Chapter 13

WORKING WITH A DENTIST ANESTHESIOLOGIST

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Staying in the dental office versus going to a hospital operating room is much more convenient for both dentists and patients. Anesthesia and dental services may be delivered in a dental office for significantly less health care dollars that would be required in the hospital operating room. With health care dollars at a premium, healthcare “reform” well on its way in the United States and more and more people paying out of pocket for dental services, utilization on the hospital operating rooms may decline in the future for otherwise healthy pediatric dental patients. There now is a trend toward in-office deep sedation and general anesthetics in some geographical regions (Olabi et al. 2012) hence, the focus of this chapter is to discuss why and how to work with a dentist anesthesiologist.

As has been described elsewhere in this text, the levels of sedation to anesthesia within medicine and dentistry are: minimal sedation, moderate sedation, deep sedation and general anesthesia. Both minimal sedation and moderate sedation are “conscious” techniques. A hallmark of a conscious technique is that the patient responds to verbal command or light tactile stimulation. In the case of minimal sedation, the description is the patient responds *normally* to verbal command or light tactile stimulation. In the case
of moderate sedation, the description is the patient responds purposefully to verbal command or light tactile stimulation. If minimal to moderate sedation fails, the next level is deep sedation or general anesthesia. For these levels, the pediatric dentist has to consider whether the patient will be treated in the dental office or in the hospital.

*What are the educational requirements for a dentist anesthesiologist?* Many years ago, there were no formal requirements for dentists to be able to administer any form of sedation or anesthesia. Likewise there were no guidelines for dentists in the area of sedation and anesthesia. The first “guidelines for teaching the comprehensive control of pain and anxiety in dentistry” were published in 1972 (Am Dent Assoc.) In the 1985 update of the “guidelines for teaching the comprehensive control of pain and anxiety in dentistry,” the concept of “deep sedation” was introduced and training required to perform this level of anesthesia was deemed to be the same as for general anesthesia (Peskin 1993). These documents have been updated many times since the original version and will continue to be updated as needed.

The training to be licensed and permitted to administer minimal to moderate oral sedation may be obtained in almost all pediatric dental residencies or through a variety of continuing education courses. To be licensed and permitted to administer deep sedation or general anesthesia, the training may only be obtained in specific residencies today. The training requirements for deep sedation and anesthesia are the same. For dentists in the U.S., the completion of a dental anesthesiology or oral and maxillofacial surgery
residency is required in order to obtain a permit to administer general anesthesia. It is
not possible to obtain training to administer deep sedation or general anesthesia in a
continuing education course. Several pediatric dentists have also completed dental
anesthesiology residencies, but the overwhelming majority of pediatric dentists have been
trained only to the level of either minimal or moderate oral sedation.

Deep sedation and general anesthesia can be thought of as equivalent. Both deep
sedation and general anesthesia are “unconscious” techniques where the patient does not
respond to verbal command or light tactile stimulation. The technical difference is only
that in deep sedation the patient does respond purposefully following repeated or painful
stimulation whereas in general anesthesia the patient is not arousable, even following
painful stimulation. Often pediatric dental patients have local anesthesia administered in
addition to deep sedation or general anesthesia which muddies the difference between
deep sedation and general anesthesia so it is easiest to simply consider deep sedation to
be equivalent to general anesthesia.

HOSPITAL-BASED VERSUS OFFICE-BASED TREATMENT

When minimal to moderate oral sedation fails in the pediatric dental office, deep sedation
or general anesthesia may be indicated. For these patients, many pediatric dentists
currently take their patients to the hospital. Consequently, patients incur extremely high
costs and dentists lose productive time in the office. In the 1990s, Mass compared the
costs for a typical one-hour dental case of office-based anesthesia versus hospital-based
anesthesia (Mass 1993). In early 1990s dollars, he found the hospital fee approximated $1,900 while the office-based case would typically cost $150. As of 2009, office-based anesthesia remained less than 10% of the cost of hospital-based anesthesia for dental procedures.

