

The Role of the Dental Surgeon in the Pediatric Intensive Care Unit

O Papel do Cirurgião-Dentista na Unidade de Terapia Intensiva Pediátrica

Geovanna Lumene Tavares Isacksson^a; Luiz Alexandre da Luz de Almeida^a; Marlene Xavier de Andrade Damasceno^a; Michele Rosas Couto Costa^a; Julianna de Freitas Ferreira^a; Júlia dos Santos Vianna Néri^a; Juliana Borges de Lima Dantas^b

^aFaculdade Adventista da Bahia, Curso de Odontologia. BA, Brasil.

^bEscola Bahiana de Medicina e Saúde Pública. BA, Brasil.

*E-mail: julianadantas.pos@bahiana.edu.br.

Abstract

Dentistry plays a significant role in the supportive care of hospitalized children in Pediatric Intensive Care Units (PICUs) as these patients arrive in this environment with altered immune systems and compromised oral health. This paper aims to present an integrative literature review on the role of dentists in the hospital setting, particularly in the PICU, and discuss the challenges encountered in this environment. A free search was conducted on the electronic platforms PubMed, Scientific Electronic Library Online (SciELO), Latin American and Caribbean Literature in Sciences (Lilacs), and Virtual Health Library (BVS) from January to February 2023, with no defined publication period and including all types of studies. Health Science descriptors (DeCS/MeSH) were used in English and Portuguese, applying Boolean operators. According to the data collected, among the conditions requiring admission to the PICU, respiratory disorders, heart and kidney failure, neurological disorders, severe metabolic diseases, infections, injuries, traumas, near-drowning incidents, and post-operative care after complex surgeries stand out. Dental care in this environment reduce hospitalization time, costs, and improve the quality of life of pediatric patients. However, the integration of these professionals into the PICU is still limited. Dentists in the hospital setting optimize multidisciplinary work through protocol-based measures derived from studies conducted in adult patients in intensive care units. Due to the lack of robust evidence related to oral care practices in pediatric intensive care settings, further research is mandatory.

Keywords: Pediatric Intensive Care Unit. Dentist. Oral Hygiene.

Resumo

A Odontologia tem um papel importante na assistência de crianças hospitalizadas nas Unidades de Terapia Intensiva Pediátricas (UTIP), pois esses pacientes chegam neste ambiente com o sistema imunológico alterado e a saúde bucal comprometida. Apresentar uma revisão integrativa da literatura sobre o papel do cirurgião-dentista no hospital, em especial, na UTIP, além de discutir os desafios encontrados nesse ambiente. Uma busca foi conduzida nas plataformas eletrônicas PubMed, Scientific Eletronic Library Online (SciElo), Latin American and Caribbean Literature in Sciences (Lilacs) e Biblioteca Virtual da Saúde (BVS), entre janeiro a fevereiro/2023, sem período definido de publicação e sob a inclusão de todos os tipos de estudos. Os descritores em Ciências da saúde (DeCS/MeSH) foram utilizados em inglês e português, sob aplicação dos operadores booleanos. Segundo dados coletados, dentre as condições que necessitam de internação na UTIP, destaca-se as alterações respiratórias, insuficiência cardíaca e renal, alterações do sistema nervoso, doenças metabólicas graves, infecções, ferimentos, traumatismos, quase afogamentos e pós-operatório de cirurgias complexas. O cirurgião-dentista neste ambiente reduz o tempo de internação, os custos e aumenta a qualidade de vida dos pacientes pediátricos. Todavia, ainda é escassa a inserção deste profissional em UTIP. O cirurgião-dentista em ambiente hospitalar otimiza o trabalho multidisciplinar através de medidas baseadas em protocolos obtidos a partir de estudos em pacientes adultos em unidades de terapia intensivas. Devido a falta de evidências robustas relacionadas à prática de cuidados bucais no ambiente de cuidados intensivos pediátricos, a realização de pesquisas futuras torna-se mandatória.

