increasing risk for type 2 diabetes, hypertension and cardiovascular disease relative to normal weight and waist circumference.

Airway management in the obese patient may be difficult due the overabundance of soft tissue or anatomic deficiencies. Anesthetic techniques that do not utilize an adjunctive airway can be challenging. Comorbid conditions decreased functional residual capacity, complex airways and even difficult intravenous access can place



the obese patient at higher risk for anesthetic complications. If deep sedation/general anesthesia is to be provided in the office setting, the practitioner should be experienced in airway management, including endotracheal intubation and supraglottic device placement. Postprocedural and post-discharge use of opioids should be considered with caution, as the risk of respiratory depression in the patient who already has obstructive sleep apnea (OSA) or sleep disordered breathing may be increased.

## **CONSIDERATIONS FOR ANESTHETIC MANAGEMENT OF THE GERIATRIC PATIENT IN OUTPATIENT FACILITIES**

The U.S. population is aging. As a result, the anesthesia team should expect an increase in geriatric patients seeking surgical care. Although chronologic age does not always predict physiologic age, it is prudent to consider age, frailty and comorbid disease as anesthetic risk factors. The goal of geriatric anesthesia is to provide safe and effective care in this increasingly medically complex population.

Medical consultation may be necessary to complete the medical history or optimize function. Determination of the geriatric patient's mental status is valuable, as postoperative delirium is more common in patients with dementia or preoperative mental status changes. Assessing the level of exercise tolerance can be integral to estimating the patient's ability to tolerate the combined stress of anesthesia and surgery. This is best communicated using metabolic equivalents for aerobic activity (METs), with 4 METs (climbing a flight of stairs without rest or shortness of breath) generally considered adequate.

Practitioners should plan for reduced dosing requirements and expect longer elimination half-lives of anesthetic drugs. This reflects the time proven adage – “start low and go slow.” Medications with anticholinergic effects should be limited or avoided, and preference should be given to reversible anesthetic agents. Prolonged recovery should be anticipated. Consideration should be given to anesthetic techniques that will cause the least disruption to a geriatric patient's routine, when available.

## **Monitoring**

Despite the technical nature of modern, computerized physiological monitors, the maxim of “treat the patient not the monitor” continues to support patient safety. For the anesthetic team, treating the patient means coordinating patient-focused anesthetic and surgical care through the use of multiple systems, or intentional strategies, including the team model of anesthesia delivery.

The team model of anesthesia delivery incorporates an OMS team leader working together with well-trained staff members. This team shares in the patient safety responsibilities and must utilize effective communication skills, with all members empowered to speak up if/when they detect something that may forecast a problem. The continuous real-time monitoring of each patient's physiological response to anesthesia and the surgical procedure supports a culture of shared patient safety responsibilities.

### **PERIOPERATIVE MONITORING**

Patient monitoring includes the continuous, time-sensitive assessment of a patient's physiological response to anesthesia and a surgical procedure including the monitoring of the following:

- Blood pressure with automated time determined capability and data recording.
- Continuous electrocardiographic (ECG) for visualization of cardiac rhythms.
- Continuous pulse oximetry for blood oxygen saturation assessment.
- Continuous capnography for continuous assessment of exhaled carbon dioxide in patients undergoing moderate or deep sedation or general anesthesia.



Pre-operative clinical patient evaluations – consisting of a physical examination and interpretation of initial monitor readings – help to determine a patient’s baseline physiology and support the intended level of sedation for each patient. In the event there are any questions about the patient’s physical condition, elective care should be delayed until the presenting questions are resolved.

Multiple factors can impact the performance and utility of perioperative monitoring. These include the technical capabilities of a commercial monitoring system and decisions related to monitor implementation; electronic medical record integration; monitor data printing, recording and storage; monitor calibration; monitor maintenance; and system updates.