The spread between hospital-based anesthesia and dental office-based anesthesia pricing still exists today. Rashewsky and colleagues (2012) determined that hospital operating room expense for a pediatric dental patient was 13.2 times the expense of office-based anesthesia. At Stony Brook Medicine, dental patients requiring treatment with general anesthesia receive dental care in either an outpatient facility at the Stony Brook School of Dental Medicine or in the Stony Brook University Hospital ambulatory setting. Rashewsky examined the time and cost for ambulatory American Society of Anesthesiologists (ASA) Class I pediatric patients receiving full-mouth dental rehabilitation using general anesthesia in those two locations. They reviewed 96 patient records for patients that were ASA I and aged 36–60 months. There were significant differences in cost, total anesthesia time, and recovery room time. The average total time (anesthesia end time minus anesthesia start time) to treat a child at Stony Brook University Hospital under general anesthesia was 222 +/- 62.7 minutes, and recovery time (time of discharge minus anesthesia end time) was 157 +/- 97.2 minutes; the average total cost was $7,303. At the Stony Brook School of Dental Medicine, the average total time was 175 +/- 36.8 minutes, and recovery time was 25 +/- 12.7 minutes; the average total cost was $414. This study provides evidence that ASA I pediatric patients can receive full-mouth dental rehabilitation utilizing general anesthesia under the
direction of dentist anesthesiologists in an office-based dental setting more quickly and at a lower cost than in a hospital based operating room setting. This is very promising for patients with the least access to care, including patients with special needs and lack of insurance (Rahewsky 2012). To some extent, the economic barrier is lowered.

So what are other advantages and disadvantages of treating pediatric dental patients in the hospital operating room versus the dental office? Having provided anesthesia services in both settings, the authors of this chapter know both systems well. To begin, there is a need for both types of treatment, in-office and in-hospital. Unfortunately, often the choice is determined by what is available to the practitioner or how the practitioner was originally trained. Many pediatric dentists, especially those trained some time ago only consider the hospital operating room option.

While the hospital operating room is safe, it is often not the most ideal place to treat many pediatric dental patients. It is a burden for the pediatric dentist to bring all of the drugs, supplies and equipment that is needed for an operating room case. In some cases, hospitals charge a facility fee and it is illegal for dentists to bring any supplies or equipment into the operating room. Hospitals may not have a wide variety of surgical instruments and dental supplies. The dentist has to use what is available. The hospital operating room also can be inefficient. Dental cases are low priority electives in a medical setting so it is not unusual for a dental case to be “bumped” in order to place a higher, emergent medical case in the operating room where the dental case was
scheduled. Hospital operating rooms also take a significant amount of time to “turn over”. The cleaning and general replenishing of supplies takes much more time compared to the typical dental office.

**THE DENTIST ANESTHESIOLOGIST**

The anesthesia provider for the vast majority of hospital operating rooms will be either a physician anesthesiologist or more commonly in the US, a certified registered nurse anesthetist. There are few dentist anesthesiologists working in hospital operating rooms providing anesthesia services. While physicians and nurses can and do provide safe general anesthesia, they lack an understanding of dentistry compared to a dentist anesthesiologist. Most dentist anesthesiologists will provide intraoral local anesthesia when appropriate for the case or at least they are available for consultation regarding the feasibility for the administration of a local anesthesia.

Dentist anesthesiologists are comfortable with providing nasally intubated general anesthesia. Some physician anesthesiologists and certified registered nurse anesthetist are less comfortable with nasal intubation and may offer only oral intubation or a laryngeal mask airway (LMA) as the airway they will provide for a dental case. Neither oral intubation nor an LMA offers the access to the oral cavity, ability to check occlusion, and all around ability to perform ideal dentistry as does a nasally intubated pediatric dental case. Dentist anesthesiologists are trained as dentists first, then go on to acquire their anesthesia training. Dentists know dental procedures. Physician anesthesiologists and certified registered nurse anesthetists do not. Dentist anesthesiologists understand
that local anesthesia provides the post-operative pain control for pediatric dental patients and that longer acting opioids such as morphine or hydromorphone are not indicated.