Palavras-chave: Unidade de Terapia Intensiva Pediátrica. Dentista. Higiene Bucal

1 Introduction

Dentistry plays an important role in the treatment of hospitalized children in Pediatric Intensive Care Units (PICU), as many of these patients have serious health conditions such as chronic diseases, genetic syndromes, or neurological disorders that can affect their oral health¹. According to the literature, poor oral hygiene can increase the risk of developing infectious diseases, particularly ventilator-associated pneumonia (VAP), which in turn prolongs hospitalization, increases the risk of death, and raises treatment costs^{1,2}.

A significant number of patients already arrive in the PICU

with compromised oral health due to the presence of oral soft tissue lesions, cavities, periodontal diseases, and other conditions that hinder routine activities such as speech and eating³. This directly affects the quality of life of hospitalized patients and worsens their overall clinical condition, leading to increased sedation and analgesia requirements, for example. Data collected through pre-surgical inspections of the oral cavity of hospitalized adult patients revealed that approximately 13% of individuals had dental caries, 21% had abscesses and gum diseases, and 46% had local injuries^{3,4}.

One of the biggest challenges for dentists in the PICU is controlling dental biofilm. According to a recent study

conducted in 2020, from the 5th day of hospitalization, the average microbial plaque index of hospitalized children can reach up to 100%⁵. As a result, bill 883/19 makes it mandatory for dental professionals to be present in Intensive Care Units (ICU) as integral members of a multidisciplinary team, aiming to provide better care for hospitalized patients through comprehensive and humanized assistance⁶.

The oral health of pediatric patients can sometimes be neglected due to various factors, including the complexity of medical treatment, lack of knowledge about the role of dentistry in the PICU, or even the caregivers' failure to prioritize regular consultations with a pediatric dentist^{7,8}. Therefore, it is the responsibility of the dentist working in the hospital environment to supervise and instruct the multidisciplinary team, especially the nurses, to ensure proper oral hygiene for patients, aiming to prevent the development of oral conditions⁷⁻⁹.

Due to the scarcity of studies in the current literature addressing the role of dentists in the PICU, along with the proven ability of these professionals to reduce morbidity and mortality rates, treatment costs, and improve the quality of life for this specific population, this study aims to present, through a narrative review of literature, the role of dentists in the hospital environment, particularly in the PICU, and discuss the challenges encountered in this setting.

2 Development

2.1 Methodology

This study is a integrative literature review. A literature search of scientific data was conducted on the electronic platforms PubMed, Scientific Electronic Library Online (SciELO), Latin American and Caribbean Literature in Sciences (Lilacs), and Virtual Health Library (BVS) from January to February 2023. The following Health Sciences Descriptors (DeCS/MeSH) in Portuguese and English were used for the literature search: “Unidade de Terapia Intensiva” and “Intensive Care Units,” “Criança” and “Child,” “Criança Hospitalizada” and “Child Hospitalized,” “Dentista” and “Dentist,” “Higiene Oral” and “Oral Hygiene.” These terms were combined in the selected databases using the Boolean operators “AND” and “OR,” as shown in Table 1.

Table 1 - Cross-referencing of DeCS/MeSH descriptors and number of studies obtained

| Search Platforms | Cross-Referencing of Descriptors | Initial Selection | Excluded Studies | Total Studies |
|------------------|--|-------------------|------------------|---------------|
| PubMed | <i>Intensive Care Units AND Child OR Child Hospitalized AND Dentist AND Oral Hygiene</i> | 12 | 8 | 4 |

| Search Platforms | Cross-Referencing of Descriptors | Initial Selection | Excluded Studies | Total Studies |
|------------------|--|-------------------|------------------|---------------|
| SciELO | <i>Intensive Care Units AND Child OR Child Hospitalized AND Dentist AND Oral Hygiene</i> | 2 | 1 | 1 |
| SciELO | <i>Intensive Care Units AND Child OR Child Hospitalized AND Dentist AND Oral Hygiene</i> | 2 | 1 | 1 |
| Free Search | - | 25 | 0 | 25 |
| Total | | 48 | 15 | 33 |

Source: research data.

