



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

# IJDR

International Journal of Development Research

Vol. 11, Issue, 05, pp. 46978-46983, May, 2021

<https://doi.org/10.37118/ijdr.21826.05.2021>



RESEARCH ARTICLE

OPEN ACCESS

## EVALUATION OF ORAL HYGIENE TECHNIQUES IN INTENSIVE CARE UNITS (ICUs) OF MACROREGIONAL HEALTH IN THE MIDWEST OF THE STATE OF SANTA CATARINA AND PROTOCOL SUGGESTION

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### ARTICLE INFO

#### Article History:

Received 17<sup>th</sup> February, 2021  
Received in revised form  
26<sup>th</sup> March, 2021  
Accepted 18<sup>th</sup> April, 2021  
Published online 22<sup>th</sup> May, 2021

#### Key Words:

Health promotion.  
Intensive care unit.  
Primary Prevention.

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### ABSTRACT

Patients admitted to the Intensive Care Units (ICUs) have weakened general health and immunity, becoming more susceptible to systemic and infectious diseases, which especially compromise the cardiac and respiratory systems. These complications can modify the initial clinical picture of health leading to the risk of death. The origin and metastatic effect of these infections can originate from the primary infection of the oral cavity. The present study is an observational cross-sectional analytical research and aims to suggest an Oral Hygiene (OH) protocol for hospitalized patients and to emphasize the importance of the insertion of the Dental Surgeon (DS) in the hospital environment. The OH protocol was developed by applying and evaluating a questionnaire and by reviewing the scientific literature on the topic. For the delimitation of the sample, the macroregional Health of the Midwest of Santa Catarina was selected (adult / specialized ICU), which comprises Joaçaba-SC. The research instrument consisted of 99 nurses and nursing technicians who performed oral hygiene in ICUs and the data analysis performed by the software program SPSS 22 and Chi-Squared Test. The results demonstrated the lack of standardization in the execution of oral hygiene, with no specific protocol in these hospitals. Chlorhexidine was standard as an auxiliary method of OH in these ICUs. The performance of the DS was minimal or nonexistent, demonstrating the need for multidisciplinary performance in hospital dentistry. In order to improve care and improve the quality of life of these ICU patients, the protocol will be made available to all participating hospitals.

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Citation: DALLANORA, Léa Maria Franceschi, MENEGAZZO, Karine, DURIGON, Antônio Sérgio et al. 2021. "Evaluation of oral hygiene techniques in intensive care units (icus) of macroregional health in the midwest of the state of santa catarina and protocol suggestion", *International Journal of Development Research*, 11, (05), 46978-46983.

## INTRODUCTION

Hospital dentistry's mission is to prevent and treat changes in the stomatognathic system in a hospital environment. Infectious changes in the oral cavity can trigger or exacerbate systemic diseases. Evidence-based dentistry must work in a multidisciplinary way, providing comprehensive treatment, in addition to health promotion with low cost and high effectiveness (SILVA et al., 2015). The oral cavity contains more than 300 bacterial species that can affect and compromise sites such as the heart, lungs, joints and peripheral vascular system (SOUTO et al., 2006). Oral bacterial infection can spread and compromise the individual's health or enhance comorbid situations (PURICELLI et al., 2015). The sick patient has a compromised immune system, being 5 to 10 times more likely to

contract infection (MACHADO, 2013). Patients admitted to the ICUs, most of the time, do not have adequate oral hygiene, contributing to the development of diseases such as aspiration pneumonia (SANTOS et al., 2008; PINHEIRO, 2014). In addition to this, chronic obstructive pulmonary disease, cardiovascular diseases and bacterial endocarditis stand out (JARDIM et al., 2013). The reasons presented by the working team for the deficit of oral hygiene in these patients, generally, are the lack of professional dentists in the sector, the lack of knowledge about dental pathologies and the lack of knowledge regarding the performance of oral hygiene procedures (SOUZA et al., 2013). Unfortunately, in Brazil, there is no standard oral hygiene protocol for patients hospitalized and admitted to the ICU (SCHLESENER et al., 2012). The incorporation of the dental surgeon to the hospital team contributes to the prevention of infections and

