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INTEGRATIVE REVIEW ARTICLE

ORAL HYGIENE IN PATIENTS UNDER MECHANICAL VENTILATION: AN INTEGRATIVE REVIEW

HIGIENE ORAL EM PACIENTES SOB VENTILAÇÃO MECÂNICA: REVISÃO INTEGRATIVA HIGIENE ORAL EN PACIENTES BAJO LA VENTILACIÓN MECÁNICA: UNA REVISIÓN INTEGRADORA

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ABSTRACT

Objective: to identify the frequency, technique and recommended products for a effective oral hygiene in patients under mechanical ventilation. **Method:** an integrative review, in the period 2002-2012, with the guiding question << *What are the products and procedures performed and optimal frequency for an effective oral hygiene of intubated patients?* >>. The sample consisted of 17 articles available in English and Portuguese, in LILACS and MEDLINE and SciELO Library. The analysis was performed after reading the material. **Results:** no high-level evidence were found to assure the right technique, exact frequency or ideal products for the procedure, however, elevation of the head, prophylaxis against pressure ulcers associated with oral hygiene and orotracheal aspiration can reduce the incidence of mechanical ventilation associated Pneumonia. **Conclusion:** the improvement of nursing professionals by the improvement of curriculum bases on oral hygiene becomes imperative to professionals take possession of this function, and also greater incentive to issue in Brazil. **Descriptors:** Oral Hygiene; Intensive Care Units; Ventilator-Associated Pneumonia.

RESUMO

Objetivo: identificar a frequência, técnica e produtos preconizados para realização de uma higiene oral efetiva em pacientes sob ventilação mecânica. **Método:** revisão integrativa, no período de 2002 a 2012, com a questão norteadora << *Quais são os produtos e procedimentos realizados e frequência ideal para higiene bucal eficaz de pacientes entubados?* >>. A amostra foi composta por 17 artigos disponíveis em inglês e português, nas bases de dados LILACS e MEDLINE e, na biblioteca SciELO. A análise foi realizada após a leitura do material. **Resultados:** não foram encontradas evidências de alto nível para afirmar a técnica correta, frequência exata ou produtos ideais para o procedimento, contudo, a elevação da cabeceira, profilaxia contra úlceras por pressão associadas à higiene oral e aspiração orotraqueal podem reduzir a incidência de Pneumonia Associada à Ventilação Mecânica. **Conclusão:** o aperfeiçoamento dos profissionais de enfermagem através da melhora das bases curriculares acerca da higiene oral se faz imperiosa para que tomem posse desta função, além de maior incentivo a temática no Brasil. **Descritores:** Higiene Bucal; Unidades de Terapia Intensiva; Pneumonia Associada a Ventilacao Mecanica.

RESUMEN

Objetivo: identificar la frecuencia, la técnica y los productos recomendados para realizar la higiene oral eficaz en pacientes bajo ventilación mecánica. **Método:** una revisión integradora, en el período 2002-2012, con la pregunta orientadora << *¿Cuáles son los productos y los procedimientos realizados y la frecuencia óptima para la higiene bucal eficaz de los pacientes intubados?* >>. La muestra estuvo conformada por 17 artículos disponibles en inglés y portugués, en el LILACS y MEDLINE y la Biblioteca SciELO. El análisis se realizó después de leer el material. **Resultados:** no se encontraron pruebas de alto nivel para afirmar la técnica correcta, la frecuencia exacta o productos ideales para el procedimiento, sin embargo, la elevación de la cabeza, la profilaxis contra las úlceras de presión asociadas con la higiene bucal y la aspiración traqueal, pueden reducir la incidencia de la neumonía asociada a ventilación mecánica. **Conclusión:** la mejora de los profesionales de enfermería, la mejora de las bases del plan de estudios acerca de la higiene oral se convierte en imprescindible para tomar posesión de esta función, y un mayor incentivo para emitir en Brasil. **Descriptor:** Higiene Oral; Unidades de Cuidados Intensivos; La neumonía Asociada a la Ventilación Mecánica.

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INTRODUCTION

Nursing care in an intensive care unit (ICU) has a fundamental importance for the therapy of patients admitted there. The ICU's overall possess dependent patients with deficits in self-care, or "state in which the person has impairment in motor or cognitive function, causing a decrease in the ability to perform self-care activities".¹ Thus, these patients need help in locomotion, feeding, grooming, and other activities; all crucial.