When physician anesthesiologists and certified registered nurse anesthetists provide deep sedation or general anesthesia for pediatric dentists, they often do not understand this simple concept and administer sometimes large amounts of opioids. This leads to excessively prolonged recovery and unnecessary post-operative nausea and vomiting.

Neither of these tends to build patient confidence nor are practice builders. The dentist anesthesiologist is trained to and comfortable working with patients that have open airway procedures being performed where as a general rule physician anesthesiologists and certified registered nurse anesthetists are not. Sharing the airway with a dentist while dentistry is being performed is a normal, daily occurrence for a dentist anesthesiologist yet a very foreign concept to most non-dentists performing anesthesia. Most physician anesthesiologists and certified registered nurse anesthetists are not comfortable performing anesthesia outside of a hospital operating room and are unfamiliar with mobile anesthesia practice. Dentist anesthesiologists understand the private practice of dentistry; they understand the dental environment and strive to maintain a nurturing atmosphere when invited to participate in the care of pediatric dental patients. The atmosphere and expectations in hospital operating rooms is quite different from a private dental office indeed and physician anesthesiologists and certified registered nurse anesthetists often do not understand this distinction. There’s also one very interesting statistic regarding patient safety. Since the first dental anesthesia residency was established in 1949, when a dentist anesthesiologist has provided anesthesia in another dentist’s office, there has not been a single patient death - ever. The same cannot be said
for a physician anesthesiologist or a certified registered nurse anesthetist. In summary, some have said that when compared to physician anesthesiologists, dentist anesthesiologists are safer, more approachable, less patronizing and more understanding of the dental process and needs of the dentist.

Also, the operating table in an operating room offers fewer options to the pediatric dentist. The ability to place the operating table in an exact location and position is often compromised when compared to a dental chair in a dental office. Room lighting and suction are often more difficult to manipulate in an operating room and sometime something as simple as a saliva ejector may not be able to be accommodated in a typical hospital operating room.

Pediatric dental patients and their parents or guardians know your pediatric dental office, know where it is located and know the office staff. Taking their child to a hospital for dental care can be daunting. Usually, they don’t know the system or what to expect. The hospital generally is less nurturing and a less comfortable environment than the private office or clinic. As noted by Rashewsky (2012), patients treated in the hospital spend much more time in non-productive activities, such as prolonged waiting times in a pre-operative holding area or longer times in recovery rooms in comparison to dental office treatment. With more and more scrutiny being given to medical expenditures in health care by insurers and governmental agencies, the use of the hospital operating rooms for healthy dental patients may very well become a thing of the past.
While the emphasis in the foregoing has been on in-office deep sedation/anesthesia, there still remains a need for some pediatric dental patients to be seen in the hospital operating room. All ASA IV and ASA V pediatric dental patients that require dental treatment should be seen in the hospital operating room. Most ASA III patients should ideally be seen there too. The ASA I and ASA II patients, and potentially some ASA III patients would be good candidates for office based deep sedation or general anesthesia.

**USE OF A DENTIST ANESTHESIOLOGIST BY PEDIATRIC DENTISTS**

The use of dentist anesthesiologists appears to be an emerging trend in pediatric dental practice (ASDA 2010). A recent paper by Olabi and associates (2012) found that 20-40% of board certified pediatric dentists currently use a dentist anesthesiologist and 60-70% would use a dentist anesthesiologist if one were available. The utilization rate appears to be regional. For example, in the northeast United States, only 12% of board certified pediatric dentists use the services of a dentist anesthesiologist yet 46% of that same group would use a dentist anesthesiologist if one were available. Conversely, 59% of board certified pediatric dentists practicing in the western United States currently use the services of a dentist anesthesiologist and 78% indicated that they would use a dentist anesthesiologist if one were available. It is also interesting to note that from a regional perspective, the southwest had the highest percentage of respondents (88%) reporting that they administered some form of in-office sedation; employed the services of a dentist anesthesiologist (59%), and would use a dentist anesthesiologist (78%) if one were
available. Finally, a novel finding of this study was that female board certified pediatric dentists were more likely to employ a dentist anesthesiologist than male members.

