

**Lesões bucais em pacientes hospitalizados em unidade de terapia intensiva**  
**Mouth Injuries in Hospitalized Patients of an Intensive Care Unit**  
**Lesiones orales en pacientes hospitalizados en una unidad de cuidados intensivos**

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**Resumo**

As condições de saúde bucal dos pacientes em unidades de terapia intensiva (UTI) costumam ser muito precárias. Este estudo foi realizado na UTI para identificar lesões bucais dessa população. Estudo exploratório, descritivo e transversal. Os dados coletados incluíram idade, sexo, condição de higiene bucal, motivos de internação, alterações orais e manejo. Dois dentistas treinados realizaram os exames orais clínicos com espátulas de madeira e gaze estéril. Foram analisados 104 pacientes entre 19 e 92 anos ( $56,82 \pm 18,23$  anos), sendo 26 mulheres e 78 homens. A maioria dos pacientes apresentou boa higiene. O motivo mais comum de admissão foi lesão cerebral grave traumática. Cinquenta e nove pacientes (56,7%) apresentaram pelo menos uma lesão oral. As lesões mais frequentes foram secura labial (26,3%), úlceras traumáticas (UT) (20,0%) e revestimento da língua (20,0%). De acordo com nossos resultados, as úlceras traumáticas representam um desafio para os médicos, a participação de um dentista e um higienista dentário ajudaria a gerenciar e prevenir infecções dessas lesões, tornando uma equipe verdadeiramente interdisciplinar essencial para a rápida recuperação de pacientes em UTI.

**Palavras-chave:** Unidade de terapia intensiva; Lesões orais; Hospital; Prevenção; Higiene oral.

**Abstract**

Oral health conditions of patients in intensive care units (ICU) is often very precarious. This study was conducted in the ICU to identify oral changes of this population. Material and

Methods this was an exploratory, descriptive and cross-sectional study. The data collected included age, gender, oral hygiene condition, reasons for hospitalization, oral changes and management. Two trained dentists performed the clinical oral examinations using wooden spatulas and sterile gauze. 104 patients between 19 and 92 years of age ( $56.82 \pm 18.23$  years) were analyzed, comprising 26 women and 78 men. Most of the patients presented good hygiene. The most common reason for admission was traumatic severe brain injury. Fifty-nine patients (56.7%) had at least one oral lesion. Most frequent lesions were lip dryness (26.3%), traumatic ulcers (TU) (20.0%) and tongue coating (20.0%). According to our results, traumatic ulcers represent a challenge for physicians, the participation of a dentist and a dental hygienist would help to manage and prevent infections of these lesions, making a truly interdisciplinary team essential for the quick recovery of ICU patients.

**Key words:** Intensive care unit; Oral lesions; Hospital; Prevention; Oral hygiene.

### Resumen

Las condiciones de salud bucal de los pacientes en unidades de cuidados intensivos (UCI) suelen ser muy precarias. Este estudio se realizó en la UCI para identificar lesiones orales en esta población. Estudio exploratorio, descriptivo y transversal. Los datos recopilados incluyeron edad, sexo, condiciones de higiene bucal, razones de hospitalización, cambios orales y manejo. Dos dentistas capacitados realizaron los exámenes clínicos orales con espátulas de madera y gasas estériles. Se analizaron 104 pacientes entre 19 y 92 años ( $56.82 \pm 18.23$  años), 26 mujeres y 78 hombres. La mayoría de los pacientes tenían buena higiene. La razón más común para el ingreso fue una lesión cerebral traumática grave. Cincuenta y nueve pacientes (56,7%) tenían al menos una lesión oral. Las lesiones más frecuentes fueron labios secos (26.3%), úlceras traumáticas (UT) (20.0%) y revestimiento de la lengua (20.0%). Según nuestros resultados, las úlceras traumáticas representan un desafío para los médicos, la participación de un dentista y un higienista dental ayudaría a controlar y prevenir infecciones por estas lesiones, lo que hace que un equipo verdaderamente interdisciplinario sea esencial para la recuperación rápida de pacientes en la UCI.

