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THE IMPORTANCE OF DENTAL CARE IN HOSPITALIZED PATIENTS IN INTENSIVE CARE UNIT

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ABSTRACT

The purpose of this literature review is to demonstrate the importance of dental surgeon in the hospital staff so that patient care is always carried out in an integrated and preventive manner. The oral hygiene performed correctly and dental treatment can prevent even greater health problems the patient's health, since the oral microbiota could be a harm to the recovery of ICU patients. Participation of dentist in hospital staff is not common, and their presence in the ICU is very important for the control of oral infections and thus preventing numerous systemic complications, such as respiratory infections, one of the most frequent. Besides the decrease in spending on public health.

INTRODUCTION

The incidence of patients who are undergoing cardiac surgery in developing nasocomial pneumonia is 20%, reaching death¹. This risk increases with the use of mechanical ventilation as well as prolonging the length of stay for 5-9 days, which causes an increase in hospital costs (Santos *et al.*, 2007; Gusmão *et al.*, 2005). In research to raise the additional average cost in intensive care units (ICU) patients who developed pneumonia this from R \$ 13,877.08 to R \$ 21,188.25 after infection (Raghavendran *et al.*, 2007). In addition to this cost is another factor the immeasurable pain, the patient's suffering and the family (Martins *et al.*, 2004). The second most common nosocomial infection is the nasocomial pneumonia and the biggest killer among all hospital-acquired infections (Cavalcanti *et al.*, 2005 and Weber *et al.*, 2007). The nasocomial pneumonia associated with mechanical ventilation occurs in 8-38% of patients, 24-76% (Chastre *et al.*, 2002 and

Guimarães *et al.*, 2006) of cases progress to death, especially when they are associated with *Pseudomonas* spp or *Acinetobacter* spp (Cavalcanti *et al.*, 2005; Chastre *et al.*, 2002; Cutler *et al.*, 2005 and Fagon *et al.*, 1993) and patients under ventilation in the ICU have a 2-10 times higher risk of death than patients without ventilation (Cavalcanti *et al.*, 2005). The mouth is part of the body and interferes decisively the appearance and spread of a list of conditions. There are approximately 350 bacterial species cultured and 200 that were recognized by genetic methods. This is a complex microflora, mostly due to the presence of the teeth, running only with the intestinal microbial flora (Sannapioco *et al.*, 2002).

The *Streptococcus viridans* dominated the colonization of the mouth in healthy adults, but in critically ill patients who have poor health, this flora is altered becoming predominantly gram-negative organisms, which is more aggressive (Raghavendran *et al.*, 2000; Cavalcanti *et al.*, 2005 and Kollef *et al.*, 1997). The microbiota of mouth is a risk for critically ill patients who have difficulty or even impossibility to perform proper oral hygiene (Safdar *et al.*, 2005). Despite a poor oral hygiene not be the only causal factor, critically ill patients are more vulnerable to colonization by pathogens in any organ of

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the body and can develop numerous secondary diseases due to improper hygiene which leads to the change of the oral flora (Potter *et al.*, 2002). Patients with systemic diseases ICU often have difficulties or total dependence to perform oral hygiene properly and it is necessary the assistance of a health professional for this (Liwu *et al.*, 1990) task. Nosocomial pneumonia is a growing concern among health professionals and government agencies to represent one of the most frequent infections (10-68%) second only to urinary infection (McNeil *et al.*, 2000; Fourrier *et al.*, 2000). These infections cause high morbidity and mortality, reaching up to 80% of patients (McNeil *et al.*, 2000; Fourrier *et al.*, 2000). The bacteria *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Acinetobacter baumannii*, *Haemophilus influenza* and *Pseudomonas aeruginosa* are causing the pneumonia associated with mechanical ventilation (VAP), a disease that affects more patients in critical condition lying in the ICU (Liwu *et al.*, 1990; Fourrier *et al.*, 2000).

The percentage of these bacteria in the mouth can reach 70% in the biofilm, 63% in language and 73% in the ventilator tube. By analyzing this data, it is observed that the bacteria present in the mouth in mechanical ventilation use in patients can reach 43% (Yoneyama *et al.*, 2002; Oliveira *et al.*, 2007). Although essential, oral hygiene does not have the necessary attention due to incapacity to perform self-care, difficult access to the oral cavity by the professional staff, lack the necessary technique for cleaning from the intensive care team, presence and positioning of the endotracheal tube is required for the survival of the patient, as well as a variety of invasive procedures and can increase the incidence of oral or systemic diseases and opportunistic (Liwu *et al.*, 1990; McNeil *et al.*, 2000). Recent studies with a multidisciplinary team of professionals in ICU members found that misconceptions about the techniques and in many cases the absence of an oral hygiene protocol, where 86 % of respondents claim to recognize the normal appearance of the oral cavity, however, none of professionals from the intensive care team, knew indicate which are the most common oral diseases (Araújo *et al.*, 2009) in a similar survey, found that 76% recognize the normal aspects of the oral cavity, but 29 % do its manifestations, such as periodontitis, caries dental, gingivitis and candidiasis (Cortizo *et al.*, 2014).