## **STAFF TRAINING**

For the anesthesia team model, patient safety is based on the shared responsibilities related to patient selection, anesthesia techniques, patient monitoring and anesthetic depth limit setting. The OMS can support patient safety through monitoring by implementing staff training related to monitor use and maintenance. The following topics are provided as general training suggestions. Given the variation in monitor systems, practice models and regulatory requirements, OMSs should consider which training topics are appropriate for their practice.

Staff training could consist of training on the following:

- Monitor use, calibration, troubleshooting and maintenance.
- The purpose of perioperative monitors and alarms.
- The importance of staff’s role in speaking up about changes in monitor readings during procedures or during recovery.
- Alarm management and the setting of appropriate alarm ranges.
- Monitor data recording, exporting and any other required processing after a procedure.
- The use of monitoring during medical emergencies or patient transport.
- Monitor data recovery after inadvertent monitor shut down.

## **PROCEDURAL AND RECOVERY CONSIDERATIONS**

At appropriate and regular intervals, it is important to confirm the accuracy of the date and time on the monitors and to synchronize the monitor timestamp with other equipment such as other monitors, the EMR or wall clocks. Without completing this step, the records may not accurately reflect the time when care was provided, especially when compared to a paper anesthesia or emergency record.

A few additional procedural considerations include confirming the following for each patient:

- Which monitors are required for the procedure based on the patient’s condition, planned anesthesia technique, professional standards and applicable regulations.
- The appropriate blood pressure cuff size for the patient.
- The compatibility of any disposable supplies such as a pulse oximetry probe.
- That the alarms are on and the alarm ranges are appropriate for the patient given their baseline vital signs and medical condition.
- That the printing, data-recording and data-saving features of the monitor are functioning appropriately.
- That the monitor data is printed, saved or otherwise secured at the end of the procedure.



After a procedure, patient monitoring should be continued during the recovery phase with the alarms on. The decision to discontinue patient monitoring and discharge the patient should be based on objective, clinical assessments and comparison to the patient's pre-operative vital signs and status. The Modified Aldrete Scoring tool or other clinical resources can be used for evaluating a patient's physical activity, respiration, circulation, consciousness and oxygen saturation.

To optimize the patient safety benefits with patient monitoring, office emergency drills should reflect the importance of the following:

- Having staff identify changes in a patient's physiological status.
- Silencing alarms without disconnecting the patient from the monitor or without the loss of monitor data.
- Changing alarm parameters.
- Saving monitor printouts and preserving monitor data, especially in the event of common emergency scenarios such as leads being disconnected by EMS and/or the monitors manually shut off. Avoid using the equipment to monitor another patient until there is confirmation the data from the emergency response has been preserved.

However, monitor readings do not independently support the emergency response efforts made by the anesthesia team during an emergency. These efforts can be contemporaneously documented on an emergency record, such as the one available for download from OMSNIC.com.

The clinical monitors available today – together with the team concept of anesthesia delivery – provide OMSs with the kind of accurate patient data from start to finish that supports safe clinical care.

## Office Anesthesia Evaluation

The Office Anesthesia Evaluation (OAE) is a unique peer review process that has been in existence since 1975. The OAE was conceived, developed, implemented and mandated by AAOMS through its component state societies to benefit the public, whom its members serve. To maintain AAOMS membership, all member oral and maxillofacial surgeons must complete this mandatory program at least every five years. The process involves a thorough and factual inspection of the member's practice location(s), team, equipment and patient care skills especially as it pertains to anesthesia and emergencies in the office. The inspection is typically conducted by an outside surgeon(s) or a designate of the state dental board. The AAOMS office anesthesia evaluation digital application (AAOMS OAE App on Apple Store or Google Play) can be used to assist with this process.

The AAOMS *Office Anesthesia Evaluation Manual* is published periodically and is used to guide the OAE process. Among other things, the manual provides sample forms; checklists; emergency scenarios such as laryngospasm, syncope, venipuncture, bronchospasm, emesis and aspiration of foreign material, airway obstruction by foreign body, angina pectoris, myocardial infarction, and cardiac arrest; cardiopulmonary resuscitation (CPR); management of blood pressure problems; drug allergies; hyperventilation; convulsions; malignant hyperthermia; and anesthesia for patients suspected of substance abuse among others.