**Palabras clave:** Unidad de cuidados intensivos; Lesiones orales; Hospital; Prevención; Higiene oral.

### 1. Introduction

The oral health of patients in intensive care units (ICUs) is often very precarious. Such

patients may present with oral pathological changes that cause periodontal diseases, biofilm accumulation, tongue coating, and mucosal lesions due to tracheal intubation and that even encourage the development of nosocomial pneumonia (Halm & Amola, 2009; Kahn et al., 2008; Matsuo et al., 2016; da Silva et al. 2020).

The poor oral hygiene of these patients allows the colonization of pathogenic microorganisms, particularly respiratory pathogens. Oral health maintenance in ICU patients can enable better control over the spread of oral infection in these medically compromised patients, thereby minimizing the relationship between lung disease and oral health (Berry et al., 2007, Halm & Amola, 2009; Kahn et al., 2008; Galhardo et al., 2020; Purwanegara et al., 2018).

Mouth injuries can influence medical therapy because of the virulence factors of microorganisms found in these diseases, which can worsen and have other effects on the patients; these effects are reflected in the systemic condition of the patients. Current data indicate that oral problems, especially periodontal disease, can act as a focus for the dissemination of pathogens, particularly in immunocompromised patients (Li et al., 2000). There are a few studies in the literature that have evaluated the prevalence of mouth injuries in ICU patients.

Carrilho Neto et al. (2011) examined 82 hospitalized patients and found 38 (69%) with poor oral hygiene, 58 (98.1%) with gingival inflammation, 41 (74.5%) with periodontal disease, and 30 (36.5%) with oral lesions, with candidiasis being the most common mucosal lesion. Recently, a study of the prevalence of oral lesions in hospitalized patients with infectious diseases in northern Brazil found that periodontal diseases and candidiasis were the most prevalent diseases in both genders, followed by recurrent aphthous ulcers, saburral tongue, simplex herpes, and squamous cell carcinoma (Gemaque et al., 2014).

The objectives of this study were to assess ICU patients and to identify the presence of mouth injuries of this population.

## **2. Methods**

This was an observational, descriptive, cross-sectional study that evaluated a convenience sample of patients in the ICU for six months (January to June 2014). The project was evaluated by the Research Ethics Committee - UNITAU and the Ethics Committee of the Regional Hospital of Vale do Paraíba / SP (CAAE-23128813.3.0000.5501). Data were extracted from the medical records of patients using a research protocol created especially for this project. A specific data collection form was designed for this study. Data consisted of age,

gender, reasons for hospitalization, and descriptions of the mouth injuries found and of their management. Clinical examinations were conducted on the patients while they were in bed. Wooden spatulas and sterile gauze were used for this evaluation. The entire oral cavity, including the teeth, gums, oral mucosa, palate, tongue and floor of the mouth, was examined.

The clinical signs of dry mouth were observed according to the absence or presence of the following aspects: saliva coating on most of the dorsum of the tongue, buccal mucosa and lips, and the absence of saliva on the floor of the mouth (Longman et al., 2000; Farsi, 2007).

An experienced dentist performed the exams. Abnormalities of oral mucosa were evaluated according to the diagnostic criteria described in the World Health Organization (WHO Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases- Longman et al., 2000).

The following oral manifestations were evaluated: the presence/absence of microbial plaque and/or biofilm accumulation, hematoma on lips and the floor of the mouth, angular cheilitis, traumatic ulcers, lip traumatic ulcer bleeding, lip dryness, signs of drooling and dry mouth, and coated tongue.

The inclusion criteria included all patients who were admitted to the ICU for any reason. Those responsible for the patients provided written, informed consent.

### **3. Results**

We analyzed 104 ICU patients. The patient ages ranged from 19 to 92 years, with a mean age of  $56.82 \pm 18.23$  years, and the study cohort included 26 women ( $61.12 \pm 15.79$  years old) and 78 men ( $56.82 \pm 18.23$  years old).

Regarding oral hygiene status, 84 patients had good hygiene, 18 had fair hygiene, and two had poor hygiene. Of the reasons for admission to the ICU, trauma brain injury/polytrauma (23 cases) was the most frequent, followed by laparotomy (10 cases). All reasons for hospitalization are shown in Table 1.

