

Mouth Rehabilitation in Children with Atrial Septal Defect and Epilepsy Under General Anesthesia: A Case Report

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ABSTRACT

Children with congenital heart disease and epilepsy require special consideration in pediatric dental treatment because systemic conditions, medication use, and the risk of medical emergencies may complicate oral rehabilitation procedures. Atrial septal defect (ASD) is associated with concerns regarding infective endocarditis and perioperative management, while epilepsy may increase the risk of seizures during stressful dental procedures. This study aimed to describe the management of comprehensive oral cavity rehabilitation in a child with ASD and epilepsy under general anesthesia and to discuss its relevance to pediatric dental practice. This research used a case report approach involving a 10-year-old girl with multiple carious teeth, ASD, and epilepsy. Preoperative evaluation was conducted through consultation with a pediatrician and anaesthesiologist, supported by thoracic radiography, panoramic radiography, and hematological examination. Dental procedures, including restorations, pulpotomy, extraction, and fluoride varnish application, were completed in a single session under general anesthesia using sevoflurane inhalation induction. The results demonstrated that comprehensive oral rehabilitation under general anesthesia was successfully performed without intraoperative or postoperative complications. Multidisciplinary coordination, individualized treatment planning, infection control, and strict perioperative monitoring contributed to treatment success. In conclusion, oral rehabilitation under general anesthesia can be a safe and effective treatment option for pediatric patients with ASD and epilepsy when supported by careful preoperative assessment and multidisciplinary management.

INTRODUCTION

Children's dentistry services for patients with systemic diseases require careful consideration (Arhakis & Kotsanos, 2022; Elhusseiny & Saleh, 2024; Erwin et al., 2022; Joo et al., 2024). History of congenital heart disease, neurological disorders, long-term drug use, and risk of medical emergencies should be considered from the planning stage to follow-up (American Academy of Pediatric Dentistry [AAPD], 2025a; Hughes et al., 2019). Children with special health needs are also more likely to experience resistance to routine dental care, so caries lesions can develop more widely before appropriate intervention (AAPD, 2025a).

Congenital heart defects are one of the important comorbidities in pediatric dentistry. Atrial septal defects and ventricular septal defects belong to a group of non-cyanotic congenital heart defects characterized by the presence of a left-to-right bypass (National Heart, Lung, and Blood Institute [NHLBI], 2022; Mavroudis et al., 2023; Rao, 2024). In large defects, the load of cardiac volume and pulmonary circulation may increase; in small defects, the patient may remain asymptomatic and only be identified during routine examinations (NHLBI, 2022; AHA, n.d.-a; AHA, n.d.-b). The most important dental implications are not only related to the risk of

infective endocarditis, but also the need to maintain optimal oral hygiene and eliminate the source of odontogenic infection as early as possible (Hughes et al., 2019; Wilson et al., 2021; AAPD, 2025b).

Epilepsy is also a relevant condition in pediatric dentistry practice. This disease is a chronic neurological disorder with a tendency to recurrent seizures (National Institute of Neurological Disorders and Stroke [NINDS], 2025; Aragon & Burneo, 2007; Jacobsen & Eden, 2008; Goswami et al., 2023). In children, epilepsy can be related to dentoalveolar trauma, poor oral hygiene, abrasion, gingivitis, and gingival enlargement in users of certain antiepileptic drugs (Aragon & Burneo, 2007; Jacobsen & Eden, 2008; Goswami et al., 2023). In addition, fear, stress, pain, and changes in medication schedules during the perioperative period can be problems that need to be anticipated during treatment (Aragon & Burneo, 2007; Jacobsen & Eden, 2008).

If a child has extensive dental care needs accompanied by a condition Complex medical, general anesthesia can be the best option (AAPD, 2025a; AAPD, 2025c; Knapp et al., 2017). This approach allows all actions to be carried out in one session, thereby minimizing psychological stress, improving the quality of care, and reducing the likelihood of action failure due to cooperative limitations (AAPD, 2025a; AAPD, 2025c; Knapp et al., 2017). This case report aims to describe the management of oral cavity rehabilitation in children with ASD and epilepsy under general anesthesia, as well as to present a literature review on ASD and epilepsy relevant to pediatric dentistry practice.