Therefore, the evaluation and maintenance of oral health of ICU patients should be performed by trained professionals, not only to prevent the weakening and deterioration of teeth but also to promote the prevention of systemic diseases whose origin can be in the mouth (Treolar *et al.*, 1995). So the purpose of this literature review is to show the importance of the dental surgeon in the hospital staff so that patient care is always carried out in an integrated and preventive manner.

Literature Review

The intensive care units (ICU) are due to the perceived need of continuous care in patients by a direct multidisciplinary team, currently made up of health professionals such as doctors, nurses, nursing technicians, physical therapists, speech therapists, nutritionist and social worker they provide constant and comprehensive monitoring of the patient (Abidia, 2007).

In 1901 the American Association of Dental Services Committee created the first Department of Dentistry within the General Hospital of Philadelphia, thus creating the concept of hospital dental care (Abidia, 2007). In Brazil, only in 2004 the Dental Hospital was legitimized with the creation of the Association of Hospital Dentistry (ABRAOH) (Lima *et al.*, 2011). In 2008, it was presented to the House of Representatives of Rio de Janeiro the Bill No. 2776/2008 establishing the mandatory presence of the dentist in hospital multidisciplinary teams, including working in the ICU in public and private hospitals, and this It is awaiting approval by the Senate and presidential approval, but some hospitals are already in the dentists in their clinical picture (http://www.camara.gov.br/proposicoesWeb/prop_mostrarintegra). Studies and systematic reviews currently show that despite the oral care of patients admitted to the ICU be of utmost importance, this practice is still scarce and the amount of plaque increases, leading to the appearance of periodontal disease and caries. It is extremely important that the dentist check the oral health of the patient and can also perform a clinical examination to act as an adjuvant in medical therapy. The role of the dentist should involve both emergency procedures as well as preventive providing greater comfort to the patient (Rabelo *et al.*, 2010).

Research done in the ICU of HCFMRP / USP with 254 hospitalized adult patients, was conducted in 129 patients care by a dentist with the hospital staff, which in addition to basic hygiene, held advanced treatments such as removing tartar, caries restoration, scraping language and extraction. The other half continued with the treatment of basic hygiene by the nursing team, as a control group. This was done throughout the hospital stay, so it can be said that a dentist working in hospital staff (ICU) can reduce up to 56% the development of respiratory infections possibilities (Belissimo- Rodrigues *et al.*, 2014). During in utero, the human has a missing oral cavity microorganisms, but during passage through the birth canal, there contamination by various strains of microorganisms such as streptococci, lactobacilli and coliforms candid, which become the most frequent microorganism in the oral cavity (Paju *et al.*, 2007). Several studies show that the first bacteria to settle in the mouth are of the species *Streptococcus salivarius*, *oralis* and *mitis biovar* (Paju *et al.*, 2007). In the first year of life, approximately 70% of the oral microflora consists of streptococci, especially of the species *salivarius*, which has compatibility massive mucosal. In addition, other groups such as *Staphylococcus spp*, and *Neisseria spp Veillonella spp* complete oral microbiota (Pace *et al.*, 2008).

The periodontal diseases are inflammatory diseases of infectious etiology and are considered the second biggest cause of oral pathology in the world population (Kollef *et al.*, 1997). Approximately 100 million bacteria are found in one cubic millimeter of dental plaque, and permanent colonization of potential pathogens (Kollef *et al.*, 1997). The number of bacterial species found in the mouth is directly related to the vulnerability of the host, hospitalization, drug use in ICU (especially antibiotics), conditions of hygiene and oral microbiota present in the ICU setting. Gram-negative bacilli are often isolated, they are *Pseudomonas aeruginosa*, *Proteus spp*, *Acinetobacter spp* and *Staphylococcus aureus* (Potter *et*

al., 2002). This demonstrates how the presence of highly infectious microorganisms in the oral microflora contributes to the microbial growth, primarily in hospitalized patients who usually requiring mechanical ventilation. Such patients are unable to close his mouth due to intubation material, remaining in contact with ambient air. (Lacaz *et al.*, 2002).