There are contemplated between the attributions of the nursing staff the maintenance of hygiene and comfort, which includes performing oral hygiene.² Within this context, it is noteworthy that in patients on mechanical ventilation, dehydration and strong odor of the oral mucosa can be evidenced; all them as result of the semi-opening of the mouth for long periods during the presence of endotracheal tube. After extubation, this may lead to further delay the acceptance of oral diet and verbal communication.³

The colonization of the oral cavity, oropharynx and dental plaque have been associated with respiratory disease and heart infection processes, caused by the microorganisms from the oral mucosa itself.¹ Dental plaque can be habitat of potentially pathogenic microorganisms into the respiratory system, often responsible for nosocomial pneumonia.⁴ Therefore, the use of techniques and suitable solutions for performing oral hygiene, provides well-being to the patient in addition to reduce the load of harmful agents in the oral mucosa.⁴

Poor oral hygiene in patients by mechanical ventilation can influence the occurrence of Ventilator-Associated Pneumonia (VAP), which has as main cause in the aspiration of microorganisms in the oropharynx.⁵ Moreover, the decrease in salivary secretions as a result of presence of the endotracheal tube has to weaken one of its main functions in the oral cavity: cleaning and disposal of the bacteria present, which shall accumulate in the mucosa.⁶ Other factors are also relevant in the development of VAP, as not raising the head above 30°, enteral nutrition and use of antibiotics.⁷

The latest publications from the Centers for Disease Control and Prevention - CDC on prevention of VAP date from 2008 and have a rank of general recommendations that involve the improvement in education, surveillance, practice and responsibility for conducting the oral hygiene procedure;⁸ however, there is not a consensus about which product should be

used yet or which technique and ideal frequency should be performed, even because there is little consistent evidence derived from controlled clinical trials in this area, as well as any recognized protocol with a high level of evidence.^{9,10}

Given this information, it is deemed important in the literature seek an update on what has been published about oral hygiene in ICUs. Following this thinking, the guiding question "What are the products and procedures performed and optimal frequency for effective oral hygiene of patients intubated?" An integrative literature review was performed, in order to identify the frequency, technique and recommended products, conducting an effective oral hygiene in patients on mechanical ventilation.

METHOD

This article was originated from the Monograph of the Residency Program in Medical-Surgical Nursing, of the State University of Londrina.

It is an Integrative Review desolved in six stages.¹¹ Through this methodological approach is possible to analyze the object of study from the perspective of several experts on the subject, with the power to bring out relevant reflections on concepts that can change health care practice.¹² Each step will be described through the activities performed in this study:

Step 1: Development of the guiding question: "What are the products and procedures performed and optimal frequency for effective oral hygiene in intubated patients?"

Step 2: Searching in the literature: The literature search was carried out from bases in Latin American Literature data and Caribbean Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) and the library Virtual Scientific Electronic Library Online (SciELO), because they are a comprehensive and reliable source of the of the best journals in Latin America (Rev) and the world (MEDLINE), and encompass most of the journals that have text available on the Internet (SciELO).¹³

The studies were grouped when met the inclusion criteria, which comprehend to: articles with a content compulsorily approach to oral hygiene in intubated patients, in English and Portuguese languages, being quantitative or qualitative studies, with descriptive, experimental or quasi-experimental drawings, and also literature reviews. They might be available on the Internet. Because it is a recent issue, the

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period chosen for analysis included articles published between 2002 and 2012.

The search for the articles occurred in the period from 1st to 31th August, 2010; and a new search was performed in January 2013 in order to redeem latest updates. To this end, the Health Sciences Descriptors Headings (MeSH) and Medical Subject Headings (MeSH) were used, which allow a single language in the search for articles through the data bases referred.¹⁴ The descriptors chosen was "hygiene bucal" and "unidades de terapia intensiva" in Portuguese, and "oral hygiene" and "intensive care units" in English, in addition to being obeyed search criteria established in each database.

Step 3: Data collection: The articles were randomly identified by letters of the alphabet sequence (A, B , C , ... R) , and the information about benchmarks and structural data (journal, the author (s), title, year of publication, theoretical framework, objective (s), methodology, main results, conclusions and recommendations) were compiled in Microsoft Office Excel®.