The specific issue addressed in this research is the management of extensive dental disease in a child who simultaneously has cardiac and neurological comorbidities (Gupta et al., 2022; Murray et al., 2024; Vaccarino et al., 2025). The attached case demonstrates that multiple dental procedures, including restorations, pulpotomy, extraction, and fluoride varnish application, were completed in one session under general anesthesia. This approach was chosen because comprehensive treatment in a single controlled setting can reduce repeated exposure to stress, minimize treatment failure due to limited cooperation, and allow safer monitoring of airway, hemodynamic status, and neurological condition.

Previous research supports the relevance of dental treatment under general anesthesia for children with special health care needs. Recent studies and reviews report that dental general anesthesia is often used when children require extensive treatment, have behavioral limitations, or present with complex medical conditions. Research on pediatric dental rehabilitation under general anesthesia also indicates potential improvement in oral health-related quality of life after comprehensive treatment. These findings are consistent with the clinical rationale of the present case, where general anesthesia allowed complete oral rehabilitation while reducing the risks associated with multiple separate visits.

However, a research gap remains in the limited number of case-based discussions that integrate atrial septal defect, epilepsy, pediatric dental infection control, antibiotic prophylaxis considerations, and general anesthesia management in one clinical framework. Many studies discuss dental general anesthesia broadly, while others focus separately on congenital heart disease or epilepsy. Fewer reports explain how multidisciplinary decision-making is applied when these conditions coexist in one pediatric patient. This gap is important because combined comorbidities may require different clinical judgments from those used in children with only dental caries or only one systemic disease.

The urgency of this research lies in the need to prevent delayed dental intervention in medically compromised children. Untreated caries and odontogenic infection may worsen pain, eating difficulty, sleep disturbance, school absence, and quality of life. In children with congenital heart disease, oral infection control is particularly important because daily bacteremia from poor oral hygiene may be more clinically relevant than a single dental procedure. In children with epilepsy, unmanaged dental disease may increase stress and discomfort, which can indirectly complicate seizure control. Thus, safe and timely dental rehabilitation is a necessary component of holistic pediatric care.

The novelty of this research is found in its integrated presentation of oral rehabilitation for a child with ASD and epilepsy under general anesthesia, emphasizing not only the technical dental procedures but also the medical reasoning behind preoperative consultation, anesthesia selection, antibiotic use, infection elimination, and postoperative monitoring. The study contributes by clarifying that antibiotic prophylaxis should not be generalized for all ASD patients, but should be determined through individualized risk assessment and multidisciplinary coordination. It also highlights the importance of conservative yet definitive dental treatment choices to reduce the likelihood of re-intervention.

The purpose of this research is to describe the clinical management of oral cavity rehabilitation in a child with atrial septal defect and epilepsy under general anesthesia and to discuss its relevance to pediatric dentistry practice. The objective is to explain the treatment planning process, perioperative considerations, dental procedures, and clinical outcomes in relation to current literature. The expected benefit is to provide practical guidance for dentists, pediatric dentists, anesthesiologists, and physicians in managing medically compromised children who require comprehensive dental care, while also strengthening awareness that oral health is inseparable from systemic health and quality of life.

METHOD

This research method used a case study in a 10-year-old girl with a weight of 32 kg coming with multiple cavity teeth. Based on the available case data, the patient has a history of congenital heart disease of *the atrial septal defect* type and epilepsy and is under the supervision of a pediatrician. The need for dental care in patients is multiple, so thorough planning is needed taking into account the patient's systemic condition.

Preoperative evaluation is carried out through consultation with a pediatrician and an anesthesiologist. Supporting examinations carried out include thoracic photographs, panoramic radiography, and complete blood tests. This step aims to assess the patient's readiness to undergo general anesthesia, ensure there are no contraindications to the action, and develop a safe perioperative strategy. The patient is fasted for 6 hours before the procedure according to the anesthesia protocol.

Prior to the procedure, the patient received 1gram of amoxicillin intravenously 30 minutes before the procedure based on the perioperative medical considerations of the treating team. Anesthesia induction is carried out by inhalation technique using a combination of N₂O-O₂ and sevoflurane, then followed by endotracheal intubation through direct laryngoscopy. All treatments are carried out in one surgical session.



Figure 1. Certificate of ASD disease and patient epilepsy



Figure 2. Intraoral photo of the patient



Figure 3. Panoramic Photos of Patients

The dental procedures performed include tooth restoration 36 and 75 with glass ionomer restoration, tooth restoration 26 and 63, dental pulpotomy 46 accompanied by follow-up glass ionomer filling, tooth extraction 85 and application of fluoride varnish on the upper and lower jaws. The selection of treatments is aimed at eliminating the source of infection, maintaining as many teeth as possible that can still be restored, and strengthening post-action caries prevention strategies. The duration of the procedure is about 2 hours and 20 minutes. During the procedure, no intraoperative complications were found.