The inclusion criteria were as follows: articles written in Portuguese and English, with the central guiding question: “what is the role of the dentist in Pediatric Intensive Care Units (PICU)?” without a defined publication period and including all types of studies due to the scarcity of articles found in the literature. Exclusion criteria included the absence of abstracts in the respective search platforms, as well as editorials and conference proceedings.

Initially, 12 articles were found in PubMed, 2 in SciELO, and 9 in LILACS. After all the refinement steps, including the application of inclusion and exclusion criteria and abstracts reading, the number of studies was reduced to 8. Additionally, a free search was conducted using the pre-selected manuscripts as a reference, resulting in a total of 33 articles for the present narrative literature review (Table 1). Relevant institutional websites were also included for providing relevant information.

2.2 History of hospital dentistry in Brazil

In the mid-19th century, Dentistry entered the hospital environment in the American nations through efforts made by physicians Simon Hullahen and Janes Garretson¹⁰. Over time, the American Dental Association and the hospital community joined forces to contribute to oral health in the hospital context. In Brazil, in 2008, preoperative dental evaluation began in hospitals, especially for the performance of complex procedures¹⁰.

These evaluations improved patients' quality of life during the course of the disease and prevented trans- and postoperative complications. With the implementation of palliative care actions, such as the National Oncology Care Policy, the need to stimulate the creation and organization of multidisciplinary teams including specialized dental care was recognized¹⁰.

On April 18, 2008, the Senate approved Bill N°. 2,776/2008, which makes it mandatory for dental

professionals to be present in ICU and other institutions that maintain patients under hospitalization. The hospital dentist became an additional support option for hospitalized patients. On February 24, 2010, Resolution of the Collegiate Board (RDC) N° 7 regulated dental care for inpatients in intensive care units^{11,12}.

The Code of Dental Ethics published by the Federal Council of Dentistry (CFO) in 2012 established the legislation related to the practice of dentists in hospital settings. According to this legislation, qualified professionals can treat patients admitted to the public and private systems. In 2013, Bill No. 34 of the Legislative Chamber was put to vote, which required dental care for patients under hospitalization, chronic diseases, and those receiving home care in the home care modality, with approval in June 2019. In 2015, Resolution CFO-162/2015 recognized the importance of Hospital Dentistry practice by the dentist¹³⁻¹⁵.

According to Article 26 of the Dental Code of Ethics, it is the obligation of the dentist to provide assistance to patients in public and private hospitals, regardless of the philanthropic nature of the institution, as long as the technical and administrative standards established by the institution are respected through interdisciplinary actions¹⁶.

However, many hospitals in Brazil still do not have the active presence of these professionals, as Hospital Dentistry is still little known among healthcare professionals and is seen as a costly profession, leading to the false idea of increased costs in hospitals with the daily presence of these professionals. Therefore, it is essential for other members of the multidisciplinary team to be informed about the relevance of the role of the dentist in improving the quality of life and systemic conditions of hospitalized patients, which consequently reduces hospitalization time and costs^{17,18}.

2.3 Integration of the dentist in hospitals

In the hospital environment, according to data from scientific literature, the role of the dentist as an integral member of a multidisciplinary team is undeniable. To this purpose, they should be familiar with the dynamics of the institution, have skills to handle medical emergencies, and possess extensive knowledge in various areas of health. Additionally, it is essential to understand the management of patients with disabilities, chronic diseases, contagious infections, and other compromised health conditions, such as those undergoing cancer treatment, organ transplantation, hematopoietic stem cell transplantation, as well as high-risk pregnancies¹⁹.

Patients who require invasive medical procedures and potential hospitalization in intensive care units (ICUs) are at significant risks of developing pneumonia, particularly those under mechanical ventilation, as cases of ventilator-associated pneumonia (VAP) are common when oral health care is not properly performed. This risk is exacerbated when there is decreased salivary flow, inadequate oral hygiene, and

insufficient control of oral microbiota²⁰.