This results in the drying of the mucosa lesions on the lip and tongue, the breaking apart of the epidermal barrier, which favors the entry of microorganisms into the bloodstream, reaching the sites any organisms (Kurtzman *et al.*, 1998). The surfaces of the human body are constantly exposed to colonization by a wide variety of microorganisms that usually live in harmony and symbiotic with the host (Lang *et al.*, 2005). The ICU patients who have compromised their physiological and immune system are subject to local and systemic infections, such as sepsis, endocarditis, brain abscess, respiratory infections, ophthalmoplegia, endofitalmite, bacteremia, intra-abdominal infections, suppurative otitis media, the abscess ovarian tube, vaginal infections and chronic conjunctivitis. Such infections may be associated with lack of oral hygiene during the length of stay in the ICU (Lotufo *et al.*, 2004). Treatment of systemic diseases can cause adverse effects in the oral cavity, because the administration of various medications can alter salivary flow (Lima *et al.*, 2004). Laxatives, tonics and anitoxígenos present in the composition sucrose, which increases the risk of developing caries lesions and tooth destruction (Lima *et al.*, 2004). Patients underwent orotracheal intubation, commonly exhibited oropharynx colonized by Gram-negative microorganisms in the first 48 to 72 hours of ICU admission. Such bacteria reach the lungs through the mouth secretions leaking from the sides of baronets tracheal tube (Araújo *et al.*, 2009).

Intubation prevents the closing of the mouth, favoring its dryness and raising the level of biofilm colonization (38) and such patients tend to present oral changes such as dry mouth, drooling, lesions on the lips, fissured tongue, parched mucous membranes and gingival hyperplasia. The use of mechanical ventilator hinders oral hygiene due to the fact the tube and its support material prevent complete visualization of the inside of the mouth exposing dental elements and supporting tissues to dry due to lack of contact with the saliva (Araújo *et al.*, 2009). Patients admitted to the ICU in most cases are unable to perform oral hygiene and therefore at greater risk of developing caries, gingivitis and periodontal disease (36). Accordingly, oral hygiene is a significant factor for the maintenance of oral and systemic health, and provide greater comfort for patients (Araújo *et al.*, 2009). The oral hygiene should be essential practice in caring for ICU patients, especially those who are disabled, intubated and / or mechanical ventilation. Some features, such as artificial saliva, electric toothbrushes, tongue scrapers, suckers and mouthwash, can be used in oral care of these patients, however at the possibility of accidental swallowing or aspiration of these products, these resources should be used by dentists (Potter *et al.*, 2002).

It is vital that a dental surgeon is present in the ICU as this professional has expertise and is therefore able to perform, educate patients, caregivers, family members and hospital health care team such as oral hygiene should be performed.

Although many products have been used for the control of dental plaque, chlorhexidine is still one of the most used and studied today. Also called chlorhexidine gluconate or digluconate (Potter *et al.*, 2002). Introduced in therapy for more than fifty years, this is widely used in medicine, it is safe and stable. In dentistry it has been effective in preventing and controlling the formation of plaque, disintegration of existing plaque and inhibition and reduction in the development of gingivitis. (Gunsolley *et al.*, 2010) As prophylaxis after oral surgery, periodontal therapy, inhibiting the development of plaques in patients with intermaxillary fixation, physically or mentally disabled, medically compromised, elderly, terminal clinical picture, high risk of getting cavities, limit bacteremia and operative contamination and prevent stomatitis (Addy *et al.*, 2000 and Quirynen *et al.*, 2001).

Several scientific studies indicate the use of 0.12% chlorhexidine gluconate for its effectiveness against Gram-positive and Gram-negative non-producing capsule (Addy *et al.*, 2000; Albandar *et al.*, 1994). Such an agent is already recognized as scientifically that is used as control, when conducted studies with the purpose of verifying the potential of other antimicrobial agents (Torres *et al.*, 2000). The use of mouthwash with chlorhexidine gluconate based on the 0.12% and toothbrushing is most effective in reducing plaque and gingivitis when compared to the use of tooth brushing with or without the use of floss (Arora *et al.*, 2010). So, besides this recognized efficacy studies have been conducted to verify its effectiveness without toothbrushing in preventing nosocomial pneumonia in intubated patients (Bopp *et al.*, 2006; Pobo *et al.*, 2009). However, there are adverse effects when the chlorhexidine gluconate is used indiscriminately for a prolonged time, such as supragingival calculus formation, development tooth stains especially in the interproximal areas in dental restorations in the mucosa and the dorsal surface of the tongue. No change in taste and occasionally scaly and painful ulcerations of the oral mucosa, swelling of the parotid gland and burning in the perianal region (Nicolosi *et al.*, 2011; Flötra *et al.*, 1971; Bolanowski *et al.*, 1995).