**Table 1.** Reasons for hospitalization of the patients in the ICU.

<b>Reasons</b>	<b># cases</b>
<b>Trauma brain injury / polytrauma</b>	23
<b>Laparotomy</b>	10
<b>Respiratory failure</b>	8
<b>Angioplasty</b>	6
<b>Brain tumor</b>	5
<b>SCI (spinal cord injury)</b>	4
<b>Craniotomy</b>	4
<b>Pneumonia</b>	4
<b>Hemorrhagic stroke</b>	3
<b>Acute renal failure</b>	2
<b>Subdural hematoma drainage</b>	2
<b>Others</b>	33
<b>TOTAL</b>	<b>104</b>

Source: Authors.

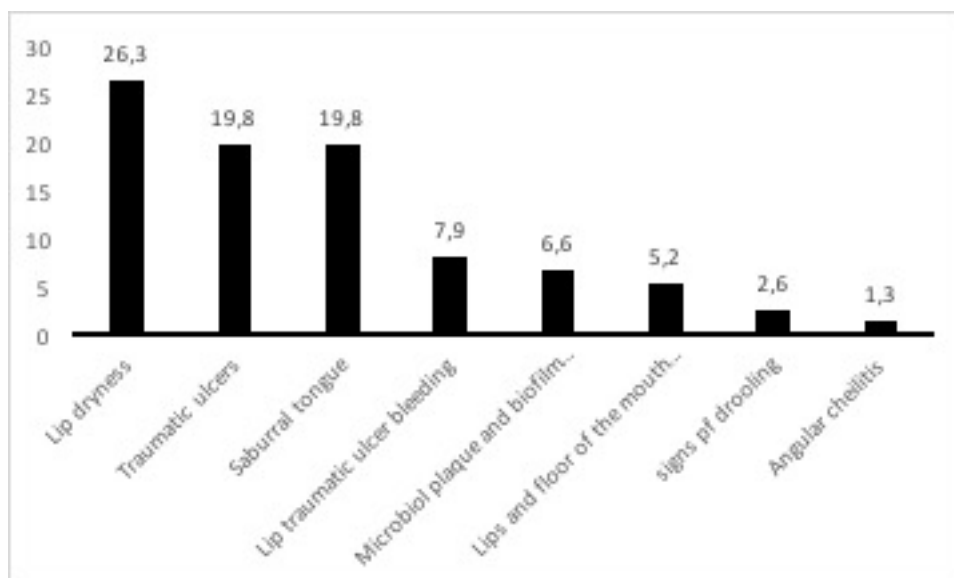
A total of 59 patients (56.7%) had at least one oral lesion (Table 2). Different oral injuries were found in the patients evaluated. The most prevalent injuries (lesions) that were found included lip dryness (26.3%), traumatic ulcer (19.8%) and sublingual tongue (19.8%). Figure 1 shows the most frequent oral mucosal injuries by the percentage of the population studied, and the clinical aspects of oral changes found are demonstrated in Figure 2. It was found that traumatic ulcer lesions located in the upper lip region were more related to the position of the tracheal tube.

**Table 2.** Distribution of the number of lesions found in the ICU patients (values in parentheses are percentages).

# of lesions	# of patients (%)
0	45 (43.3%)
1	46 (44.2%)
2	9 (8.7%)
3	4 (3.8%)
<b>Total</b>	<b>104 (100.0%)</b>

Source: Authors.

**Figure 1.** Graphical representation of oral mucosal injuries found in the patients (percent).



Source: Authors.

**Figure 2.** Clinical aspects of oral injuries: A – C, traumatic ulcers; D, lip traumatic ulcer bleeding; E, signs of drooling; F, saburral tongue; G, lip hematoma; H, angular cheilitis; I, dry lips and traumatic ulcers.



Source: Authors.

#### 4. Discussion

Although oral medicine is still not a globally recognized specialty, the role of dentists, as part of a multidisciplinary team, is already a reality in several Brazilian hospitals, helping to improve the oral health conditions of hospitalized patients (Gemaque et al., 2014; Morais et al., 2006)

Pineda et al. (2006) showed that many types of pathogens in the oral cavity are found in intubated patients, who are most affected by respiratory pathogens. da Cruz et al. (2014) showed that patients had an increased accumulation of bacterial plaque and tongue coating within 72 hours after the initial assessment, suggesting that the length of hospital stay is a key factor in the occurrence of bacterial accumulation. In a study on terminal cancer patients, the authors found that tongue inflammation, dry mouth, bleeding spots, tongue coating and candidiasis were the most frequent oral lesions (Mori et al., 2006). The present study found that various oral lesions in the upper lip region were probably related to the position of the oral and nasotracheal tubes. Oral trauma caused by the endotracheal tube is most prevalent in ICU patients, and nosocomial pneumonia, caused by mechanical ventilation, is one of the main causes of death by septic shock in the ICU (Li et al., 2000).