The AAOMS OAE program consist of four parts:

- Part I – An evaluation of the office facilities, emergency medications and emergency equipment.
- Part II – A demonstration by the oral and maxillofacial surgeon and team of the management of simulated office emergencies.
- Part III – A debriefing between the evaluator(s) and the oral and maxillofacial surgeon of the emergency demonstrations and/or facility.



- Part IV – An observation of the anesthesia/surgeries performed in the office (subject to state laws and patient consent).

## Mobile Anesthesia

The information outlined in this section is applicable to OMSs and other anesthetic providers, regardless of their practice model. Anyone considering the mobile anesthesia provider model should be mindful of applicable state laws, rules and regulations, professional resources – such as the *AAOMS Parameters of Care* and the *AAOMS Office Anesthesia Evaluation Manual* – and the scope of their state dental licenses, training and experience.

### **PATIENT RELATIONSHIPS AND SELECTION**

Patient safety is supported when the provider is appropriately familiar with the patient and anticipated procedure. The provider’s responsibility includes determining the patient’s appropriateness for the planned outpatient anesthesia treatment. The mobile anesthesia provider’s responsibilities include, but are not limited to:

- Performance of a patient assessment, including a medical history and a physical examination prior to performing surgery.
- Documentation of the patient’s physical status in their record using the American Society of Anesthesiologists’ physical status classification prior to surgery.
- Documentation of a diagnosis indicating the need for surgical care.

An established patient selection process should be applied to meet to the specific needs of each patient. In the event there are any questions about the patient selection process, elective care should be delayed until the presenting questions are resolved. The sample questions below are offered to help mobile anesthesia providers identify the type of information that can support a safe patient selection process.

- When is advanced access to the patient’s medical history available?
- What is the process to obtain a medical consultation?
- Where will the pre-operative physical exam be performed?
- Will access be provided to the office medical record to document the patient pre-operative assessment?
- Who is responsible for selecting candidates for in-office anesthesia and the level of anesthesia based on a patient’s specific risks?
- What options are available on the day of surgery if the independent assessment of the patient indicates a different level of anesthesia would be in the best interest of the patient?
- What is the process to obtain the patient’s informed consent for the anesthesia and for the procedure?

### **FACILITY RESOURCES AND SAFETY**

Anesthesia should be delivered in a safe and suitably equipped facility. State and federal regulations and professional resources have identified the facility requirements for anesthesia delivery, including when intravenous sedation and/or general anesthesia is delivered. At a minimum, each location where anesthesia is administered should have its own vital sign monitoring equipment for:

- ECG
- Blood pressure
- Pulse oximetry
- End-tidal CO<sub>2</sub>



All patient monitoring equipment should receive regularly scheduled maintenance to ensure proper calibration and functioning.

Having a suitably equipped facility for anesthesia also includes being prepared for potential crisis events. Emergency response planning that includes the identification and condition of emergency medications, equipment and supplies will support management of an emergency event. The sample questions below are offered to help mobile anesthesia providers identify the suitability of a facility for anesthesia administration and may provide insight into the facility's emergency medical response resources.

- Does the facility follow applicable laws, rules, regulations and professional standards related to the delivery of anesthesia?
- Are pre-procedure crash cart checklists regularly used to ensure that emergency equipment and medications are readily available and fully functioning? Who is responsible for completing these checklists?
- Is the anesthesia team familiar with the location and function of the monitoring equipment and the emergency response equipment offered in each office?
- Are pre-procedure “time outs” performed before each procedure to identify any patient-specific risks related to the proposed surgical procedure or anesthetic technique?
- Does local EMS have the pertinent facts related to emergency facility access – such as which elevator or door to use in an emergency – and are hallways and operatories appropriately sized for easy EMS access?