Step 4: Evaluation of studies included in Integrative Review: The initial search was by the titles of articles fulfilling the adopted descriptors and were selected those that mentioned products and procedures performed and optimal frequency for effective oral care of intubated patients. In the first search, 55 articles were found, four in LILACS, 48 in MEDLINE and three in SciELO virtual library. Was then performed reading all the abstracts of selected articles, in order to rescue only which contemplate the theme in question, leaving 29 articles. Yet for the refinement process, the reading of the remaining full articles was performed to nullify any doubt about the inclusion of the article in the Review. After this stage remained in the study only 17 articles that

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met all the inclusion criteria mentioned above.

For purposes of analysis were then included 17 items, categorized according to the database of origin, author, title and year of publication, journal, evidence level, country of publication, objectives, methodology, results and conclusions. The main focus was given to the findings and conclusions of articles in order to retrieve the best evidence of the practice of oral hygiene in intubated patients.

Step 5: Interpretation of results: From repeated readings of selected abstracts in the previous phase, extracted those studies that focused regarding products and procedures performed and optimal frequency for effective oral care of intubated patients. There was performed a comparison of results of the articles analyzed, highlighting the consistencies and discrepancies.

Step 6: Synthesis of knowledge: There were carried out the synthesis of the articles analyzed after thorough reading of selected material, and the captured information were provided in a figure.

RESULTS

Among the 17 articles selected, one belonged to the LILACS database (5,9%), one by SciELO (5,9%) and the remaining 15 were from the MEDLINE base (88,2%). The theme oral hygiene is still new in the literature, mainly in Brazil, and the United States is the country with the highest number of publications, responsible for 82,3% of the articles included in this review. Thus it is still scarce availability of articles in Portuguese on the topic (11,8%). Figure 1 shows an overview of the studies included in this review.

Authors	Databases/ Virtual library/Year	Products/ Methods	Evidence level ¹⁵	Results
Santos PSS, Mello WR, Wakim RCS, Paschoal MAG. ³	LILACS/ 2008	Oral solution: enzymatic system X cetilpiridinium.	Level II	Improvement in oral dryness, halitosis and ease of removal of debris.
Beraldo CC, Andrade D. ¹⁶	SciELO/ 2008	Integrative review.	Level V	Chlorhexidine prevented the PAV and oral colonization.
Halm MA, Armola R. ¹⁷	MEDLINE/ 2009	Literature review with clinical trials.	Level I	Reduction of dental plaque: superior results for mechanical interventions to chlorhexidine.
Pendergast V, Hallberg IR, Jahnke H, Kleiman C, Hagell P. ¹⁸	MEDLINE/ 2009	Oral cultures post intubation and diagnosis of Pneumonia	Level IV	Deterioration of the oral hygiene after intubation; PAV in 46% of patients after 10th day of intubation.
Munro CL, Grap MJ, Jones D J, McClish DK, SesslerR CN. ⁷	MEDLINE/ 2009	Cleansing with chlorhexidine 2 times/day, or brushing 3 times/day, or brushing and hygiene with chlorhexidine, or usual care.	Level II	The use of chlorhexidine was effective for those who did not possess PNM; brushing or this association with chlorhexidine did not show effectiveness.
Pobo A, Lisboa T, Rodriguez A, Sole R, Magret M, Trefler S, et al. ¹⁹	MEDLINE/ 2009	Two groups: chlorhexidine 8/8 hours and electric brushing 8/8 hours.	Level II	There was no difference between the groups.
Garcia R, Jendresky L, Colbert L, Bailey A, Zaman M, Majumder M. ²⁰	MEDLINE/ 2009	Intervention: education program for the ICU team.	Level III	PAV decreased from 8.6% to 4.1% and mortality decreased from19.4% to 14.6%.
Mori H, Hirasawa H, Oda S, Shiga H, Matsuda K, Nakamura M. ⁶	MEDLINE/ 2006	Prophylactic measures and use of PVPI.	Level III	Reduction of PAV or delay to its occurrence.
Feider LL, Mitchell P, Bridges E. ¹⁰	MEDLINE/ 2010	Oral hygiene practice of nurses intensivists.	Level VI	Feeling of fear and long time for the procedure.
Cutler CJ, Davis N. ²¹	MEDLINE/ 2005	Frequency, technique and tools used for oral hygiene.	Level III	Despite being recommended for each 2 hours, oral hygiene was held every 4 hours.
Hanneman SK, Gusick GM. ²²	MEDLINE/ 2005	Observation of nursing practice.	Level IV	The frequency of oral hygiene reported is greater than the documented.
Bopp M, Darby M, Loftin KC, Brosious S. ²³	MEDLINE/ 2006	Chlorhexidine x standard hygiene.	Level IV	Small sample, without significant results.
Weireter Jr LJ, Collins JN, Britt RC, Reed SF, Novosel TJ, Britt LD. ²⁴	MEDLINE/ 2009	Development of protocols and routines change.	Level VI	Fall of 12.8 to 1.1 cases of PAV every 1000 patients.
DeKeyser Ganz F, Fink NF, Raanan O, Asher M, Num M, Benbinishty J. ²⁵	MEDLINE/ 2008	Oral hygiene practices with nurses.	Level VI	No protocol in the units surveyed.
Binkley C, Furr LA, Carrico R, McCurren C. ²⁶	MEDLINE/ 2004	Questionnaire about oral hygiene practices with nurses.	Level VI	91% considered oral hygiene as high priority/responsibility of nurses.
Jones DJ, Munro CL, Grap MJ, Kitten T, Edmond M. ²⁷	MEDLINE/ 2010	Use of children's toothbrush, toothpaste and mouthwash (2 times/day).	Level IV	17% of oral cultures positive for pre-existing pathogens before the start of the intervention.
Jones DJ, Munro CL, Grap MJ. ²⁸	MEDLINE/ 2011	Presence of dental plaque with standard oral care.	Level IV	More than 60% of the surface was covered by buccal plaque in the first week.