Another study obtained results similar to those of the present study, determining that most of the injuries were caused by the endotracheal tube position. This study determined the incidences of lip dryness (26.3%), traumatic ulcers (19.8%), traumatic ulcer bleeding (7.9%), tongue coating (19.8%), biofilm accumulation (6.6%), hematoma in the lip and mouth floor



(5.2%), hypersalivation (2.6%), and angular cheilitis (1.3%). For the treatment of injuries, the following clinical approaches were used: for traumatic ulcers, bleeding ulcers and traumatic angular cheilitis, triamcinolone acetonide cream was applied three times a day; for lip and floor of the mouth hematoma and lip dryness, mineral oil was used; and for tongue coating, a treatment of 8.4% baking soda was applied. The present study determined that ICU patients are at high risk of developing oral alterations, such as lip dryness, which must be associated with low salivary flow and xerogenic medications taken by patients. Traumatic ulcer lesions are usually caused by poor attachment of the tracheal tube, and tongue coating is usually due to decreased salivary flow and bacterial accumulation. To improve the patient's condition during the hospital stay, the orotracheal tube position was reviewed with the nursing staff. In the studies analyzed, there was generally no oral cavity infection control protocol found in public or private hospitals. In contrast, in the hospital in which the present study was conducted, an oral care protocol is performed twice daily, which explains the good hygiene status of the patients of this study.

Due the small sample size, these results should be considered as preliminary data, further studies should be performed with a larger number of patients and involving multi centers (institutions/ICUs).

In 2009, Halm & Armola demonstrated that patients on mechanical ventilation showed greater amounts of biofilm and increased colonization of pathogens in the oropharynx beyond nosocomial pneumonia. Intervention measures for the prevention of oral diseases and traumas include the use of chlorhexidine gluconate (0.12%) and guidance to a multidisciplinary team to improve the placement of the endotracheal tube, thus preventing both the colonization of bacteria and oral trauma.

Other studies showed that critical patients in ICUs should receive oral care as soon as possible, as oral colonization by respiratory pathogens occurs within 72 hours after ICU admission (Matsuo et al., 2016; Pires et al., 2011).

Another measure is to include a clinical examination of the oral condition and an intra-physical examination of the mouth in which the dentist evaluates bleeding, changes in mucosa, ulcers, dental conditions, the quantity and quality of saliva, halitosis and trauma to diagnose the oral condition of the recently admitted ICU patient. From these observations, the dentist can guide and train the nursing staff, thus highlighting the importance of oral hygiene. The reduction in the infection rate demonstrates that the dentist can and should be part of the multidisciplinary hospital team (Araújo et al., 2009).

Among the 104 patients analyzed, only two presented poor oral hygiene, 18 presented

with fair oral hygiene, and 84 presented with good oral hygiene. A cleaning protocol using chlorhexidine gluconate (0.12%) administered to all patients in the ICU twice a day could explain the high-quality results achieved due the presence of a dentist and nursing staff with dental training. The oral hygiene condition was verified, but it should be made clear that it was not part of the main objective of the study. Because there is a dental plaque / biofilm control protocol already established with the use of chlorhexidine, we only verify the amount of plaque and we certify with the results that this protocol is being effective in this ICU. It is essential that ICU patients have oral hygiene care during their stay to prevent oral diseases and possible complications (Purwanegara et al., 2018; Santos et al., 2008)

In conclusion, the main finding of this study was the presence of traumatic oral ulcers arising primarily from poor positioning of the orotracheal tube and mucosal dryness. It is important to have the presence of a dentist within a multidisciplinary team to conduct biofilm control in the oral cavity, thus preventing contamination of these injuries, promoting oral health, and improving the overall clinical status of ICU patients.

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