## **STAFF PERFORMANCE AND SAFETY**

As with facility resources, staffing levels and staff training requirements should follow the applicable regulations and professional standards. One foundation of the team model is to establish a culture of patient safety where all team members seek to reduce risk in all aspects of patient care. Examples of risk-reduction strategies for the trained anesthesia team, which are also applicable with mobile anesthesia providers include the following:

- Training for anesthesia patient management through programs such as DAANCE.
- Conducting regular and realistic office emergency drills.
- Utilizing standardized communication tools to improve the staff's communication skills regarding patient safety matters.
- Empowering staff to improve patient safety through the establishment of a “just culture.”

The sample questions below are offered to help mobile anesthesia providers identify the suitability of staff training and emergency responses in any location they are providing services.

- What level of CPR certification has the staff achieved?
- What other training is required of staff who will assist in mobile anesthesia related procedures?
- Is the staff trained on how to operate the vital sign monitors, configure the alarms and create a recording or printout?
- How frequently are medical emergency drills conducted?
- Have specific emergency responses roles been identified for each staff member?
- What roles do staff play in the event of an emergency and are staff members cross-trained in emergency responses?



## CARE COORDINATION

The treating OMS should retain the responsibility for postoperative care and maintain communication to ensure that each patient receives appropriate care continuity. This may include the ability and privilege to admit patients to an extended care hospital for surgical care and/or other management. To assist with identifying the care coordination opportunities, a few questions for mobile anesthesia providers to consider include the following:

- Do patients know how to contact the OMS after-hours?
- What resources are available to conduct a postoperative patient examination including after hours if necessary?
- If someone other than the OMS is responsible for triaging postoperative phone calls from patients, at what point is the OMS notified of postoperative complications?
- Were patient-specific pre-operative instructions provided, including the need for a patient escort?
- What resources are available when a patient requires an extended postoperative recovery?
- What is the discharge process?

## Emergency Preparedness

Despite the best effort of all concerned, crisis events can and do occur. Therefore, it is important for the anesthesia team to make intentional efforts to prevent as well as recognize and respond effectively to potential crisis events.

### OMS SYSTEMS AND PATIENT SAFETY

Systems are intentional strategies to limit risk and enhance safety outcomes. Incorporating accepted professional resources, such as the AAOMS *Office Anesthesia Evaluation Manual* or the AAOMS *Parameters of Care*, can help OMSs establish systems that support the delivery of patient-focused care and a safe and effective anesthetic experience for their patients. A few examples of systems which promote patient safety include are as follows:

- Establishing written patient assessment protocols to identify patient risk factors before surgery.
- Utilizing standardized clinical documentation forms and electronic medical record templates to improve the reliability of clinical information.
- Conducting pre-procedure time out checklists to identify any patient-specific risks related to the proposed surgical procedure or anesthetic technique.
- Performing regular crash cart checks to ensure that emergency equipment, supplies and medications are readily available and fully functioning.
- Conducting interdisciplinary emergency drills to assist with the recognition of and response to potential crisis events.

### MOCK DRILLS/PRACTICE SESSIONS

Learning experiences that embrace an interactive component have been shown to be the most effective approach to improving outcomes in healthcare. One way to incorporate such learning is to conduct thoughtful, regular and realistic practice sessions with feedback. In keeping with its commitment to safety, AAOMS requires members and their teams to conduct mock drills/crisis practice sessions at least four times per year.

The goals of practice such as mock drills include: 1) developing cohesion as members of a team, understanding of the roles and responsibilities for each, 2) making sure everyone knows where equipment and medications are located and how they are used, 3) identifying areas that need improvement with a plan to correct them, and most



importantly, 4) moving through stages of learning, from *unconscious incompetence* (“you are not able to do something and have little of idea what you are supposed to do”) to *conscious incompetence* (“you understand what needs to be done but are not able to do it”) to *conscious competence* (“you are aware of what needs to be done and are able to do it with conscious effort”) to *unconscious competence* (“you both know what to do and are able to act without conscious effort”).