Based on the data of the foregoing study, it is apparent that dentist anesthesiologist availability is a main impediment to increasing the number of deep sedation and general anesthetics in dental offices. To understand the problem, some understanding of the history is needed. It was realized in the 1950s that a specialty of anesthesia in dentistry would benefit the profession. Concomitantly, the department of dental anesthesiology at the Tokyo Medical and Dental University was created by Dr. Tadashi Ueno (Matsuura 1993). In 1953, the American Dental Society of Anesthesiology (ADSA) was formed (Peskin 1993). The first application for specialty status was submitted to the American Dental Association (ADA) during this time (Allen 1992). Unfortunately for dentistry, and more importantly dental patients, this application was unsuccessful.

The next major event affecting the administration of anesthesia by dentists was in the early 1980s. Physicians ‘drew a line in the sand.’ As a portion of a policy statement in 1982, The American Society of Anesthesiologists (ASA) wrote “anesthesia care is the practice of medicine.” As a consequence, dentists administering anesthesia could be accused by state medical boards of practicing medicine without a license. Fortunately, by 1987 the ASA had published a more reasonable statement: “The ASA recognizes the right of qualified dentists as defined by the American Dental Association to administer conscious sedation, deep sedation and general anesthesia to patients having dental procedures only” (ASA 1987).
The ASA recognition has allowed a maturing of the anesthesia specialty. In 2007 the Commission on Dental Accreditation (CODA) published a Standards document entitled “Advanced Dental Education Programs in Dental Anesthesiology.” Hence, standards now exist for dental anesthesia residencies to be accredited. The standards are stringent. Residents must perform a minimum of 500 deep sedations/general anesthetics, 200 of which must be intubated general anesthetics, and at least 50 must be nasotracheal intubations. Twenty cases must incorporate advanced airway techniques such as fiberoptic intubation or laryngeal mask airway. A minimum of 100 cases must be for children age 6 years or younger and 50 cases must be for special-needs patients.

According to an editorial by Dr. Joel Weaver (2007), three major benefits to the dental profession will be derived from the accreditation of dentist anesthesiologist residency programs. These are:

1. Since there is a huge increased need and demand for dentists to provide advanced sedation and anesthesia services for other dentists, accreditation should provide increased funding opportunities to support more residents and residency programs to meet that need and demand.

2. Accreditation by dentistry helps cement anesthesia at its highest level as being within the scope of dental education and within the scope of the clinical practice of dentists.

3. Finally, accreditation keeps the highest level of anesthesia education within the control of dentistry and maintains our ability to control the quality of anesthesia training that dentist anesthesiologists receive to protect the safety of the public that we serve.
State dental boards now have an appropriate measuring stick to judge the adequacy of anesthesia training for dentist anesthesiologists. They should now recognize that future dentist anesthesiologists must be graduates of CODA-accredited training programs to be eligible for anesthesia permits (with, of course, traditional grandfathering for those who completed training prior to accreditation.)

Accreditation helped to provide increased support for more residents and residency programs to meet the need and demand. In 2007, there were roughly 200 dentist anesthesiologists in the United States. There were five dental anesthesia training programs in North America that were graduating a combined nine residents in dental anesthesia per year. In 2013 there are approximately 300 dentist anesthesiologists in the United States, the number of dental anesthesia training programs in North America has doubled. Currently, thirty residents graduate in dental anesthesia annually.

