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## Review

# Oral health promotion in Intensive Care Unit patients: management and adaptations

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**Addressing the clinical management and, adaptive techniques for clinical preventive interventions adapted to promote oral health in intubated and tracheostomized patients in Intensive Care Units (ICUs). Scientific articles were searched and analyzed as well as the bibliographic databases linked to hospital dentistry practices and oral care in ICU. Inclusion criteria were: articles published in English indexed at LiLACS, SciELO and PubMed databases between 2003 and 2014. The search gathered 23 references. Demonstrating the oral health promotion techniques applied to critically ill patients and to train the nursing staff and technicians in order to contribute to the quality of life of ICU patients and decrease the rate of nosocomial pneumonia and other systemic complications, systematic review and brief communication. Ethical approval for this study was granted by the Catholic University of Brasilia, CAAE 44578215.0.0000.0029. Preventive oral health interventions must be constant in the ICU and the dentist in the ICU can contribute to the clinical management, adapting treatments and guidance to health professionals.**

**Keywords:** Oral hygiene, Pneumonia, Ventilator-Associated, Endocarditis, Hospital Services

## INTRODUCTION

Patients referred to intensive care units usually present predisposition to poor oral hygiene due to their systemic death conditions such as the difficulty to accomplish their

own oral hygiene tasks, the presence of equipment in the UCIs and, mostly, the lack of experience of dentists and other professionals responsible for the performance of this health promotion activity (Jones, 2005; Rello et al., 2007; Belissimo-Rodrigues et al., 2014).

Oral hygiene deficiency contributes to biofilm accumulation (bacterial plaque) on dental surfaces and soft tissues, specially the tongue (coating), thus leading

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to periodontal diseases and periodontopathogenic bacteria accumulation associated to the emergence of respiratory infections (Azarpazhooh and Leak, 2006; Berry et al., 2007).

The nosocomial pneumonia acquired in a critical environment is characterized by the predominance of gram-negative pathogens and modified bacterial flora 48 hours after hospital admission. This systemic condition is associated to oral health, since biofilm accumulation becomes an organized microbial reservoir, which may lead to pneumonia caused by inefficient oral hygiene (Muscedere et al., 2008).

Strategies to promote oral health must be constantly applied to all ICU patients; however always respecting the particularities of each case and training health professionals on how to do it correctly (Pineda et al., 2006; Shi et al., 2013).

Clinical dentistry actions in ICUs target at quality of life and health promotion through the elimination of possible inflammatory, infectious and painful sites resulting from problems in the stomatognathic system of intubated and tracheostomized patients (Scannapieco, 2005; Prendergast et al., 2009; Türk et al., 2012).

### **Aim**

The present study aims to approach the clinical management and the adaptive techniques for clinical preventive interventions adopted to promote oral health in tracheostomized patients treated in public and private intensive care units (ICUs), systematic review and brief communication.

### **METHODS**

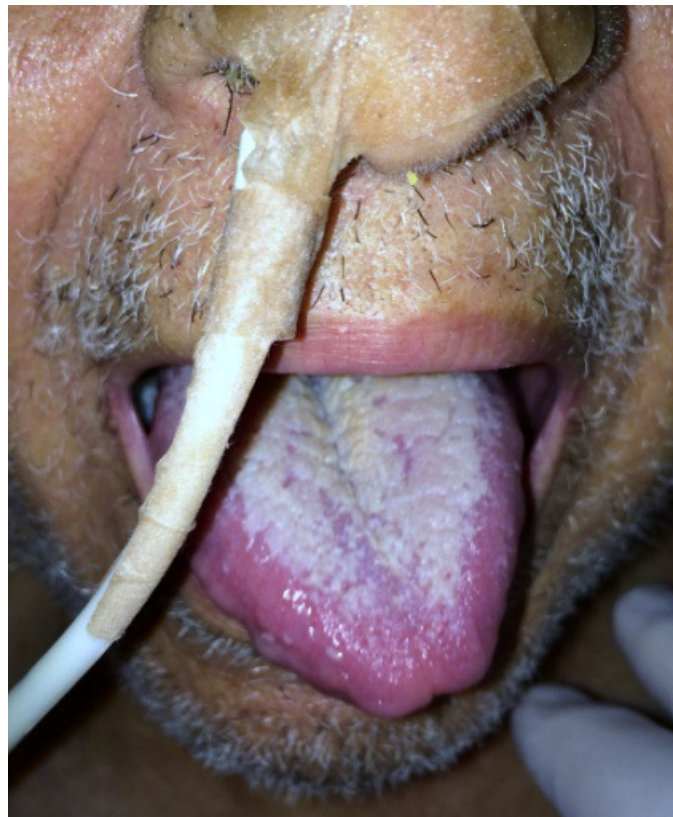
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### **Clinical Guidelines**

According to a generalist and multidisciplinary view of health promotion, the dentist plays an important role on the actions that pursue quality of life for patients considered to be vulnerable, such as those admitted at ICUs (Jones, 2005; Fields, 2008).