In a study conducted by Santos et al.²¹, a protocol for oral hygiene was proposed and transmitted to the entire ICU team (physicians, physiotherapists, speech therapists, and nurses) through written materials and practical training provided by dentists. In a study by Munro et al. in 2009²², four groups of mechanically ventilated patients were compared, each receiving different methods of oral care: swab cleaning with 0.12% chlorhexidine solution twice a day, toothbrushing with fluoridated toothpaste three times a day, toothbrushing with 0.12% chlorhexidine solution and oral cleaning with a conventional antiseptic (control group). The results showed that only the use of 0.12% chlorhexidine was effective in reducing cases of VAP, while toothbrushing had little impact. In a systematic review conducted by Labeau et al. in 2011²³, 14 studies were evaluated that used 0.12% chlorhexidine and povidone-iodine (PVPI) for oral hygiene and assessed the impact of these interventions on pneumonia rates. The results showed that chlorhexidine had a positive effect in reducing respiratory infections.

Thus, it is evident that the role of the dentist in the hospital environment streamlines and optimizes the interdisciplinary work of the team through the development of specific care activities in the field, as well as the prevention of diseases and promotion of health²⁴.

2.4 Pediatric intensive care unit - epidemiological context

Pediatric patients in critical condition or serious illness due to diseases or injury, may require special care in a PICU. According to data from the Sabará Children's Hospital in São Paulo, among the diseases and conditions that require admission to the PICU, are severe asthma or respiratory failure, heart failure, acute or chronic renal failure, nervous system disorders, severe metabolic diseases, severe infections, injuries and trauma resulting from accidents, near-drowning incidents, and postoperative care after complex surgeries are noteworthy²⁵.

According to Mendonça et al.²⁶, in 2010, there were approximately 1,915 admissions to the PICUs of the Unified Health System (SUS) network in the state of Pernambuco, with a higher prevalence among males (58.1%). The study identified the most predominant age groups of hospitalized children, which were 1-4 years and 5-9 years, respectively. The average length of stay in the ICU was around 14 days for patients aged 1-4 years and 11 days for those aged 5-9 years. Regarding mortality rates, there were 207 deaths, corresponding to an average of 17 deaths per month. The highest mortality rate was observed in the group under one year of age (40.1%) and in the age group of 5-9 years (14.0%).

The same study also analyzed the main causes of hospitalization in pediatric patients. Neoplasms had a high frequency of 28.9%, followed by congenital malformations and infectious parasitic diseases with 19% and 13.7%, respectively. As for the main causes of death, there was a

predominance of infectious parasitic diseases at 30%, followed by neoplasms (14%), congenital malformations (13.5%), and respiratory system diseases (12.6%)²⁶.

In a recent study conducted at Santa Maria Hospital in Rio Grande do Sul, the results obtained were similar to the findings by Mendonça et al. (2017)²⁶. Out of 1,805 admissions to the PICU during the study period, 56.1% were male pediatric patients. Regarding the age range of the hospitalized patients, 41.6% were up to one year of age, with a higher prevalence at two months of age. However, concerning the average length of stay in the PICU, the present study demonstrated an average of 7.5 days²⁷, whereas in Mendonça et al.'s study (2017)²⁶, this figure was higher (14 days).

Regarding the average annual mortality rate, 14.3% (n=258) of children died, with a higher proportion of this rate among females (16.7%) compared to males (12.4%). Regarding the main causes of hospitalization, there was a higher prevalence of respiratory diseases, with pneumonia being prominent, as well as trauma, post-abdominal surgery, and sepsis. The mortality rates for these causes of hospitalization, regardless of gender, were 42.6% for sepsis, 15.3% for respiratory diseases, and 8% for trauma²⁷.

In another study published in 2022, data on the epidemiological profile in the Pediatric Intensive Care Unit (PICU) of a hospital in Paraná were obtained. A total of 545 medical records dated between 2016 and 2020 were analyzed, and it was noted that approximately 58.9% belonged to male pediatric patients. The mean age of hospitalization was 3 years and 3 months, and among the main reasons for admission to the PICU, the primary cause was respiratory tract diseases, accounting for 42.7% (n=233), followed by neurological disorders at 22% (n=120), gastrointestinal alterations at 11.7% (n=64), and cardiocirculatory conditions at 9.3% (n=51). When examining the average length of stay in the PICU, it was 7.26 days, with a longer duration for female patients (8.96 days)⁷.