CLINIC USE OF A DENTIST ANESTHESIOLOGIST

Dentist anesthesiologists can help pediatric dentists with their more troublesome patients by allowing dentistry to be done safely, efficiently and in a cost effective manner in the pediatric dental office. Most dentist anesthesiologists in the United States are “mobile”, that is, they bring all of their drugs, supplies and equipment with them when they travel to a pediatric dental office to provide anesthesia services. Figure 1 demonstrates a typical
“mobile” setup of a dentist anesthesiologist. Figure 2 shows the dentist anesthesiologist’s drugs, supplies and equipment in a dental office, providing general anesthesia for a
pediatric dental patient.
The usual procedure for involving a dentist anesthesiologist is as follows. The pediatric dentist arranges a day for the dentist anesthesiologist to be in the office. A number of cases are scheduled to make the day more efficient for both doctors. A few days before the treatment day, the pediatric dental office provides a copy of the schedule with patient data to the dentist anesthesiologist. The dentist anesthesiologist typically reviews the
medical history as collected by the pediatric dentist and phones and talks to the parent or
caregiver one or more days prior to the anesthetic. Further questioning about the medical
history of the child occurs at that time. Contact information for physicians or other health
care providers may be obtained if consultation with the patient’s physician is indicated.
Financial arrangements are discussed with the parent. During the pre-operative phone
call, NPO (nihil per os; nothing by mouth) requirements are relayed as well as any other
pre-operative instructions such as which medications to take and which to withhold. The
dentist anesthesiologist explains to the parent what to expect. For pre-cooperative
pediatric patients or uncooperative patients with special needs, it is especially important
to inform the parent or caregiver the method of induction of general anesthesia and what
is expected of the parent or caregiver.

CHOICE OF DEEP SEDATION OR GENERAL ANESTHESIA: It is a moot point
whether deep sedation or general anesthesia are chosen as the technique for a particular
case. The dentist anesthesiologist is trained in both techniques and there is enough gray
area, overlap and continuum of spectrum between deep sedation and general anesthesia
that teasing out the exact definition during a given case is an academic exercise only.

PREMEDICATION BEFORE DEEP SEDATION OR GENERAL ANESTHESIA:

Premedication before general anesthesia in the pediatric patient is generally not
recommended unless the pre medication/pre induction is given in the office by the
treating practitioner thirty minutes to an hour before planned anesthetic. Parenteral
anxiety is actually the biggest contribution to the anxiety of the child. When a premedication is chosen, the oral route is by far the most common. Further, a benzodiazepine is the most commonly chosen class of drug for orally administered premedication prior to deep sedation or general anesthesia and the specific benzodiazepine is most often midazolam. This drug is chosen as it provides some degree of amnesia, is an anxiolytic agent and has a very shallow dose response curve which translates to a very wide margin of safety.

*INDUCTION OF DEEP SEDATION OR GENERAL ANESTHESIA:* An IV induction is the safest and most effective method of inducing deep sedation or general anesthesia. If the patient will allow an IV to be started, that is ideal. Some older children and higher functioning patients with special needs will allow it. If a lack of cooperation precludes starting an IV, there are two primary methods of inducing deep sedation or general anesthesia. Some dentist anesthesiologists prefer an induction with intramuscular (IM) drugs. Most often the IM drug of choice is ketamine, with or without midazolam, with or without glycopyrrolate. The other primary method of inducing general anesthesia to an uncooperative dental patient is a “mask” induction. This technique utilizes an inhaled volatile general anesthetic gas, most often sevoflurane. Sevoflurane really isn’t used to induce deep sedation, only general anesthesia. Some dentist anesthesiologists have both sevoflurane and ketamine available and use each technique for different situations. Others exclusively use one technique over the other.
Those that prefer a mask induction generally agree that it saves the patient the injection experience. Those preferring the IM induction hold that pediatric patients get inoculations on a regular basis and this is simply one more “shot” and they will have more in the future. Those that criticize mask inductions say that holding a child down and forcing a mask on them, especially in a claustrophobic patient is less than ideal. Others will point out that in the more cooperative pediatric dental patient, who participates in holding the mask, the induction can be stress free. Based on personal experiences, there is no right or wrong way to induce general anesthesia in the pediatric dental patient.