Oral health should not be considered separately from the general health clinical and intensive planning when it deals with evidences based on its association to some systemic conditions, such as pneumonia (Azarpazhooh



**Figure 1.** Accumulation biofilm tongue in a patient in the ICU.

and Leak, 2006; Muscedere et al., 2008, Pobo et al., 2009).

The hospital system has been giving greater importance and credibility to dentistry in ICUs. It is not a constant, but a possible methodology with positive health results such as nosocomial pneumonia rate decrease. In addition, it is a considerable functional differential to ICU itself (Belissimo-Rodrigues, 2014).

The main problems presented by ICU patients are biofilm accumulation, tongue coating (Figure 1), supragingival calculus, dental cavitation caused by caries lesions (Figure 2) and residual dental roots. All these problems are related to oral health preventive actions (Abidia, 2007; Rello et al., 2007; Prendergast et al., 2009).

Oral health clinical activities must be considered a minimal intervention which depends on the proper professional adaptation and performance as well as on teamwork involving such professionals; however, these activities start with multidisciplinary planning (Furr et al., 2004; Ames et al., 2011).

The dentist must intensify actions aiming to eliminate possible inflammatory, infectious and painful sites caused by oral problems as well as to provide better quality of life and service to ICU patients (Pineda et al., 2006).



**Figure 2.** Unsatisfactory condition of the oral cavity, the presence of dental caries in a patient in the ICU.

### **a) Clinical Management**

According to Porto et al. (2010), from the dentistry undergraduate and graduate point of view, dentists do not have the opportunity to devote themselves to hospital environments, especially ICUs; therefore, it is necessary to technically and scientifically prepare these professionals in order to help them to provide good oral health practices to critical patients.

The dentist must be aware of the patient's bio-psycho-social condition since it helps achieving the correct planning and performance of demanding clinical activities. It is a way to avoid the use of non-applicable interventions to the patient's actual clinical situation and nuisance (Furr et al., 2004; Jones, 2005; Türk et al., 2012).

The clinical management of critically ill patients, whether they are intubated or tracheostomized, must be done along with the intensivist doctor, the physiotherapist or the nurse responsible for positioning the patient's bed at 45 degrees at the time to perform the dental procedure (Ames et al., 2011; Yusuf, 2013).

Patient's repositioning as well as all the ICU equipment used to hinder visibility during the oral health procedure and to overcome patient's non-cooperation during the treatment must be well organized by the nursing staff (Türk et al., 2012; Shi et al., 2013; Belissimo-Rodrigues et al., 2014).

It is mandatory to shut down the nasoenteral diet of certain patients. It may be done by the dietician or the nursing staff, because dentistry procedures might make the patient nauseous, especially during tongue and posterior dental region cleaning (Feider et al., 2010; Yusuf, 2013).



**Figure 3.** Expander and mouth opener mouth as employees in dental care in the intubated patiente.

### **b) Adaptive Techniques**

According to our clinical experience, using auxiliary means is of great help; it means applying beneficial trick clinical strategies to get wider mouth opening and better visibility during oral health clinical procedures applied to intubated and tracheostomized patients (Porto et al., 2010).

The correct use of mouth expanders and previously made mouth openers along with the teamwork from a medical staff composed of dentist, physiotherapist and intensivist doctors can help to better access the patients' mouth (Jones, 2005; Fields, 2008; Ames et al., 2011) (Figure 3).

Dental care activities must not be performed by a single professional, it is important to have auxiliary personnel to assist the dentist during the performance of logistic activities related to the treatment. It is worth emphasizing the importance of having a well-trained nursing staff aware of the dentistry procedures, especially the correct use of mouth expanders and mouth openers. The staff must be capable of helping with the salivary suction and performing other oral health procedures (Tablan et al., 2004).

### **c) Dentistry Interventions in an Intensive Care Unit**

All dentistry interventions must be assisted by auxiliary personnel using the constant vacuum suction system installed in ICUs. The system must be equipped with a suction device adapted to it in order to render a faster and more efficient procedure (Abidia, 2007; Yusuf, 2013).

When the correct planning meets the needs of each critically ill patient, the preventive oral health interventions



supposed to be done in the ICU do not differ from those performed in the doctor's office (Scannapieco, 2005; Ames et al., 2010). The great difference lies on the dentist's professional experience on adapting him/herself to the new professional context.

Daily teeth-bushing should not be forgotten in ICUs. It is necessary to use prophylactic paste and a smooth bristled toothbrush to reach the mouth areas which are most difficult to be accessed. It is considered to be an irreplaceable measure for biofilm and bacterial plaque removal (Pineda et al., 2006; Berry et al., 2007; Shi et al., 2013).