reduction of the length of hospital stay (ORLANDINI *et al.*, 2013). In 2015 the Federal Council of Dentistry (CFO), through Resolution CFO 162/2015 recognized the practice of Hospital Dentistry by the dentist (CFO, 2015). However, its inclusion in multidisciplinary hospital teams, especially within the ICUs, is not yet a reality (ORLANDINI *et al.*, 2013). Given the above, the objective of the study was to suggest an oral hygiene protocol for the ICU, based on the analysis of the questionnaires applied to ICU nursing professionals in the health region of the Midwest of Santa and in the existing scientific literature.

## MATERIALS E METHODS

In order to verify knowledge and how oral hygiene was performed by nursing teams, a cross-sectional analytical research was carried out with data analysis using the SPSS 22 software program and the Chi-Square Test. Descriptive statistics were performed, showing the frequency in each case, being presented in tables and graphs in percentage format. The nursing population (nurses and nursing technicians) who worked in the ICUs of hospitals in the macro-regional health sector in the Midwest of Santa Catarina, from January 2017 to March 2017, were involved as a target population. This macro-region was chosen for its proximity with Joaçaba - SC. This macro-region is divided into three regions: Health Region of Alto Uruguai Catarinense composed of Hospital São Francisco, located in the city of Concórdia - SC, Health Region of the Midwest which includes Hospital Universitário Santa Terezinha (HUST) – Joaçaba - SC; Health Region of the Alto Vale do Rio do Peixe which includes the Hospital Hélio Anjos Ortiz located in Curitibaanos - SC, Hospital Maicé located in Caçador – SC; and Hospital Divino Salvador in the city of Videira - SC. However, Hélio Anjos Ortiz Hospital chose not to participate in the research. This study was approved by the Ethics and Research Committee on Humans at the University of the West of Santa Catarina, UNOESC-Joaçaba, number 60916016.70000.536, 2016. Permission was requested from the director of the co-participating institution and the target audience through the Free and Informed Consent Form. Then, the semi-structured questionnaire (Appendix A) was applied, which was carried out by two researchers, undergraduate students of Dentistry in the tenth phase of UNOESC-Joaçaba. It should be noted that the research would be carried out by e-mail, however, most institutions wished it to be carried out in person due to the fact that not all employees have an e-mail account. The São Francisco Hospital in the city of Concórdia responded via the internet.

The questionnaire covered: brushing techniques and frequency, hygiene of the patients'tongue, auxiliary chemicals products, patients' oral condition, prosthesis hygiene, existence of oral hygiene protocol, relationship between oral problems and systemic diseases and the interest in receiving instructions from a dental surgeon. The criteria for inclusion in the research were the acceptance of nursing technicians who worked in the institutions' ICU and performed oral hygiene for patients. Exclusion criteria, those who refused to participate in the questionnaire. The suggestion of an Oral Hygiene Protocol - ICU, (Annex B).