Once deep sedation or general anesthesia is induced, the vast majority of dentist anesthesiologists will establish IV access. Having an IV allows administration of additional drugs, if needed and it provides an immediate access should emergency drug administration become necessary.

**AIRWAYS:**

Open airway is defined as an airway that is not intubated or secured with an airway adjunct such as a nasoendotracheal tube or laryngeal mask airway. Open airway anesthesia is performed daily for all levels of anesthesia and has been performed safely for many years and taught in many pediatric dental residency programs in the US. The literature does not provide a sufficient reason for open airway versus intubated anesthetics; instead it is left up to the individual providing the anesthetic, their training,
comfort level, and case selection. Any level of sedation being administered should utilize a throat pack or oral partition. It is our recommendation that during open airway cases the practitioner judiciously uses water if it is required at all and uses a rubber dam to decrease the amount of debris that goes in the throat pack or oropharynx. The throat pack is placed in the oropharynx to protect contents from going down the airway and causing possible complications such as a laryngospasm. When working in a pediatric dental office, the type of airway is often debated by dentist anesthesiologists. Some strongly prefer an “open airway” for all procedures, feeling the patient can be kept at a lighter plane of anesthesia than with advanced airway manipulation. They contend that induction and recovery is faster in short cases with an open airway. However with an open airway case in a pediatric patient, a patent airway must be maintained at all times and often either the pediatric dentist, dentist anesthesiologist or dental assistant will end up manipulating the airway for at least a portion of the procedural time. Fewer supplies and equipment are also necessary in an open airway case than one where there is more aggressive airway manipulation. Both deep sedation and general anesthesia may be accomplished with open airway techniques.

Other dentist anesthesiologists prefer a more secure airway even though it requires a deeper level of anesthesia. Nasotracheally intubated general anesthesia is considered by some to be the “gold standard” for dental anesthesia cases. With experience and good technique, it takes but a few seconds to a couple of minutes longer than an open airway case. An advantage is that with the secure airway, mandible position and the use of water spray are no concern. Also, with endotracheal intubation, laryngospasm during the case
is not an issue: the incidence of laryngospasm is also very low upon either induction or emergence in an intubated dental anesthesia case. If an endotracheal tube is used, the resultant anesthetic is always general anesthesia, not deep sedation. If the plan is to maintain the anesthetic on a volatile agent such as sevoflurane, some type of advanced airway will be necessary. For a dental procedure in which some degree of airway protection is desired, other than an endotracheal tube, a flexible laryngeal mask airway (LMA) may be chosen. The LMA offers a more protected airway than a simple throat partition as used in an open airway technique but it does not offer the same level of protection as an endotracheal tube. Additionally, occlusion may be checked and a variety of other dental manipulations done in cases of an open airway or nasoendotracheal tube where these same things may not easily be accomplished under LMA general anesthesia. Technically deep sedation may be utilized with an LMA while practically speaking, the resultant level if an LMA is used will always be true general anesthesia.
MAINTENANCE OF GENERAL ANESTHESIA: Once the patient is induced, IV access is secured, and the airway of choice is established, the next decision is determining how to maintain general anesthesia. Again, there are two main options. One is to maintain general anesthesia with IV drugs and the other is to maintain general anesthesia with inhaled general anesthetic gas. Maintaining with IV agents has a number of advantages. There is no concern of “gas hygiene” and pollution of the dental operatory with waste anesthetic gases. The equipment used to administer the IV medications is typically a small, lightweight infusion pump. The drugs used most often are propofol with remifentanil or alfentanil. Each of these drugs have a very short clinical duration of action and therefore rapid emergence from general anesthesia. Propofol is also a great antiemetic agent while it is exerting its effects so post-operative nausea and vomiting are extremely rare. Other agents may be administered through the IV regardless of whether IV or gas maintenance is desired. Various anti-emetics are sometimes administered, as are antibiotics, analgesics and/or steroids.