This oral hygiene deficiency condition found in ICUs may be the greatest problem found in technical dentistry, since most ICU professionals perform oral hygiene using wooden spatulas rolled in gauze. Although this technique is widely used, it does not meet official dental practices and shows low effectiveness in removing the bacterial plaque (Feider et al., 2010; Türk et al., 2012).

It is necessary to better understand the herein discussed subject as well as the way health professionals deal with the main techniques and with the oral health procedures assumed to favor the correct oral hygiene protocol (Tablan et al., 2004; Pobo et al., 2009).

The fluoride therapy, using 1.23% or neutral acidulated fluoride, may help the first phase of the treatment, especially in keeping the oral pH in ICU patients. It is important to say that this is an oral health complementary activity and should be done after the oral hygiene using the toothbrush for a certain period (Ames et al., 2011).

Tongue hygiene, in other words, the tongue coating removal must be constantly done using the patient's toothbrush with saline solution or 0.12% chlorhexidine; the procedure must be supervised (Pineda et al., 2006; Paju and Scannapieco, 2007).

The tongue hygiene must be always performed from the posterior to the anterior region of the mouth. The use of some auxiliary means such as tongue scrapers may be effective in eliminating the environment favorable to bacterial accumulation, specially the gram-negative bacteria which are associated to nosocomial pneumonia (Scannapieco et al., 2003; Tablan et al., 2004; Nelson et al., 2010).

Another efficient clinical dental action is the use of 0.12% chlorhexidine, twice a day, for the maximum period of 7 to 10 days. This medication has bactericidal and bacteriostatic action, thus specially helping to eliminate possible inflammatory sites and bleeding, since such conditions could impair future treatments (Pineda et al., 2006; Berry et al., 2007; Pobo et al., 2009; Shi et al., 2013).

Performing prophylaxis in the clinic using constant vacuum suction with 0.12% chlorhexidine may be efficient since the patients have difficulty in rinsing and spitting (Rello et al., 2007; Fields, 2008).

Using hemostatic tweezers or needle holder with little amount of gauze soaked in this chlorhexidine solution -

after using the herein described clinical management and adaptation - is another possibility for the intubated and tracheostomized patients. This technique may be especially effective in the hygiene of posterior regions of the mouth and of the endotracheal tube (Tablan et al., 2004; Ames et al., 2011; Yusuf, 2013).

Other oral antiseptics are used in some ICUs, but only a few studies described in the literature have presented clinically effective results. It is possible to see that financial planning advocates for the use of the cheapest techniques rather than the more effective ones (Paju and Scannapieco, 2007; Feider et al., 2010).

The presence of cavities and dental fractures may result from existing caries lesions or traumas at the time the patient is admitted. The atraumatic restorative treatment (ART) favors these conditions because the resin-modified glass-ionomer cements are the most reliable materials due to their biocompatibility and release of fluoride ions. These cements enable remineralization in early dental caries areas, fact that benefits the first stage of the treatment (Jones, 2005).

The ART technique, the supragingival scaling and root planning must be done exclusively by dentists. These are specific procedures not able to be performed by other professionals, who could be ethically accounted by competent organs for performing such procedure, whenever necessary (Rello et al., 2007; Fields, 2008;). Emergency surgery interventions may be done within the ICU environment, especially when the tooth becomes an infectious and painful site, which is considered to be a negative aspect to patients' rehabilitation (Tablan et al., 2004; Nelson et al., 2010).

Performing the clinical planning with the intensivist doctor and all the multidisciplinary staff, before the surgical intervention, is mandatory since they must know the patients' real systemic conditions as well as the possible adverse reactions to the anesthetic and post-extraction medications (Jones, 2005; Rello et al., 2007; Prendergast et al., 2009; Porto et al., 2010).

It is expected that the clinical experience and the dentistry orientation focused on promoting health quality of life to critically ill patients may work as possible training or future guides to hospital environment assistance, especially in Intensive Care Units (Scannapieco et al., 2003; Furr et al., 2004; Azarpazhooh and Leak, 2006; Pineda et al., 2006; Fields, 2008; Muscedere et al., 2008; Pobo et al., 2009; Feider et al., 2010; Yusuf, 2013; Belissimo-Rodrigues et al., 2014).

## CONCLUSION

Preventive oral health interventions must be constant in the ICU because they help in the elimination of inflammatory, infectious and painful problems.

The dentist in the ICU can contribute to the clinical management, adapting treatments and guidance to

health professionals.

## ACKNOWLEDGEMENT

All the authors participated in the elaboration and writing of the current paper. They read and interpreted the analyzed studies and participated in the clinical activities illustrated in the present review.

The authors are responsible for the actions and clinical guidelines that were based on the clinical and hospital reality in Brazil.

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