When confronted with this data, it is observed that many of these pediatric patients do not have adequate oral hygiene due to their debilitated state associated with the need for intubation, which promotes the development of periodontal

disease, halitosis, and candidiasis⁴. During the stay in the PICU, oral changes related to systemic diseases or resulting from the use of medications, as well as those stemming from artificial respiratory equipment, commonly occur²⁸.

The use of certain medications can contribute to the emergence of oral alterations, with notable examples being phenytoin, nifedipine, and cyclosporine, which are associated with clinical presentations of secondary gingival hyperplasia. These hyperplastic lesions often mimic other diseases: however, they are adverse effects. Another type of alteration that often affects the oropharyngeal region of pediatric patients admitted to the PICU is dysphagia, with an increased risk of incidence as the patient's age advances⁴.

Patients admitted to the PICU often experience progressive deterioration of their oral health, as their immune system is already compromised. This increases their susceptibility to developing dental caries and periodontal disease, impacting not only their overall well-being but also contributing to longer hospital stays and increased treatment costs, which directly affect the patient's quality of life⁴. Prolonged hospitalization for the patient may also pose a greater risk of developing nosocomial pneumonia, as pathogenic bacteria can colonize the respiratory tract during this period^{4,28}.

It is important to emphasize that many of these children either arrive at the PICU with existing oral lesions or develop these alterations shortly after admission. This underscores the need for the presence of a dentist in this environment to prevent and treat conditions that can affect the oral cavity of these patients and, consequently, worsen their overall health²⁸.

2.5 role of the dentist in the hospital environment and pediatric intensive care unit (PICU)

The role of the dentist in the hospital setting is of great importance for the satisfactory, comprehensive, and compassionate care of pediatric patients, particularly in the PICU. Despite the scarcity of studies addressing the role and significance of dental professionals in the PICU, Table 2 summarizes the findings of the five studies highlighting oral health problems in hospitalized pediatric patients, whether in intensive care units or not.

Table 2 - Results obtained from different studies related to the role of the dentist in a hospital setting and in the PICU (Pediatric Intensive Care Unit)

| Author, Year, Country | Title of the Article Study Type | Main Results | Conclusion |
|--|---|---|---|
| Austriaco-Leite et al., 2018 ²⁸ Brasil | Dental evaluation of patients in pediatric Intensive Care Units (ICUs) Retrospective descriptive study | The sample of 145 patients, ranging from zero to 15 years old, with a predominance of females (54.48%). The study identified satisfactory to poor oral hygiene, with only 5.52% of patients experiencing oral alterations during hospitalization, and 3.45% already presenting oral alterations upon admission. | Children admitted to ICUs may present oral alterations from the moment of admission, highlighting the necessity of having a dentist as part of the multidisciplinary team to promote the patient's quality of life. |