Figure 4. Intraoral photos After the procedure

After the procedure is completed, the patient is transferred to the recovery room and monitored until fully conscious. Postoperative instructions include a soft diet for 3 days, avoiding hot foods, not gargling hard for 2 x 24 hours, and keeping the oral cavity clean carefully. Post-action therapy included amoxicillin 250 mg and paracetamol 250 mg. At the control visit, the patient's general condition was good and no postoperative complications were found.

RESULTS AND DISCUSSION

Consultation with a pediatrician and anesthesiologist before the procedure is a very important step, especially to assess the patient's clinical stability, review the medications being used, and determine the safest anesthesia strategy (AAPD, 2025a; AAPD, 2025c). The American Academy of Pediatric Dentistry (AAPD) recommendations emphasize that in patients with special health care needs, coordination with the attending physician is necessary when sedation, general anesthesia, or other modifications of measures that may affect the safety of service will be performed (AAPD, 2025a).

Based on a cardiology perspective, the aspects that need to be considered are not only the existence of ASD itself, but also the status of correction of the abnormality, the presence of residual defects, a history of infective endocarditis, the presence of heart prosthetics, the degree of hemodynamic disorders, and the recommendations of the pediatric cardiologist (Hughes et al., 2019; Wilson et al., 2021; AAPD, 2025b). The most recent American Heart Association guidelines confirm that dental antibiotic prophylaxis is only recommended in the group of patients at highest risk for infectious endocarditis complications (Wilson et al., 2021; AAPD, 2025b). Therefore, in the scientific writing of this case, the administration of amoxicillin before action is more appropriately understood as an individualized clinical decision based on perioperative medical evaluation and multidisciplinary coordination, rather than as a universal recommendation for all ASD patients (AAPD, 2025a; Wilson et al., 2021; AAPD, 2025b).

The prophylactic use of antibiotics is not routinely administered in all cases of septal defects; focal control of oral infections remains very important. The AAPD states that *Streptococcus viridians* bacteremia is more common from daily activities such as chewing and brushing teeth than from a single dental procedure (Wilson et al., 2021; AAPD, 2025b). This confirms that preventive, restorative, and source elimination of infection have an equally important, even more fundamental, role than the administration of prophylactic antibiotics alone (Hughes et al., 2019; Wilson et al., 2021; AAPD, 2025b). In pediatric patients with congenital heart disease, good oral cavity rehabilitation can lower chronic inflammatory burden, improve quality of life, and facilitate long-term health maintenance (Hughes et al., 2019; Knapp et al., 2017).

Based on the neurological side, epilepsy adds to the complexity of treatment due to the potential for seizures during the preoperative, intraoperative, and postoperative periods. The dentist needs to ensure a recent history of seizures, adherence to taking antiepileptic medications, and possible drug interactions (Aragon & Burneo, 2007; Jacobsen & Eden, 2008). According to Aragon and Burneo, Jacobsen and Eden, and Goswami et al., epilepsy patients require well-planned dental care because their own illness and antiepileptic therapy can affect oral health and dental care (Aragon & Burneo, 2007; Jacobsen & Eden, 2008; Goswami et al., 2023). In these cases, general anesthesia helps reduce stress, anxiety, and defensive responses that in certain patients can be triggering factors for seizures (Aragon & Burneo, 2007; Jacobsen & Eden, 2008). In addition, the operating room environment provides the advantage of strict monitoring of the patient's airway, hemodynamics, and neurological condition (AAPD, 2025a; AAPD, 2025c).

The selection of inhalation anesthesia with sevoflurane in the case of children is still commonly done. Although there have been reports of epileptiform activity in certain conditions, recent studies have shown that induction of anesthesia with sevoflurane can still be safely used in children if done with proper technique and monitoring (Lerman, 2022). Thus, the main issue is not simply the selection of a single anesthesia agent, but the individualization of the anesthesia plan based on the patient's medical condition, the experience of the anesthesia team, and the readiness to handle possible complications (AAPD, 2025a; AAPD, 2025c; Lerman, 2022).