## RESULTS

All 99 professionals, being nurses and nursing technicians, answered the questionnaire: 22 at HUST, 22 at Divino Salvador, 38 at Maicé and 17 at Hospital São Francisco. There was a prevalence of females with 91 professionals (91.9%), and the predominant age group of 26-35 years, about 61 professionals (61.6%). The general data of the participants are shown in Table 1. Regarding brushing and techniques used, 100% of the interviewees stated that they perform oral hygiene. At HUST, 10 professionals (71.4%) used gauze and / or toothbrush. In Divino Salvador, 15 (60.0%) used a wooden spatula and / or toothbrush. In Maicé and São Francisco, on the other hand, the largest use was the wooden spatula and / or gauze and / or toothbrush, with 28 (63.6%) and 7 (15.9%), respectively (Table 2). About following a specific technique for oral hygiene, more than half of the sample stated not to follow one (55.6%) against 44.4%. Techniques used: fones technique (17.1%), Scrubbing technique: back and forth (16.1%), mixture of two techniques (10.1%), three or more (7.07%), Modified Bass technique (4.04%) and Bass technique (2.02%) (Graph 3). Regarding the frequency of brushing, it was predominantly three times a day (31.3%). As for the auxiliary chemical product, the most used ones were toothpaste and chlorhexidine solution (65.6%); 33.3% of the sample used only chlorhexidine solution. Chlorhexidine gel has not been used in any institution. Regarding the patients' oral condition: good dental condition, terrible conditions, partially dentate, edentulous, prosthesis users and traumatized. About prosthesis hygiene, 59.5% of professionals performed it; 40.5% did not perform it, as most prostheses did not stay with patients. In patients who used prostheses, the way of cleaning obtained several answers, but the predominance was the use of toothpaste with toothbrush. Hygiene of the patient's tongue, 100% of the sample declared to perform it. Regarding the storage of prostheses, (62.6%) said they did not store them in the hospital, but rather deliver them to the patient's family.

**Table 1. Participants general data**

		Hust		Divino Salvador		Maicé		São Francisco		Total	
		N	%	N	%	N	%	N	%	N	%
SEX	Female	19	20.90%	22	24.20%	34	37.40%	16	17.60%	91	91.90%
	Male	3	37.50%	0	0.00%	4	50.00%	1	12.50%	8	8.08%
AGE	Younger than 25 years of age	0	0.00%	1	12.50%	7	87.50%	0	0.00%	8	8.08%
	26 – 35 years of age	14	23.00%	14	23.00%	26	42.60%	7	11.50%	61	61.61%
	36 – 45 years of age	4	18.20%	7	31.80%	5	22.70%	6	27.30%	22	22.22%
	46 – 55 years of age	4	50.00%	0	0.00%	0	0.00%	4	50.00%	8	8.08%
	Older than 56 years of age	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Source: The authors, 2017

**Table 2. Brushing techniques**

	Hust		Divino Salvador		Maicé		São Francisco		Total
	N	%	N	%	N	%	N	%	
How is the oral hygiene performed?									N
With wooden spatula	0	0.00%	1	33.30%	0	0.00%	2	66.70%	3
With gauze	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
With toothbrush	2	28.60%	2	28.60%	3	42.90%	0	0.00%	7
With wooden spatula and/or gauze and/or toothbrush	5	11.40%	4	9.10%	28	63.60%	7	15.90	44
Gauze and/or toothbrush	10	71.40%	0	0.00%	4	28.60%	0	0.00%	14
Wooden spatula and/or toothbrush	3	12.00%	15	60.00%	3	12.00%	4	16.00%	25
Wooden spatula and/or gauze	0	0.00%	0	0.00%	0	0.00%	3	100.00%	3
Others	2	66.70%	0	0.00%	0	0.00%	1	33.1%	0

Source: The authors, 2017

Other professionals reported storing it in a plastic bag (15%), or even in a sterile glove (6%). When investigating about the existence of oral hygiene-ICU protocols in hospitals, 69.6% declared that they did not exist, against 30.4% who answered affirmative (Graph 4). Regarding the existence of a relationship between oral problems (tooth decay and gum disease) and infections in the heart and lungs, 92.9% of the professionals responded positively and only 7.1% believed that there was no relationship. The interest in receiving instructions for hygiene and oral care from a dental surgeon was 100%.

## DISCUSSÃO

In this research, the professionals recognized the importance of OH, performing daily brushings in the hospitalized patients with effective frequency, but each institution performed oral hygiene differently, even differing in the hospital itself. It was also found that in the responses to the questionnaire there was a lot of disagreement, showing doubts and unpreparedness about the topics covered. This proves the lack of OH protocol in the interviewed ICUs, which can be explained by the result found, where 69.6% stated that there is no specific protocol. Thus, the need to suggest and adapt a standard protocol is justified. The oral condition of the inpatients under the conception of the employees varied a lot, with patients with missing teeth and edentulous teeth. Some institutions evaluated this condition at the time of cleaning, which is the correct way to proceed. The protocols must also be distinguished regarding conscious and intubated patients, as they differ both in the type of microbial colonization of the oral cavity and in the therapy to be used (PINHEIRO; ALMEIDA, 2014).