Figure 1. Distribution of studies on oral hygiene in patients under mechanical ventilation, according to the authors, year of publication and database, country of origin, methodology, level of evidence, main results and main conclusions, from 2002 to 2010.

In this study, only nine articles (52,9%) were written by nurses as leading researchers; the remainder were performed by physicians (29,5 %) and dentists (17,6%). Nevertheless, studies using survey with nurses in ICUs in the United States and Israel, highlighted that oral hygiene procedure is considered a medium to high priority for critical patients.^{10,25} Furthermore, in a survey about the practice of oral hygiene, held with nurses from ICU's in the United States, 91% agreed that they

themselves are responsible for the oral hygiene of intubated patients.²⁶

Another major issue was the frequency of oral hygiene. Noteworthy is a study that monitored the presence of VAP in two ICUs for ten years, in which were performed continuous updates of a multidisciplinary care protocol based on findings in patients, and which demonstrated a decrease in problematic during the research period.²⁴ A literature review also performed in the United States found results that recommend performing

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tooth brushing twice a day, but find no studies that substantiate the best evidence on the optimal frequency of oral hygiene.¹⁷

A consensus on what is the best technique or product used for oral hygiene in intubated patients was not found. Among the 17 studies analyzed in this review, four (23,5%) recommend the use of chlorhexidine 0,12% for hygiene of these patients within ICUs.^{7,16,17,23} Included in these surveys two literature reviews, a randomized clinical trial and a case study, and three of them were conducted in the United States.

A randomized clinical trial conducted in the United States in 2009, which compared the use of chlorhexidine 0,12%, the use of toothbrush and the combination of both, confirms that there is no such benefit when using chlorhexidine and tooth brushing together.⁷ Associated this result, a retrospective study, also conducted in the United States, comparing the use of chlorhexidine 0,12% with the use of electric toothbrush, also suggests that these associated practices do not bring any advantage to prevent VAP.¹⁹

A literature review published in 2009 in the United States which contains only randomized studies found evidence level I (evidence that the treatment is effective) to utilize toothbrush in reducing dental plaque in place of chlorhexidine.¹⁸ In contrast, analysis of a Japanese protocol used iodized povidine three times a day and continued care by a multidisciplinary team, resulted in successful reduction of VAP.⁶

Several studies have highlighted the association of prophylactic measures in combating VAP.^{6,20,22,24} There were found effective interventions,²⁴ where the weekly multidisciplinary team was reviewing the effectiveness of their procedures and behaviors, through laboratory tests and chest x-ray to diagnose the occurrence of VAP. A study of multidisciplinary interventions with an educational program on prophylaxis for aspiration pneumonia to all ICU professionals succeeded in their pipelines.²⁰