Practice can be considered as having two major components: drills and scrimmages. Drills are activities that develop and grow the skills necessary to perform effectively. Scrimmages are activities that involve applying knowledge and skills into simulated challenges. Scrimmages should be as realistic and meaningful as possible, mimicking the kinds of challenges seen in a crisis event. In the effort to develop effective practice sessions, team leaders should recognize the value and role of each of these elements.

## **MAKING PRACTICE EFFECTIVE**

While simulation-based scrimmages run by an outside administrator are desirable, they may not be feasible. Fortunately, less “high-fidelity” practice types have been shown to be effective approaches to team training with active engagement in the learning process. Regardless of the variation of the type employed, practices should be conducted on a regular basis, planned with the needs of the team in mind, be challenging physiologically and mentally, mimic real-life situations, incorporate a level of stretch for the team, include constructive feedback (de-briefing), employ a “growth mindset” (challenge embraced as desirable and an opportunity to learn) and incorporate an element of engaging team building.

Common versions of practice include the following:

- The “traditional” approach is for the team to follow the lead of the OMS, working through algorithms of common crisis events. This allows for the team to rehearse actions, identify shortcomings and experience how to successfully work together.
- Bring in an outside expert to create/conduct scenarios, observe performance and provide feedback. This puts the anesthesia team “under the microscope” in a good way.
- Either of the above can be enhanced with videotaping, which allows participants to see what actually took place compared with what they thought took place.
- Talking around a conference table about what individuals or the team might do. This allows clarification of responsibilities and identification of challenges that might arise, which in essence is a form of mental rehearsal.

Scenarios used to guide scrimmages should emphasize the types of patients the office typically treats, including age, medical and physical status, and procedure types. While scenarios should generally focus on events occurring in the office operating room(s), where anesthetics are most commonly administered, they also should include other areas of the office such as the recovery area, waiting room, hallway and bathroom. Algorithms for specific crisis events should be creative rather than formulaic and allow for progression through a variety of possible solutions to presenting problems. They should provide an opportunity for the team to discuss risk factors and an opportunity to consider how pre-operative assessments might have prepared the team in advance. In the effort to make sessions as realistic as possible, the team should use a CPR/airway manikin and carry out tasks in a manner that approximates reality, such as performing CPR, managing the airway, connecting IV tubing, drawing up “mock” drugs, etc. As much as possible, sessions should allow participants to experience the thoughts and emotions they face during a true crisis, including mental and physical stress. One way to do so is to incorporate elements of stress, such as setting time limits to complete a given task.





## **DELIBERATE PRACTICE AND FLOW**

Two things have been identified as making high performance more likely: 1) deliberate practice and 2) flow.

*Deliberate practice* is characterized by intentional design, graduated difficulty (stretch), clear goals, immediate and constructive feedback and repetition to correct shortcomings with targeted reinforcement. *Flow* is a highly productive state of consciousness when individuals/teams become highly effective and in their actions. For these purposes, the most important element conducive to flow is a balance between the challenge and the skills that the individual has, clear goals and the ability to tune out distractions.

Given that principles of effective practice are well-established in other disciplines (aviation, military and sport), the OMS team should borrow from what is known to increase the effectiveness of their own practices. For example, there is value in focusing 80 percent of the allotted time and attention to the 20 percent of knowledge and skills that have the most impact on outcomes. Focus should include practicing skills both in isolation as well as in a version that approximates the “real thing” environment. Objectives for practices should be measurable, such as intubating a manikin or accessing and activating an AED within a specific time. Modeling – which means demonstrating how to perform specific actions effectively – should be employed with practices conducted in a context as similar as possible to the one in which team members are expected to perform, such as positioning the operating chair in a position that would allow CPR to be performed. “Inter-leaving” – shifting back and forth from one skill being developed to another – should be incorporated as it enhances long-term skill retention. Sessions should allow for feedback in a manner that is specific to identified shortcoming(s) and provided in a supportive environment.