For conscious patients, the professionals reported that the patient performed his own brushing, in line with the protocol proposed by Jardim *et al.* (2013), where hospitalized patients without the use of mechanical ventilation are able to perform their own basic oral hygiene care. It is important that independence and self-care are encouraged. It was evident that no institution followed a specific brushing technique, but all were concerned with the hygiene of the patient's tongue. The ideal brushing technique is one that removes the greatest amount of biofilm, where the literature recommends the Bass Technique. According to Perry (2004), this technique has certain advantages over other techniques: the short back and forth movement is easy to control, it concentrates the cleaning action on the cervical and interproximal portions of the tooth where the microbial plaque is most accumulated. Tongue hygiene is an essential measure, and according to Oliveira *et al.* (2007) and Montenegro *et al.* (2006), 70% of pathogens in the oral cavity were found in dental biofilm and 63.33% of these same bacteria found on the tongue. There was a similarity in the use of the auxiliary chemicals: 0.12% chlorhexidine gluconate-based solution, considered the gold standard of mouthwashes (FRANCO *et al.*, 2014). Its use is indicated in hospitalized and immunocompromised patients (DORO *et al.*, 2006). Hortense *et al.* (2010); Morais *et al.* (2012); Torres *et al.* (2000), highlighted that chlorhexidine was the product of choice due to its substantivity, as it shows bacteriostatic effects for up to 12 hours. The mechanical control combined with the chemical control of the bacterial plaque helps to improve the standard of oral health (HORTENSE *et al.*, 2010). No institution performed the hygiene of the prostheses as recommended by the literature. Bastos *et al.* (2015) recommended the association of chemical and mechanical methods of hygiene in order to obtain an adequate control of biofilm. Chemical control: full dentures; the use of sodium hypochlorite (bleach) 15 ml to 200 ml of water, for 10 minutes every 4 days; removable partial dentures, apple vinegar in the same proportions. Mechanical control: brushing with toothpaste. The oral mucosa should also be cleaned with sterile gauze soaked in 0.12% chlorhexidine digluconate solution (PIRES *et al.*, 2014). Santana *et al.* 2014 stated that the presence of the dental surgeon in a hospital environment is necessary for the diagnosis and treatment of oral conditions and as a partner in medical therapy, being able to offer a comprehensive treatment to the patient. For the oral hygiene of these critical patients to be carried out

efficiently, it is necessary to have a standard protocol, as well as the training of the professionals responsible for it.

## CONCLUSION

ICU patients are considered critical and prone to develop diseases such as aspiration pneumonia and bacterial endocarditis, where the primary focus is usually the oral cavity. Through this research, the real need for a standard oral hygiene protocol for ICUs was observed.

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## APENDIX A

### 1-Profile analyses

Full Name: \_\_\_\_\_  
Institution where you work: \_\_\_\_\_  
Gender: ( ) MASCULINO ( ) FEMININO  
Age:  
( ) 25 - 35 ( ) 36 - 45 anos  
( ) 46 - 55 ( ) 56 or older

### 2-Brushing techniques

2.1 Do you perform oral hygiene in patients admitted to the ICU here?

( ) YES ( ) NO

2.2 How is it performed?

( ) With wooden spatula ( ) With gauze  
( ) with a toothbrush ( ) others

2.3 Do you follow any specific hygiene techniques?

( ) Yes ( ) No

2.4 Which technique(s)?

( ) Bass technique: short vibratory movements  
( ) Modified Bass Technique: short vibratory movements + outward gum movements  
( ) Fones technique: circular movements  
( ) Scrubbing technique: back and forth  
( ) None of the above

### 3.Frequência da escovação:

( ) once a day  
( ) twice a day  
( ) every other day  
( ) once a week  
( ) others. (Please specify them): \_\_\_\_\_

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### 4. Auxiliary chemicals:

( ) Chlorhexidine solution ( ) Chlorhexidine gel  
( ) Toothpaste ( ) Others. Please specify

### 5. Oral condition of patients:

( ) dentate patients with good dental condition;  
( ) dentate patients with poor dental condition;  
( ) Patients partially dentated in both dental arches;  
( ) edentulous (toothless) patients;  
( ) patients with facial skull trauma.