The decision to complete the entire treatment in a single session of general anesthesia in this case also has a strong clinical basis. The AAPD places general anesthesia as an indication in patients who need immediate comprehensive care or have medical conditions that limit cooperation (AAPD, 2025c). A one-stage comprehensive course reduces the need for repeat visits, lowers stress exposure, and can reduce the risk of recurrent bacteremia from invasive procedures performed separately (Wilson et al., 2021; AAPD, 2025b; AAPD, 2025c). Systematic review also shows that dental care under general anesthesia in children tends to improve *oral health-related quality of life* overall (Knapp et al., 2017).

Based on the odontological aspect, the treatment strategy in this case appears to be principle-oriented but realistic. Teeth that are still defensible are restored using composite resin and glass ionomer cement, while teeth that are assessed as indefensible are removed. This approach is rational because in patients with special health needs, the goal of rehabilitation is not only to close the cavity, but also to relieve pain, control infection, improve chewing function, and reduce the risk of needing re-intervention in the near term (AAPD, 2025a; AAPD,

2025c; Knapp et al., 2017). The application of fluoride varnish at the end of treatment is also in accordance with the principles of secondary and tertiary prevention to suppress the progression of new caries (AAPD, 2025c).

The selection of pulpotomy on teeth 46 in this case was based on considerations of tissue conservation, efficiency of time of action, and efforts to minimize broader tissue manipulation in patients with systemic comorbidities. Compared to pulpectomy, pulpotomy is a simpler and more conservative procedure because the action is limited to the removal of inflamed coronary pulp tissue without thorough root canal instrumentation. In the context of this case, pulpotomy is seen as the right choice to eliminate complaints, maintain dental function, and support the comprehensive completion of oral cavity rehabilitation in one general anesthesia session (Wilson et al., 2021; AAPD, 2025d).

Pulpectomy requires instrumentation of root canals to periapical tissues as well as more treatment visits, increasing the likelihood of tissue trauma and bacteremia. In contrast, pulpotomy is a more conservative procedure because it only removes the inflamed coronal pulp tissue without manipulation of the radicular pulp. Thus, the risk of spreading bacteria into the systemic circulation can be further minimized. In addition, in this case the patient has undergone cardiac correction and is planned only periodic medical control without advanced invasive measures. Therefore, pulpotomy was chosen as a safer, more effective, and minimally invasive treatment to maintain dental function 46 as well as eliminate complaints without increasing the risk of systemic complications (Wilson et al., 2021; AAPD, 2025d).

The success of this case, which is characterized by the absence of intraoperative and postoperative complications and good control conditions, suggests that rehabilitation of the oral cavity under general anesthesia can be safely performed in pediatric patients with ASD and epilepsy. Nevertheless, long-term follow-up remains critical. True success is determined not only by a single surgical procedure that goes smoothly, but also by good plaque control, periodic revisits, reinforcement of education to parents, and continuity of coordination with the physician who treats the patient's systemic disease (AAPD, 2025a; Hughes et al., 2019).

CONCLUSION

Rehabilitation of the oral cavity under general anesthesia is an effective option in children with extensive treatment needs accompanied by comorbidities such as *atrial septal defect* and epilepsy. The safety of action is determined by a thorough preoperative evaluation, multidisciplinary communication, selection of *appropriate care* settings, and strict perioperative monitoring. The literature review also confirms that, in patients with cardiac septal defects, oral health control and individual endocarditis risk assessment are more important than the routine application of antibiotic prophylaxis. In epilepsy patients, control of triggering factors and the continuation of antiepileptic drugs are essential components to support the success of dental care.

REFERENCE

- American Academy of Pediatric Dentistry. (2025a). Management of dental patients with special health care needs. In *The reference manual of pediatric dentistry* (pp. 364–371). American Academy of Pediatric Dentistry.
- American Academy of Pediatric Dentistry. (2025b). Antibiotic prophylaxis for dental patients