## **STRESS AND CRISIS EVENTS**

The literature reveals several things about performing under duress in a healthcare environment: 1) stress is common, 2) stress degrades performance, 3) most practitioners who have “figured out” how to perform well under stress have done so through experiential learning, 4) practice offers an opportunity to engage trainees in individual and team learning experiences that provide a foundation for effective performance, and 5) the value of practice is closely related to the quality and, to a lesser degree, the quantity of the simulations/drills/scrimmages.

It is important that individuals have acquired an appropriate level of knowledge and skills in their area of responsibility that they be able to access and apply them in the face of distractions/stress. An important way to do so is through the application of productive mental skills. While many mental skills have been identified, two straightforward approaches are learning to control breathing patterns (exhaling longer than inhaling reduces heart rate and improves focus) and re-framing the moment in a way that turns “stress” in “challenge.” Practice sessions provide individuals an opportunity to try out and develop mental skills when the stakes are theoretical rather than actual.

## **OFFICE EMERGENCY MANAGEMENT PLAN**

**What needs to be done?** A detailed management plan for how the team works together when an emergency occurs must be carefully established and practiced in advance. In addition, there should be ready access to information that supports care management such as algorithms for common crisis events.

**Who is going to do what needs done?** In advance, the details of how the team operates, such as who and how many people stay with the patient, who meets EMS and where, how does EMS enter the office if it is not a standalone facility, who maintains records, etc., must be worked out and understood. Examples include the following:



- Recommended Staffing
  - Procedural
    - State and/or AAOMS guidelines
    - May vary based upon the depth/level of anesthesia, procedure and other factors
- Office Staff Preparation
  - Dental Anesthesia Assistant National Certification Examination (DAANCE) staff Certification/Recertification or equivalent
  - Documented Staff Ongoing Training/Continuing Education
    - Online Anesthesia Review for Dental Anesthesia Assistants
    - Anesthesia Simulation Training
    - Competency Assessment
- Provider and Office Staff Anesthesia Ongoing Training/Continuing Education
  - Office-Based Emergency Airway Management (OBEAM)
  - Advanced Protocols for Medical Emergencies in the Oral and Maxillofacial Surgery Office (APME)
  - Anesthesia Simulation Training
  - Anesthesia-specific CE – Maintenance of Proficiency Section
- Dental Anesthesia Reporting
  - Dental Anesthesia Incident Reporting System (DAIRS)

## Provider Training/Continuing Education

It is known that knowledge will decline as time passes from the educational aspect of health profession training. In addition, there will always be an inevitable expansion of the field with new knowledge and developments over time. Accordingly, an important component of providing safe and effective care is the continuous learning process known as being a “lifelong learner.” The field of oral and maxillofacial surgery is not static and new monitoring equipment, medications and understanding of patient factors have led to improved outcomes throughout the years. Many “older” practitioners recall learning to change from methohexital to propofol as their primary general anesthetic agent and integrating end tidal carbon dioxide monitoring into their practice after leaving their residency programs. Continuing educational opportunities have provided the primary means for dissemination of this information.

All 50 states and the District of Columbia have requirements for permits to administer anesthesia by the OMS in the office and these requirements vary from state to state, especially in the number of hours of continuing education. These are specific anesthesia-focused topics and set hours on a yearly or biannual basis. Practitioners are often responsible for logging their hours with either submission during the renewal of their permit or to maintain on file in anticipation of a potential audit. These CE courses are required to be certified by an independent organization such as ACCME (Accreditation Council for Continuing Medical Education) of the American Medical Association or the American Dental Association CERP program, among other recognized providers.

The American Medical Association defines two different CE categories, Category 1 and 2. Category 1 credits are those programs that have applied for certification and have been credentialed.