### 6. Prosthesis hygiene

6.1 Is the hygiene of patients' prostheses performed?

( ) Yes ( ) No

6.2 How is it performed?

\_\_\_\_\_

6.3 How is the prosthesis stored?

\_\_\_\_\_

### 7. Is the patient's tongue hygiene performed??

( ) Yes ( ) No

### 8. ICU Oral Hygiene Protocol

8.1 Is there an Oral Hygiene Protocol in the ICU?

( ) Yes ( ) No

8.2 Please, describe it: \_\_\_\_\_

9. Do you think there is a relationship between oral problems (tooth decay, gum disease) and infections in the heart and lungs?

( ) Yes ( ) No

10. Are you interested in receiving hygiene and oral care instructions from a Dental Surgeon?

( ) Yes ( ) No

<b>APENDIX B - ORAL HYGIENE PROTOCOL SUGGESTION - ICU</b>
<b>TASK: ORAL HYGIENE OF THE PATIENT IN THE ADULT ICU</b>
<b>PERFORMER:</b> Nursing team
<b>OBJECTIVES:</b> <ul style="list-style-type: none"> <li>• Make oral hygiene a routine practice;</li> <li>• Perform clinical examination and detect infectious foci or lesions present in the oral cavity (Dental Surgeon);</li> <li>• Maintain the oral cavity in good health and prevent the onset and worsening of oral diseases;</li> <li>• Reduce the risk of respiratory infection and bacterial endocarditis;</li> <li>• Provide comfort and well-being.</li> </ul>
<b>FREQUENCY:</b> Frequency is related to the patient's need and risk. It is recommended to perform this protocol at least every 12 hours.