| Author, Year, Country | Title of the Article Study Type | Main Results | Conclusion |
|--|---|---|--|
| Galeotti et al., 2021 ²⁹ United States | Dental and periodontal care at the bedside using a portable dental unit in hospitalized patients with special needs: the experience of an Italian pediatric hospital Pilot study | A total of 9 patients with special needs, hospitalized for various reasons, underwent a preliminary experience of dental treatment at the bedside using a portable dental unit. The results demonstrated advantages such as quick access to complex dental conditions, avoiding treatment delays and reducing the need for surgical rooms. There was positive feedback in terms of patient and caregiver comfort and adherence, leading to increased trust. However, there were limitations in terms of logistics, material transportation, team mobility, remote reporting, overheating of the compressor during lengthy procedures, and the use of the patient's room suction circuit. Overall, the results confirm the feasibility of providing dental procedures at the bedside using portable dental units, as it is an accessible device. | Hospitalized patients with special needs require dental procedures such as extractions, restorations, cleanings, and oral health education. The main advantage of bedside treatment using a portable dental unit is the quick access to dental care for managing complex medical conditions, thus avoiding treatment delays for patients. |
| Nicopoulos et al., 2007 ³⁰ United States | Oral health needs and barriers to dental care in hospitalized children Retrospective descriptive study | A bedside oral examination was conducted on 120 hospitalized children. Previous dental treatments and current needs were assessed. The mean age was 6.7 years (minimum 3 and maximum 12), with 60% being male. A high frequency (28%) of children who had never received dental treatment was observed, and 42% of the sample had dental treatment needs. Soft tissue changes were observed in 59% of cases. Children with chronic conditions faced greater difficulties in receiving dental care (24%) compared to children with acute conditions (3.5%). | A high number of hospitalized children with dental treatment needs was identified. Additionally, pediatric patients with chronic systemic conditions were more likely to face barriers in accessing dental care. |
| Blevins, 2013 ³¹ United States | Status of oral healthcare in hospitalized children Systematic literature review | According to parents, 17% of hospitalized children brushed their teeth more than once a day. However, at home, 60% brushed their teeth more than once a day. According to nurses, their assessments, interventions, oral health education, and referrals related to oral hygiene were conducted infrequently, with approximately 40% not providing guidance to patients regarding oral hygiene. The majority (65.3%) did not document any dental changes, and 85.7% had never recommended a dental visit to the patient. | There is an urgent need to improve oral healthcare in hospitalized children. Pediatric nurses can contribute to the identification, care, and prevention of oral health problems in this population through documentation of oral assessments, which ensures better oral health for these individuals. |
| Sales, 2021 ³² Brasil | Oral hygiene in pediatric intensive care unit: Development of audiovisual educational material Integrative literature review | An audiovisual educational material on oral hygiene was developed for healthcare professionals to use with hospitalized patients in the pediatric intensive care unit (PICU). It was found that the use of digital media is relevant for the education of these professionals as it facilitates learning and allows for interaction among individuals, promoting shared learning experiences. | Indeed, the creation of audiovisual educational material on oral hygiene for hospitalized patients in the pediatric intensive care unit (PICU) is a user-friendly and promising tool to update nurses and nursing technicians. It has the potential to improve their performance and the delivery of oral care to children and neonates. By providing visual and interactive content, this educational resource can enhance their knowledge, skills, and confidence in providing proper oral hygiene practices to patients in the UTIP setting. Ultimately, this can contribute to better oral health outcomes for pediatric patients. |

Source: research data.

Comparing the technological advancements achieved in recent years with those of the 1980s, a decrease in mortality rates in Brazilian PICUs can be observed. Previously ranging from 15% to 20%, the rates have now reduced to 3% to 10%³³. The inclusion of properly trained multidisciplinary teams, which includes qualified dentists, is among the various factors that may have contributed to this reduction. As a result, the presence of dentists in the PICU is expected to become more common as studies supporting their role and importance continue to be published.

3 Conclusion

The lack of robust evidence regarding oral care practices in pediatric intensive care settings necessitates further research. Based in the included studies, most interventions for this population are based on protocols and outcomes derived from studies conducted on adult patients in the ICU.

In addition to the progress achieved over the years, the inclusion of dentists in hospital settings, especially in the PICU, aims to improve oral health and prevent additional diseases. Therefore, it is necessary to promote scientific research and highlight the importance of dental professionals in the hospital context, leading to reduced hospitalization time and costs and ultimately improving the quality of life for pediatric patient.