- at risk for infection. In *The reference manual of pediatric dentistry* (pp. 500–506). American Academy of Pediatric Dentistry.
- American Academy of Pediatric Dentistry. (2025c). Behavior guidance for the pediatric dental patient. In *The reference manual of pediatric dentistry* (pp. 379–399). American Academy of Pediatric Dentistry.
- American Academy of Pediatric Dentistry. (2025d). Vital pulp therapy for primary and immature permanent teeth. In *The reference manual of pediatric dentistry*. American Academy of Pediatric Dentistry.
- Aragon, C. E., & Burneo, J. G. (2007). Understanding the patient with epilepsy and seizures in the dental practice. *Journal of the Canadian Dental Association*, 73(1), 71–76.
- Arhakis, A., & Kotsanos, N. (2022). The young dental patient with systemic disease. In *Pediatric dentistry* (pp. 515–525). Springer.
- Elhusseiny, G. A., & Saleh, W. (2024). Oral health in children with chronic kidney disease, hemodialysis, and renal transplantation: A comprehensive narrative review of the oral manifestations and dental implications. *Clinical Medicine Insights: Pediatrics*, 18, 11795565241271688.
- Erwin, J., Paisi, M., Neill, S., Burns, L., Vassallo, I., Nelder, A., Facenfield, J., Devalia, U., Vassallo, T., & Witton, R. (2022). Factors influencing oral health behaviours, access and delivery of dental care for autistic children and adolescents: A mixed-methods systematic review. *Health Expectations*, 25(4), 1269–1318.
- Goswami, M., Johar, S., & Khokhar, A. (2023). Oral health considerations and dental management for epileptic children in pediatric dental care. *International Journal of Clinical Pediatric Dentistry*, 16(1), 170–176. <https://doi.org/10.5005/jp-journals-10005-2499>
- Gupta, K., Kumar, S., Kukkamalla, M. A., Taneja, V., Syed, G. A., Pullishery, F., Zarbah, M. A., Alqahtani, S. M., Alobaoid, M. A., & Chaturvedi, S. (2022). Dental management considerations for patients with cardiovascular disease—A narrative review. *Reviews in Cardiovascular Medicine*, 23(8), 261.
- Hughes, S., Balmer, R., Moffat, M., & Willcoxson, F. (2019). The dental management of children with congenital heart disease following the publication of Paediatric Congenital Heart Disease Standards and Specifications. *British Dental Journal*, 226(6), 447–452. <https://doi.org/10.1038/s41415-019-0061-3>
- Jacobsen, P. L., & Eden, O. (2008). Epilepsy and the dental management of the epileptic patient. *Journal of Contemporary Dental Practice*, 9(1), 54–62.
- Joo, Y., Lee, J., Choi, H.-J., Song, J. S., Lee, K. E., & Kang, C.-M. (2024). Dental treatment patterns in pediatric patients with rare diseases: A retrospective analysis at Yonsei University Dental Hospital. *Journal of the Korean Academy of Pediatric Dentistry*, 51(4), 417–431.
- Knapp, R., Gilchrist, F., Rodd, H. D., & Marshman, Z. (2017). Change in children’s oral health-related quality of life following dental treatment under general anaesthesia for the management of dental caries: A systematic review. *International Journal of Paediatric Dentistry*, 27(4), 302–312. <https://doi.org/10.1111/ipd.12259>
- Lerman, J. (2022). Induction of anesthesia with sevoflurane in children: Curiosities and controversies. *Paediatric Anaesthesia*, 32(10), 1100–1103. <https://doi.org/10.1111/pan.14521>
- Mavroudis, C., Backer, C. L., & Anderson, R. H. (2023). Ventricular septal defect. In *Pediatric cardiac surgery* (pp. 317–360).
- Murray, P. E., Coffman, J. A., & Garcia-Godoy, F. (2024). Oral pathogens’ substantial burden on cancer, cardiovascular diseases, Alzheimer’s, diabetes, and other systemic diseases: A public health crisis—A comprehensive review. *Pathogens*, 13(12), 1084.

- National Heart, Lung, and Blood Institute. (2022). *Congenital heart defects types*. National Institutes of Health. [NHLBI congenital heart defects](#)
- National Institute of Neurological Disorders and Stroke. (2025). *Epilepsy and seizures*. National Institutes of Health. [NINDS epilepsy and seizures](#)
- Rao, P. S. (2024). Diagnosis and management of ventricular septal defects. *Reviews in Cardiovascular Medicine*, 25(11), 411.
- Vaccarino, V., Prescott, E., Shah, A. J., Bremner, J. D., Raggi, P., Dobilienė, O., Gale, C. P., & Bugiardini, R. (2025). Mental health disorders and their impact on cardiovascular health disparities. *The Lancet Regional Health – Europe*, 56.
- Wilson, W. R., Gewitz, M., Lockhart, P. B., Bolger, A. F., DeSimone, D. C., Kazi, D. S., Baddour, L. M., Delahaye, F., Levison, M., Bolger, A., & Taubert, K. A. (2021). Prevention of viridans group streptococcal infective endocarditis: A scientific statement from the American Heart Association. *Circulation*, 143(20), e963–e978. <https://doi.org/10.1161/CIR.0000000000000969>