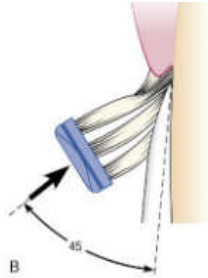
<b>BASIC PROCEDURES :</b> <ul style="list-style-type: none"> <li>• Gather necessary material;</li> <li>• Simple hand washing;</li> <li>• Be in agreement with PPE's</li> <li>• Communicate to the patient or companion about the procedure;</li> <li>• Position the patient keeping the head elevated (from 30° to 45°) to avoid aspiration pneumonia (check if there are patient restrictions that prevent positioning);</li> <li>• Aspiration of the oral cavity whenever necessary;</li> <li>• Carry out the inspection of the oral cavity, checking for abnormalities;</li> <li>• Observe the presence of prostheses (total or partial) in conscious patients and remove them;</li> <li>• If necessary, use devices to maintain the mouth opening (ex: wooden spatulas);</li> <li>• In the presence of a tongue coating the association of tongue scrapers is indicated;</li> <li>• The cleaning of the oral cavity must always be from the posterior region towards the anterior;</li> <li>• Recommended brushing technique: Bass technique; *</li> <li>• Sanitize the prostheses before replacing them; **</li> <li>• Organize the environment at the end of the procedure;</li> <li>• Clean the toothbrush under running water and in the 0.12% chlorhexidine digluconate aqueous solution;</li> <li>• Dry and pack it closed in a ventilated environment;</li> <li>• Discard gloves, mask and gauze in the infectious waste;</li> <li>• Wash hands;</li> <li>• Write down the necessary information in the medical record;</li> <li>• According to oral needs, request oral rehabilitation (bucco-maxillofacial surgeon).</li> </ul>
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<b>INTUBATED UNDER MECHANICAL VENTILATION (DENTATE PATIENTS AND PARTIALLY DENTATE PATIENTS)</b> <ul style="list-style-type: none"> <li>• Detach the mechanical solutions and guarantee the correctness of the tube;</li> <li>• Check the cuff pressure (cuff) (maintain pressure between 18 and 22 mmHg or 25 and 30 cmH<sub>2</sub>O);</li> <li>• Wash the oral cavity with aqueous solution of 0.12% chlorhexidine digluconate followed by aspiration;</li> <li>• Brush using the Bass technique with a drop of 1% chlorhexidine gel (teeth and tongue);</li> <li>• Wash the cavity with 0.12% chlorhexidine solution again and aspiration;</li> <li>• Carry out the hygiene of the ventilation tube with gauze moistened in the aqueous solution of 0.12% chlorhexidine digluconate;</li> <li>• Use lip moisturizer like essential fatty acids or glycerin;</li> <li>• Reattach the ventilation tube.</li> </ul>	<b>INTUBATED UNDER MECHANICAL VENTILATION (TOOTHLESS PATIENTS)</b> <ul style="list-style-type: none"> <li>• Release mechanical ventilation and ensure the correct fixation of the tube;</li> <li>• Check cuff pressure (maintain pressure between 18 and 22 mmHg or 25 and 30 cmH<sub>2</sub>O);</li> <li>• Washing of the oral cavity with aqueous solution of 0.12% chlorhexidine digluconate followed by aspiration;</li> <li>• Application of spatula with gauze, soaked in 0.12% chlorhexidine gluconate solution, over the entire oral mucosa, edentulous edges, tongue and palate;</li> <li>• Aspirate the excess, without rinsing;</li> <li>• Moisturize lips;</li> <li>• Reattach the ventilation tube.</li> </ul>
<b>CONSCIOUS PATIENT (DENTATE PATIENTS AND PARTIALLY DENTATE PATIENTS)</b> <ul style="list-style-type: none"> <li>• Assist and / or superviseso that they perform their own oral hygiene;</li> <li>• Mouthwash with 0.12% chlorhexidine digluconate aqueous solution;</li> <li>• Brushing with toothpaste using the Bass technique;</li> <li>• Brushing the tongue;</li> <li>• Rinse with water;</li> <li>• Sanitize the Removable Partial Prosthesis (RPP), if they have one.</li> </ul>	<b>CONSCIOUS PATIENT (TOOTHLESS PATIENTS)</b> <ul style="list-style-type: none"> <li>• Removal of the total prosthesis, if the patient has it;</li> <li>• Mouthwash with 0.12% chlorhexidine digluconate aqueous solution;</li> <li>• Brushing with toothpaste on the alveolar edges;</li> <li>• Hygiene of the Total Prosthesis (TP) if they have one.</li> </ul>

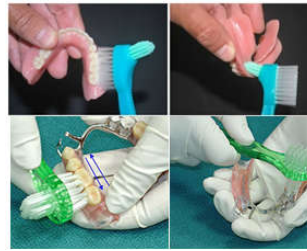
**OBS: Toothbrushes must be individual and discarded every 15 days.**

**\* BASS TECHNIQUE** (CARRANZA Jr., FA; NEWMAN MG; TAKEI HH, 2004).

1- Extra soft brush, position the brush bristles in the area between the edges of the gum and the tooth at a 45 ° angle. Then make small and gentle vibrating movements, tooth by tooth, or at most a group of two, without removing the brush from the place and trying to get between the teeth. The pressure should be enough to make the gums pale.



**\*\* PROSTHESIS HYGIENE:** Brushing with special brushes for prostheses (RPP and TP), with water and neutral soap daily.



(Picture 1)

(Picture 2)

**Removable Partial Prosthesis (RPP):** soak with a tablespoon of apple cider vinegar diluted in a glass of water for 30 minutes daily.

**Total Prosthesis (TP):**soak with a tablespoon of sodium hypochlorite (bleach) diluted in a glass of water for 30 minutes daily.

→These products assist in the disinfection of these prostheses

→Patients who must remove their prostheses must store them in a container intended for this purpose.

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