DISCUSSION

The emphasis on oral hygiene in the care of patients on mechanical ventilation, and the implementation of nursing interventions for prevention of VAP was striking when reading articles.^{10,25} The nurses are aware of its importance and role in the performance of this procedure,²⁹ and that it should not be done by other professionals.²⁶

Regarding the frequency of daily oral hygiene performed by nurses, divergent

information were found: a study which combined a questionnaire with the nurses about the frequency of oral hygiene and the products used for this procedure, and observation of their practice found in records of an average frequency of 3,3 times every 24 hours, and the professionals reported an average of 4,2 fold over the same period.²²

The AACN (American Association of Critical Care Nurses) in the United States recommends tooth brushing of patients on mechanical ventilation twice a day, in addition to cleaning the mouth every two to four hours, and frequent vacuuming.³⁰ However, a study with intensive nurses showed that professionals perform a lower frequency of this procedure, guided by the fear of moving the endotracheal tube or cause aspiration of products used for hygiene, and to consider a costly action.¹⁰

Limitations encountered by these professionals studied can be remedied with the continuing education of the staff, so ensuring security across the technique of performing the procedure. The implementation of protocols in the institutions and interventions in conjunction with other health professionals can support the credibility of oral hygiene practices. Furthermore, the authors suggest that nursing curricula must be redesigned, so, that graduates professionals have theoretical support to instruct the rest of the staff in how to conduct an oral hygiene properly.²⁶

It was not found until the end time of this review studies supporting the use of a specific product into clinical practice. Some studies propose recommendations for the use of chlorhexidine 0,12%; however, have no evidence on high-level evidence to establish it as ideal for oral hygiene brushing.^{7,16,17,23} The use of traditional or electric tooth brushing associated with the chlorhexidine 0,12% also showed no benefit in practice; however,^{7,19} tooth brushing was significantly important in reducing dental plaque and is recommended at least twice a day.¹⁷

Measures to prevent tracheal aspiration were highlighted in this review. Maintaining the head of the bed at 30 degrees, trading mechanic ventilator circuit every seven days and prophylaxis against pressure ulcers, all together, proved to be preventive in regard to the aspiration of microorganisms from the oral mucosa, which consequently reduces the incidence of VAP. However, in the four studies in which these measures were identified, isolated interventions have shown little or no effect in reducing pneumonia.^{6,20,22,24}

Multidisciplinary interventions and educational programs were also of great value in combating VAP. The success of these intervention studies is the association of measures against aspiration of microorganisms in the oral mucosa, conducted by nurses, physiotherapists and doctors, and the effort to maintain the integrity of the oral mucosa,²⁰ as well as maintaining feedback with the entire team, with evaluation of the success or failure of interventions performed by professionals of the institution.²⁴

CONCLUSION

Oral hygiene is undervalued in Brazil. Despite being a topic that deserves special attention of nursing, and of vital importance for patients in critical care, it is remarkable that there is a large portion of the unprepared teams for assistance. Also striking was the lack of interest in further research in this area by the nursing professionals.

Most articles from this review was not performed in Brazil; however, even with different realities in opposition to our country, nursing care and interventions to be carried to the patient are the same, since needs and risks are similar.

Some recommendations were found in this study, but none can be considered definitive regarding the reduction of pathogenic microorganisms in the oral mucosa; on average, the advocate tooth brushing is from two to three times a day and cleaning every two to four hours. The use of chlorhexidine 0,12% still remains a gap in knowledge, because there is insufficient evidence to support its use. No oral hygiene techniques that stood out from the others were found, it remains to elucidate the best instruments to perform the technique and the process of aspiration of the oral cavity during the procedure.

Interventions together for preventive aspiration of microorganisms from the oral mucosa, such as tracheal suction, elevated bed, changing positions and the very practice of oral hygiene should be instituted in ICU's, and highlighted as a priority in preventing VAP. However, it is emphasized that the need for simultaneous attainment of these behaviors for which there is benefit in their task.

Nursing can begin a process of loss of autonomy in performing oral hygiene in intensive care units, because other professionals have initiated important research topics, in addition to the possibility of other professionals to take charge of this procedure.

Further studies should be performed, since there are still no studies demonstrating a high level of evidence in the ideal conduct for preventing VAP. It is noteworthy that nursing should take the lead in such surveys in order to provide support for the patient daily care.

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