References

1. Dos Santos TB, do Amaral MA, Peralta NG, Almeida RS. A Inserção da Odontologia em Unidades de Terapia Intensiva. *J Health Sci* 2017;19(2):83-8. doi: <https://doi.org/10.17921/2447-8938.2017v19n2p83-88>
2. Costa VCS, Gomes AVSF, Vasconcelos MAC, Leite MCS, Lima MAS, Ferraz BV, et al. O papel do Cirurgião Dentista na prevenção da pneumonia associada a ventilação mecânica. *Res Soc Develop* 2022;11(10):e247111032759–e247111032759. doi: <https://doi.org/10.33448/rsd-v11i10.327>
3. Binkley C, Furr LA, Carrico R, McCurren C. Survey of oral care practices in US intensive care units. *Am J Infect Control* 2004;32(3):161-9. doi: 10.1016/j.ajic.2003.05.001
4. Batista SA, Siqueira J da SS, Silva Jr A, Ferreira MF, Agostini M, Torres SR. Alterações orais em pacientes internados em unidades de terapia intensiva. *Rev Bras Odontol* 2014;71(2):156-9.
5. Alencar AMA, Ribeiro EOA, Prestes GBR, Soares KS, Siqueira LG, Nascimento SMA. Oral condition from patients admitted on pediatric intensive care unit. *Braz J Hea Rev* 2020;3(4):10127-42. doi: <https://doi.org/10.34119/bjhrv3n4-238>
6. Conselho Federal de Odontologia. Aprovado Projeto de Lei que garante a presença do Cirurgião-Dentista nas UTIs. CFO; 2013.
7. Civa IM, Silva AB. Clinical epidemiology-profile of pediatric intensive care unit of Hospital of West of Paraná. *Braz J Develop* 2022;8(10):70368-7. doi: <https://doi.org/10.34117/bjdv8n10-358>
8. Amaral COF, Marques JA, Bovolato MC, Parizi AGS, Oliveira A, Straioto FG. Importância do cirurgião-dentista em

Unidade de Terapia Intensiva: avaliação multidisciplinar. *Rev Assoc Paul Cirur Dent* 2013;67(2):107-11.

9. Hadda HLAL, Lopes FF, Cardoso da Silva MSA, Diniz-Souza LC. Avaliação odontológica de pacientes internados em unidade de terapia intensiva (UTI) pediátrica. *CES Odontol* 2019;31(2):6-14. doi: <https://doi.org/10.21615/cesodon.31.2.1>
10. Ramalho AGP, Carvalho CCB. Odontologia hospitalar no Brasil. Brasília: Uniceplac; 2021.
11. Inocêncio APS. Relatório técnico/científico: protocolo de higiene bucal para pacientes adultos em terapia intensiva no Hospital Universitário de Vassouras. Vassouras: Universidade de Vassouras; 2019.
12. Scorsatto JT, Rovani G, Flores ME, Conto FD. Ações para implementação de Odontologia Hospitalar no sistema público municipal. *Rev Exten* 2017;16(2):213-26.
13. Miranda A F. Odontologia hospitalar: Unidades de Internação, Centro Cirúrgico e Unidade de Terapia Intensiva. *RCO* 2018;2(2)5-13.
14. Webster J, Anschau F. Assistência odontológica em ambiente hospitalar. *Rev Odontologia (ATO)* 2019;19(4):177-84.
15. Rocha AL, Ferreira EF. Odontologia hospitalar: a atuação do cirurgião dentista em equipe multiprofissional na atenção terciária. *Arq Odontol* 2014;50(4):154- 60.
16. Silveira FT, Moraes NE, Barbin EL. Reflexões sobre o código de ética odontológica aprovado pela resolução CFO nº 118/2012. Pelotas: Universidade de São Paulo; 2014.
17. Oliveira RJ, Didier TC, Cavalcanti IDL, Mota CCBO, Faria DLB. Importância do cirurgião-dentista na equipe multiprofissional no ambiente hospitalar. *RBO* 2018. doi: <http://dx.doi.org/10.18363/rbo.v75.2018.e1106>
18. Bezinelli LMA. Odontologia hospitalar nos hospitais públicos vinculados a secretaria do estado da saúde de São Paulo. 2014. doi: <https://doi.org/10.11606/T.23.2014.tde-180922014-135246>
19. Conselho Regional de Odontologia de Mato Grosso. Disponível em: <https://website.cfo.org.br/wp-content/uploads/2020/07/manual-odontologia-hospitalar.pdf>
20. Bassan LT, Peres MPSM, Franco J. Oral care in prevention of ventilator-associated pneumonia in neonatal and pediatric intensive care unit: protocol proposal. *Semantic Schola* 2018 doi: 10.18363/rbo.v75.2018.e1183
21. Santos PSS, Mello WR, Wakim RCS, Paschoal MÂG. Uso de solução bucal com sistema enzimático em pacientes totalmente dependentes de cuidados em unidade de terapia intensiva. *Rev Bras Ter Intensiva* 2008;20(2):154-9. doi: <https://doi.org/10.1590/S0103-507X2008000200007>
22. Munro CL, Grap MJ, Jones DJ, McClish DK, Sessler CN. Chlorhexidine toothbrushing, and preventing ventilator-associated pneumonia in critically ill adults. *Am J Crit Care* 2009;18:428-37. doi: <https://doi.org/10.4037/ajcc2009792>
23. Labeau SO, Van de Vyver K, Brusselaers N, Vogelaers D, Blot SI. Prevention of ventilator-associated pneumonia with oral antiseptics: a systematic review and meta-analysis. *Lancet Infect Dis* 2011;11:845-54. doi: [https://doi.org/10.1016/S1473-3099\(11\)70127-X](https://doi.org/10.1016/S1473-3099(11)70127-X)
24. Mattevi GS, Figueiredo DR, Patrício ZM, Rath IBS. A participação do cirurgião-dentista em equipe de saúde multidisciplinar na atenção à saúde da criança no contexto hospitalar. *Ciênc Saúde Coletiva* 2011;16(10):4229-36. doi:

