Review Article

# Chair-Side General Anesthesia for Pediatric Dental Patients – Risky or Risk Free

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## Abstract

Dental treatment under general anesthesia (GA) may be provided in the hospital operating room or dental office on the dental chair. There are various methods of behavior management that pediatric dentists apply in their day-to-day practice which are both nonpharmacological and pharmacological. Although most of the children can be managed with nonpharmacological methods, few require pharmacological methods. Pharmacological methods such as prescribing premedications, conscious sedation, and GA. Conscious sedation and GA are slowly gaining popularity in pediatric patients. Here, we discuss the pros and cons of chairside GA in this paper.

**Keywords:** Behavior, chair-side, general anesthesia, pediatric

## Introduction

Dental caries is the most common chronic infectious disease of childhood, caused by the interaction of bacteria, mainly *Streptococcus mutans*, and sugary foods on tooth enamel.[1] *S. mutans* can spread from mother to baby during infancy and can inoculate even predentate infants. These bacteria break down sugars for energy, causing an acidic environment in the mouth and result in demineralization of the enamel of the teeth and dental caries.[2] Early childhood caries can begin early in life, progresses rapidly in those who are at high risk, and often goes untreated.[3,4] Its consequences can affect the immediate and long-term quality of life of the child and family, and can have significant social and economic consequences beyond the immediate family as well The most common immediate consequence of untreated dental caries is dental pain, which affects children's regular activities, such as eating, talking, sleeping, and playing.[5] There are various treatment modalities for the restoration of decayed teeth depending on the cooperation level of the child. Management of child patients for various dental procedures in the dental office is very challenging. The behavioral problems are commonly seen in children under the age of 6 years due to various elements such as immature reasoning, restricted coping skills, and anxiety/fear causing elements in the dental office.[6] The pediatric dentists try to manage the behavior of children with varied behavior management techniques. The behavior management techniques are broadly classified as nonpharmacological and pharmacological methods.[7] Most of the times, the children can be managed with nonpharmacological methods, but there are conditions wherein pharmacological methods have to be applied. Pediatric dentists have long been seeking to provide excellent dental care to their youngest and most disabled patients while, at the same time, encouraging these patients to develop a positive attitude toward dental treatment. Basic behavior control techniques have created the conditions for a level of minimal discomfort without the associated fear experienced by the majority of children.[8] In deciding whether to use pharmacological management, several prominent factors must be considered – each of which is intrinsically complex when considered in the context of the pediatric dental setting. Among some of these factors are:[9]

1. The risks involved with pharmacological management compared to routine communicative techniques
2. Past safety record of pharmacological management
3. Extent of the patient's dental needs

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4. Practitioner training and experience, including the ability to "rescue" a child when significantly compromised
5. Extent of professional investment and support for the technique, influence of other professional organizations related to safety and guidelines
6. Monitoring
7. Cost and third-party payors
8. Venue issues (i.e., office vs. outpatient care facility)
9. Parental expectations and societal changes
10. Nature of the child's cognitive and emotional needs and personality
11. Integration of these factors into an acceptable modus operandi embraced by the dental profession.

Conscious sedation has made it possible for many patients with specific characteristics to accept dental treatment in the dental office.[10] However, some children and some patients with development problems require the administration of general anesthesia (GA) for the implementation of therapeutic measures in an efficient and safe way.[11] Comprehensive dental rehabilitation under GA is a treatment modality for many pediatric dentists. GA is utilized for pediatric dental patients to provide comprehensive and high quality dental care when conventional dental treatment is not an option. Routine dental procedures for children are performed under GA for various reasons, including for patients: of a very young age; with complex medical/physical/mental conditions; with a need for extensive treatment; with a need for oral surgery treatment; with a need for emergency treatment that is extensive; who require safety considerations; who have language barriers preventing communication; and who travel long distances to receive specialty care.[12] The American Academy of Pediatric Dentistry (AAPD) endorses GA for pediatric dental patients who: are unable to cooperate; experience ineffective local anesthesia; are extremely fearful, anxious, or uncommunicative; require significant surgical procedures; can benefit from GA protecting them from psychological trauma and/or reducing medical risks; and require immediate, comprehensive oral care. Furthermore, many medical conditions present with oral disease that must be managed in an inpatient setting, and the operating room (OR) is often the best place to provide such care.[13] Pediatric dentists are trained to recognize the need for hospital-based dental treatment and to work with an anesthesia team to provide optimal care for their patients.[14] The AAPD definition of medically necessary care includes services of GA and use of surgery facilities. GA should be strictly limited to those patients and clinical situations in which local anesthesia (with or without sedation) is not an option and the patients coming under the American Society of Anesthesiologists (ASA) I and ASA II criteria.[13]