- **Category 1** – Includes these activities as defined by the AMA:
  - 1) live activities, such as specialty society annual meetings,
  - 2) enduring materials, such as a CME activity on a DVD, 3) journal-based CME, such as the CME articles available through the *JAMA Network*, 4) test item writing, such as writing questions for a certification exam of a member board of the American Board of Medical Specialties (ABMS), 5) manuscript review, such as participating in the pre-publication peer review process for articles submitted to *JAMA*, 6) performance improvement (PI) CME, such as a performance in practice (Part IV) activity for an ABMS-member board and 7) internet point-of-care, such as physicians using databases vetted by a CME provider to engage in self-directed learning to answer a question relevant to their clinical practice.
- **Category 2** – Includes those activities obtained from home self-designated study programs, journal reading, etc. In totaling the required number of hours for licensing and maintenance of certification, there may be limits on the number of Category 2 credits that can be reported. Category 2 credits are not “certified” by a third party and are self-reported only. Examples of Category 2 credits are: 1) unstructured online searching and learning (i.e., not internet point-of-care), 2) reading authoritative medical literature, 3) consultation with peers and medical experts, 4) self-assessment activities, 5) medical writing, 6) preceptorship participation and 7) peer review and quality assurance participation.

Obtaining continuing education in anesthesia can be obtained in a variety of formats. The classic “in-person” attendance at state, regional and national meetings allow the practitioner to choose topics directly applicable to their delivery of anesthesia in the OMS office setting. The benefits of in-person meetings also permit the doctors and potentially their anesthesia team as well to interact with the lecturer and other participants.

Live webinar format presentations allow for much of the value of in-person events without the need for travel and other costs. Although not as facile a way to interact with speakers and other attendees, chat features and scheduled Q&A sessions may assist in the learning process. Locally, the doctor and the anesthesia team can all be together to gain some of the benefits of specific team discussions directly relevant to their unique practice. Webinars may be recorded and thus allow subsequent review of the material and/or presentation to members that may have had a conflict during the original presentation. Other formats such as podcasts, review articles and maintenance of certification programs also confer CE credits available to the anesthesia team. Validation of attendance and assimilation of the material by post-course testing are typically required for credits to be received. Also, the collection of feedback for the course developers is required for these and in-person events so that continuous quality improvement is occurring.

Participation in continuing education programs throughout one’s career is not only a licensing and possibly board certification requirement, but one that is necessary to provide optimum patient care. All practitioners need to be lifelong learners as they progress in their practices. The potential isolation of the OMS in an independent practice setting only makes this a more critical aspect.

Continuing education (CE) requirements not only satisfy licensure requirements on the state level for dental and medical licensing boards, but several states across the country have specific anesthesia CE requirements for their state and regional OMS societies. Additionally, AAOMS hosts webinars and conferences focused on anesthesia for members and OMS office staff. This includes the biannual Patient Safety Conference that includes expert presenters from within and outside the specialty of oral and maxillofacial surgery.

In addition, the Committee on Continuing Education and Professional Development (CCEPD) and the Committee on Anesthesia (CAN) consistently provide offerings on anesthesia topics at the AAOMS Annual Meeting and Scientific Sessions, and AAOMS supports a Special Interest Group (SIG) on anesthesia to assist in the creation of recurring CE programs for AAOMS members and their office staff. One example of AAOMS-sponsored CE is the pre-conference course on Anesthesia Update held at the AAOMS Annual Meeting. Examples of courses



intended for staff members include Advanced Protocols for Medical Emergencies in the OMS Office, Anesthesia Assistants Skills Lab and the Anesthesia Assistants Review Course. OMSs are also encouraged to access to anesthesia-related CE from sister organizations such as the American Dental Society of Anesthesia (ADSA), the American College of Oral and Maxillofacial Surgeons (ACOMS) and local, state and regional OMS society offerings.

The newly created Daniel M. Laskin Institute For OMS Education and Innovation is a centralized classroom and a state-of-the-art simulation center at AAOMS headquarters in Rosemont, Ill., near Chicago, and the Institute has become the destination for members and their staff seeking simulation training in Office-Based Airway Emergency Management (OBEAM).