If an inhalational maintenance is desired with either an LMA or endotracheal tube in place, most often that gas is sevoflurane although occasionally isoflurane or desflurane are chosen for specific reasons. Sevoflurane is a good all around inhalational general anesthetic. It is the most desirable for an inhalational induction as it is least irritating to the pulmonary system and has an inoffensive odor. It works rapidly and has a relatively rapid offset.
Another benefit of the inhalational anesthetics is that they have generally not been in a shortage situation nor have prices escalated as they have with most IV drugs. In 2013, every drug used in anesthesia for dentistry has been in short supply or on back order at least once and the price of most IV drugs used in anesthesia for dentistry has increased from two to ten-fold over a four year period. Inhalational general anesthetics have been relatively price stable.

RECOVERY: At the conclusion of the procedure for the pediatric dental patient, the drugs are turned off, the patient allowed to breathe 100% oxygen. The pediatric patient is allowed to regain consciousness and recover completely. For the patient that had an open airway deep sedation or general anesthetic, the throat partition is simply removed and oxygen continued most often via nasal cannula.

There are different schools of thought on the proper time to extubate those patients that were intubated. Deep extubation has merit as does awake extubation and each may be used on different patient populations or for different reasons. Deep extubation is done during emergence when the child is deeply anesthetized and will not respond to the endotracheal tube being removed. Awake extubation is when the endotracheal tube is removed once a patient has opened their eyes, lifted their head for five seconds, spontaneously breathing with no residual muscle relaxant on board. It is still debated whether deep extubation versus awake extubation is the preferred technique to reduce the
incidence of emergencies on emergence from anesthesia. Whether the patient is extubated deep or awake the overall incidence of adverse events have not been shown to be different.

Once the patient has regained consciousness, they are observed for a period of time until they may be safely dismissed. For some patients and some deep sedation techniques for pediatric dental patients, that may be as short a time period as ten minutes and for other pediatric dental patients and general anesthesia techniques the recovery time may exceed one hour. Pediatric dental patients usually recover fairly quickly from deep sedation or general anesthesia in the dental office and they recover without significant upset or discomfort in the majority of cases. These patients have complete amnesia from shortly after the IM injection or mask induction through part of the recovery period. They generally experience no trauma directly related to the anesthesia.

**MEDICAL EMERGENCIES:**

Dentist anesthesiologists are trained to handle medical emergencies in the dental setting by virtue of their training and by involving the office staff at each individual office where they administer anesthesia. It is the anesthesia provider’s responsibility for ensuring the facility meets appropriate standards. Each state law also mandates minimum levels of equipment and facilities. The anesthesia provider must ensure immediate personal access to emergency drugs and equipment and always ensure the office staff can provide basic life support and activate EMS. Every patient is monitored as if the patient was in a hospital setting. An ECG is always used and blood pressure, heart rate, respiratory rate
and oxygen saturation is also always used. Depending on the practitioner, procedure and type of airway chosen, end tidal carbon dioxide and/or a precordial stethoscope may be utilized. Emergency back up lighting, oxygen, suctioning and monitoring is brought to each facility with the anesthesia provider or already fixed in each facility.

**SUMMARY**

There are a variety of locations that deep sedation and general anesthesia may be safely performed for pediatric dental patients. Each has **benefits and drawbacks**. **It is up to the pediatric dentists to make the choice**. This chapter was intended to provide background information to facilitate that choice. It has emphasized **different cost profiles and availability of both operating room time and mobile dentist anesthesiologists**. There are different techniques for inducing and maintaining deep sedation and general anesthesia, different airway adjuncts that may be chosen, different drugs that may be used for maintaining deep sedation and general anesthesia and different ways of recovering the pediatric dental patient from deep sedation or general anesthesia. The bottom line is, all options are correct. The important thing is not who administers the anesthetic or where, but that there remains the availability of obtaining anesthesia services for pediatric dental patients that have such an important need for it.

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