According to the AAPD, deep sedation and GA should only be performed by qualified health professionals, who have a specific training and who are legally accredited to perform such activities.[13] It must be stressed that the acquisition of knowledge concerning the administration of deep sedation and GA cannot be obtained through postgraduate education in pediatric dentistry or through lifelong learning. In the United States of America, only dentists who have completed an advanced course that complies with the requisites of the American Dental Association are considered as qualified to administer drugs for deep sedation and GA. The Dental Council of India also has given guidelines stating that dental clinics across the country will have to carry out the procedures for conscious sedation/GA only under the supervision of a qualified medical anesthesiologist capable of handling the responsibility and management of any pediatric/anesthetic emergency.[15]

As previously mentioned, the pediatric dentist is responsible for providing a safe environment so that deep sedation and GA can be performed. In addition to the evaluation of the anesthesiologist's qualifications, he must verify the following aspects to minimize the risks that can affect the patient: (1) venues and equipment, (2) monitoring and documentation, (3) selection of patients through their medical records and physical conditions, (4) indications relating to the use of anesthesia, (5) preoperative assessment, (6) properly trained support staff, (7) emergency drugs, equipment, and protocols, (8) provision of preoperative and postoperative instructions to patients/legal representatives, and (9) proper knowledge regarding the recovery criteria that permit patients to be discharged and sent home.[16]

The GA can be provided as in patient after admitting the patient to the hospital or can be done as a day care surgery wherein the patient is treated chairside in the dental office. The day care surgery protocol otherwise known as chairside GA in dental terminology has certain benefits. The earliest reference for day-care surgery is mentioned as early as beginning of the 19$^{th}$ Century by James Nicoll a Glasgow surgeon who performed almost 9000 outpatient operations on children in 1903 and later in 1912, when Ralph Waters from Iowa, USA, described "The Down Town Anaesthesia Clinic," where he gave anesthesia for minor outpatient surgery.[17,18] However, it lost its momentum within the next 20 years. However, again the importance of day-care surgery has increased recently. Apart from cost containment, other benefits of outpatient's surgery are: decompression of busy hospital beds, less nosocomial infections, and early recovery in home environment with the family. Thus, there is less disruption of personal lives.[19] The added advantages for dental patients are: the dentist is well acquainted with operatory so he can get the needed materials should the need arise, the patient appointments are lessened to a single visit, the cooperation level of child increases (the next time, he visits a dentist), and also the patient does not have to wait for OR availability.[20] The parents are also opting for chairside GA because of the changing parenting styles, less time at disposal for keeping multiple appointments. The advantages of chairside GA outweigh the disadvantages and so slowly the trends are changing toward chairside anesthesia rather than in OR.[21,22] Many people still feel that GA has disadvantages such as being more risky, operation costs being

high, lengthy procedures but with advent of newer drugs the margins of error have reduced.[23,24]

## Risks

Today, although sedation are GA are not so much risky anymore with better equipment and medications still there are risks associated, especially in chairside. There are many risks involved with child sedation for dental procedures. Brain damage and death are the most dramatic and paralyzing outcomes for the patient, family, staff, and practitioner.[25] These tragic consequences are caused primarily by respiratory and airway compromise in sedated children. Minor risks include vomiting, irrational and paradoxical behaviors, and extremes in physiological parameters.[26] The orofacial complex in humans is unique. Phylogenetic and ontogenetic evolution has been designed to keep physical threats away from one's head and its surrounding "space." Even psychological invasion of that space appears to cause significant stress.[27] Hence, the practice of dentistry may have its own intrinsic stimuli that evoke avoidance mechanisms in adults, and especially in children. Restorative dentistry is usually performed in the mouth with an aerosol water spray. The mouth is a part of the airway, and when it is being challenged by procedural steps, the airway is also challenged. If the patient's ability to control the airway is impaired due to pharmacological override of routine airway reflexes (e.g., swallowing), failure to compensate or protect those reflexes can result in more primitive reflexes such as laryngospasms. An unresolved and poorly managed laryngospasm can result in significant brain damage or death. Preventive and protective formats such as rubber dams are certainly indicated, especially in sedated or anesthetized patients.[28] Despite estimates promulgated by the various authors, it is not possible to determine the safety record associated either with sedations or GA involving children and dentistry. There are individual reports of morbidity and mortality and quasi meta-analyses of reports and cases that can provide clues about the number of adverse outcomes.[29,30] Changes in parents' acceptance of certain assertive behavior management techniques combined with parents' lack of desire to set limits, less willingness to use physical discipline, and parents who are unsure of their roles as parents produce patients unwilling to cooperate in the dental clinic.[31,32]

## Conclusion

Chairside GA in pediatric patients is a far safer method in treatment of children lacking cooperative ability than many other methods. Previous knowledge by the pediatric dentist regarding the indications for GA provides a better quality dental care, ensuring more safety and less discomfort for their patients. Slowly, we need to incorporate this practice in our clinics keeping in mind the need of the hour and safety measures.

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### Conflicts of interest

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