## Simulation Training

AAOMS has created an extensive program intended to provide every OMS and their staff training in Office-Based Airway Emergency Management (OBEAM) and Office-Based Crisis Management (OBCM). Modules in the National Simulation Program include didactic and hands-on mastery-based skills training and adult cooperative learning modules that allow participants to learn and update their airway skills as well as improving team dynamics. As of 2026, AAOMS members will need to complete simulation training to maintain their membership in the organization.

Maintenance of proficiency by all members of the team is an integral part of quality care and patient safety in oral and maxillofacial surgery. Lifelong learning from multiple sources consistently enhances the efficiency and effectiveness of both OMSs and their staff in the interest of patient safety.

## Ongoing Quality Assessment and Lifelong Learning

In order to provide optimal patient care, it is important to know where OMSs are and identify areas for improvement. In that effort, it is important to be involved in performance improvement activities that are systematically organized and implemented in such a way as to monitor, assess and improve the quality and safety of healthcare.

Quality Assessment is a dynamic process that must be ongoing to provide actionable information to optimize necessary actions, responses and decisions. Because oral and maxillofacial surgeons have been trained across both medicine and dentistry, ongoing Quality Assessment has been an integral part of the specialty from both a Process Improvement (PI) and Quality Improvement (QI) perspective. Sometimes utilized interchangeably, PI and QI are in fact different.

In the effort to appropriately implement Quality Assessment, one must understand what PI and QI are and the sometimes subtle, but important, differences between them. Although both take a systems' view, PI places the emphasis on human performance while QI places the emphasis on the actual process the human is attempting to perform. They are intricately linked and must be accomplished together to achieve wanted and expected outcomes.

### **LIFELONG LEARNING**

Lifelong learning is an integral tool to the delivery of safe, efficient, effective and quality healthcare. It is self-motivated continuous learning that extends beyond the completion of formal education resulting in the ongoing development of knowledge and skills. Continued knowledge and improvement, both didactic and task-based performance, is the hallmark of this process. AAOMS and ABOMS are related organizations that fully support the importance of this concept/process.



## CHARACTERISTICS OF ONGOING QUALITY ASSESSMENT AND LIFELONG LEARNING

Performance must be observed, measure, analyzed, critiqued, improved and practiced. Quality Assessment and Lifelong Learning together are key to improved mishap prevention, positive outcomes, quality care and patient safety.

### KEY ASPECTS

- **Physical Requirements** – The actual hands-on, how to do and what to do related to a particular process or situation. The physical performance of a task. Can the provider and staff perform the task when stressed?
- **Didactic Requirements** – What does the provider and their staff need to know? What needs to be memory-based and what needs to be on a readily available reference?
- **State Requirements** – Many states have specific requirements and qualifications for the delivery of office-based anesthesia. Providers and staff must be aware of current requirements, stay abreast of changing requirements and be engaged when changes are suggested or discussed.
- **Record Keeping** – Among recommendations:
  - Anesthesia Record Recommendations: See OAE section.
  - Training Record Recommendations: See OAE section.
  - Drills: A record should be kept of drill scenarios, actions by each member of the team, a performance critique and recommendations for improvement in performance if warranted.
  - Additional Quality Assessment forms if needed.

Ongoing Quality Assessment and Lifelong Learning are the signature elements in practice efficiency, procedural effectiveness, the delivery of high-quality state of the art patient care and optimized patient safety and emergency response. Oral and maxillofacial surgery as a specialty must do all it can, and OMSs must do all they can to utilize and optimize these principals when building and training staff, evaluating practice and providing care.

## Conclusion

AAOMS expects this white paper will be revised over time as warranted, as is the case where there is ongoing evolution of knowledge, technology and practice preferences. Reality informs AAOMS that there is a necessary balance between what is ideal and what is practical, particularly in communities where resources are limited and access to care is challenged. While it is understood the choice of agents and techniques is dependent upon the experience, training and preferences of individual practitioners, safety can never be sacrificed.

## Suggested Readings

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