<https://doi.org/10.1590/S1413-81232011001100028>

25. Cuidados Intensivos Pediátricos – Especialista. Hospital Sabará. Disponível em: <https://www.hospitalinfantilsabara.org.br/sintomas-doencas-tratamentos/cuidados-intensivos-pediatricos-especialista/>
26. Mendonça JG, Guimarães MJB, Mendonça VG, Portugal JL, Mendonça CG. Perfil das internações em Unidades de Terapia Intensiva Pediátrica do Sistema Único de Saúde no estado de Pernambuco, Brasil. *Ciênc Saúde Coletiva* 2019;24(3):907-16. doi: <https://doi.org/10.1590/1413-81232018243.02152017>
27. Benetti MB, Weinmann ARM, Jacobi LF, Moraes AB. Unidade de Terapia Intensiva Pediátrica: perfil das internações e mortalidade. *Saúde (Sta. Maria)* 2020;46(1):1-12. doi: <https://doi.org/10.5902/2236583440879>
28. Austríaco-Leite HL, Ferreira-Lopes F, Alves Cardoso da Silva MS, Diniz-Souza LC. Avaliação odontológica de pacientes em unidade de terapia intensiva (UTI) pediátrica. *CES Odontol* 2018;31(2):6-14. doi: <https://doi.org/10.21615/cesodon.31.2.1>
29. Galeotti A, Ciribè M, Matarazzo G, Antonielli G, Festa P, Inserra A, et al. Dental and Periodontal Care at the Bedside Using a Portable Dental Unit in Hospitalized Special Needs Patients: the experience of an Italian Pediatric Hospital. *Int J Environ Resd Public Health* 2021. doi:10.3390/ijerph18157987
30. Nicopoulos M, Brennan MT, Kent ML, Brickhouse TH, Rogers MK, Fox PC, et al. Oral health needs and barriers to dental care in hospitalized children. *Special Care Dent* 2007;27(5):206-11. doi: <https://doi.org/10.1111/j.1754-4505.2007.tb00348.x>
31. Blevins JY. Status of Oral Health Care in Hospitalized Children. *MCN. Am J Maternal/Child Nurs* 2013;38(2):115-9. doi: 10.1097/NMC.0b013e318269daac
32. Sales JT. Higiene bucal em Unidade de Terapia Intensiva Pediátrica: produção de material didático audiovisual. Rio de Janeiro: Universidade Federal do Rio de Janeiro; 2021.
33. Alves MVMFF, Bissiguini PO, Nitsche MJT, Olbrich SRLR, Luppi CHB, Toso LAR. Perfil dos pacientes internados em uma unidade de terapia intensiva pediátrica de um hospital escola do interior de São Paulo. *Ciênc Cuid Saúde* 2014;8-8.