However, as chlorhexidine mouthwash has beneficial effect as regards the reduction of oral microorganisms, and can be used as a preventive measure to the onset of VAP. Thus, the topical use of chlorhexidine in the oral hygiene of hospitalized patients and mechanically ventilated can promote the reduction of bacterial colonization in the oral cavity, thereby reducing the incidence of VAP (Van Strydonck *et al.*, 2009; Budtz-Jorgensen *et al.*, 1972). This procedure appears to be safe and well tolerated, since they have not shown significant side effects in any of the analyzed articles. In respect to the costs of a hospital stay, it can be said that the use of chlorhexidine in hospitalized patients is an efficient measure and is inexpensive (Lacaz *et al.*, 2002; Lang *et al.*, 2005; Lima *et al.*, 2004).

DISCUSSION

According to Law No. 7,498, of June 25, 1986, governing the regulation of nursing exercise in hospitals, attributing the daily care of hygiene and comfort, including oral hygiene, nursing technicians under the guidance and supervision of nurse (Brasil *et al.*, 1986). In an interview with 402 members of the

nursing staff of public and private institutions to know their opinion about the need for a dentist integrating the team and in response, 86% consider their necessary presence. (Pace *et al.*, 2008). This can be confirmed in a survey conducted in large public hospital where the medical clinic have 46 beds. In semi-structured interviews and non-participant observation of the nursing staff working in medical and surgical clinic. During the research period there was no offering dental care to these patients by nurses, found out in the structured observation, that nursing technicians take on average per shift 10-12 patients with all types of addictions. And they say that there is work overload and it undermines the execution of basic care such as oral hygiene and other bodily higenes (Passos *et al.*, 2011). Other research that relates to oral care and practices carried out by staff of the intensive care unit involving professionals working in the ICU of public and private hospitals, two hospitals with ICU, accounting for 25 beds with an average of 40 workers per team, and these professionals; 2 doctors, seven physiotherapists, one psychologist, 10 nurses, nursing 21 técnico and 2 auxiliary nurse providing care continues, with 84 % of these professionals have to admit the presence of a dentist present in the ICU (Cortizo *et al.*, 2014).

The nursing staff, currently responsible for the maintenance of oral incapacitated patient self-care, meets various difficulties at the time of cleaning, the presence of tracheal tube and SOG hindering access to the oral cavity for cleaning and prevents the closing of the mouth causing xerostomia and promotes the proliferation of plaque also face up to other instruments, such as: ribbons, laces, mouth retractors, among other materials used to support that occasionally obstruct the view of the oral cavity and limit their access (Araújo *et al.*, 2009). The main objectives of the nursing staff in the ICU is to promote health and prevent infections, under any circumstances, but one of the reasons presented by the staff and the "lack of knowledge regarding the procedure to downtime for the practical implementation and the physical limitations presented by the patient " (De Souza *et al.*, 2013) concern the lack of a standard technique or protocol of oral hygiene and the lack of relationship between the dental / nursing, culminating in poor hygiene.

When you think of hospital infection problem is more serious in the ICU when the patient is more exposed to the risk of infections, with a view to their clinical condition. Studies show that oral hygiene performed on ICU units are inadequate and inefficient, leading to the imbalance of the resident microbiota, increasing the possibility of acquiring secondary pathological compromising the patient's health (Van Strydonck *et al.*, 2009; Budtz-Jorgensen *et al.*, 1972; Carvalho *et al.*, 2003; Shulman *et al.*, 2005 and Santos *et al.*, 2008). It is believed that with the advances and studies regarding the presence of a dentist in intensive care units, bring important contributions to trust the scientific expertise of the dental professional will add in preventing and or improvement of the oral cavity condition and systemic, especially in critically ill patients (Morais *et al.*, 2006 and Santos *et al.*, 2008).

Conclusion

The oral care performed to hospitalized patients and especially in ICUs may represent significant improvement, with the

presence of a dentist working in intensive care units, spreading all its technical and scientific knowledge on dentistry and oral care for the nursing staff and provides staff with adequate training and availability of the correct hygiene practice.

Competing interests

The authors declare that they have no competing interests.

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