Evaluation of preoperative oral hygiene in patients with maxillofacial fractures: a retrospective clinical study

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Abstract

The purpose of this study was to establish the oral epidemiological profile of patients admitted in a public hospital in the state of Ceará in the immediate preoperative period using the Simplified Oral Hygiene Index (IHO-S). This is a cross-sectional retrospective study of 40 male patients and 4 female patients hospitalized who underwent surgical treatment of maxillofacial fractures. The mean age of the patients was 31.27 years, presenting 21 patients (52.5%) with good oral condition, 18 patients (45%) with regular condition and only 1 (2.5%) with poor oral condition. Although oral hygiene has been considered good, studies that emphasize the removal of bacterial biofilms should be performed for patients who have obtained the worst results, in order to reduce the problems that these poor results may cause. Through this study the importance of the dental surgeon in a hospital environment is apparent, acting in the treatment and prevention of factors associated with the oral cavity during the period of hospitalization.

Keywords: IHO-S; Oral Hygiene; Maxillofacial Trauma.

Introduction

According to the World Health Organization, the promotion of oral health as a strategy to reduce diseases arising from the oral cavity and maintenance of oral health, which affect the health of individuals, consists of

several factors, among which is seen in general hygiene and adequate oral hygiene [1]. The study proposed by Greene and Vermillion (1964) sought to categorize individuals and groups according to the quality of their oral hygiene by obtaining an index capable of classifying the oral health status by observing the amount of visible bacterial plaque, therefore, the Simplified Oral Hygiene Index (IHO-S) was developed [2].

The oral microbiota is harmoniously related to the host, but due to several factors, it can become pathogenic, causing health risks. Oral hygiene has been widely accepted as an important preventive practice that ensures better dental and systemic health. In addition, it has been described as a key factor to eliminate and prevent postoperative infection, since pre and post-operative contamination of the fractured site and the incidence of infection are related to the oral hygiene and dental condition [3].

The oral health situation has a direct impact on the general condition of patients, as outbreaks of infection, such as residual roots, gingivitis and the presence of bacterial plaque can accentuate underlying pathologies, as well as hinder healing processes [4].

The assessment of the oral condition and the need for dental treatment in hospitalized patients require monitoring by a qualified dentist, avoiding an increase in the proliferation of fungi and bacteria and, consequently, infections and systemic diseases that pose a risk to the patient's health [5-6].

Thus, the aim of this study was to ivestigate the oral epidemiological profile of patients hospitalized at the Santa Casa de Misericórdia de Fortaleza, Ceará, in the immediate preoperative period, using the IHO-S.

Material and methods

This research was characterized as a quantitative, observational, retrospective, descriptive, cross-sectional study. It was carried out at the Maxillofacial Surgery Sector of the Santa Casa da Misericórdia de Fortaleza (SCMF), a reference center for the treatment of patients with facial fractures, benign lesions of the stomatognathic system and dentofacial deformities, in the period between February 2016 and March 2017.

Inclusion criteria were being aged between 18 years and 100 incompletes years, in the immediate preoperative period of maxillofacial surgery performed at SCMF, for the treatment of maxillofacial fractures involving the oral cavity.

As exclusion criteria, patients who underwent maxillofacial surgery performed elsewhere were excluded;

patients who have not suffered fractures in the dentate region or who do not present sutures or intraoral soft tissue injuries; under 18 or over 100; who had any immunodeficiency, diabetes or hematological disorders; totally edentulous; and with allergy to the components of the mouthwashes used. Lectures were held in the wards and waiting rooms of the Maxillofacial Surgery Sector of SCMF, informing about the research project, and patients were instructed to contact the sector nurse if they were interested in participating in the research.

Patients who met the inclusion criteria were selected and filled out the Informed Consent Form (FICF) and then underwent oral health assessment using the IHO-S. In the evaluation of the IHO-S, the buccal surfaces of teeth 16, 11, 26 and 31 and lingual surfaces of teeth 36 and 46 were evaluated, which represent all sextants of the oral cavity. In the absence of one of these teeth, the examination was performed on the closest tooth.

Each surface examined was classified into 4 grades [2]:

● Grade 0 - absence of bacterial plaque (BP) or intrinsic stain;

● Grade 1 - presence of bacterial plaque covering no more than 1/3 of the examined surface or absence of BP, but with the presence of intrinsic stain;

● Grade 2 - presence of BP covering more than 1/3, but not more than 2/3 of the examined surface, with or without the presence of intrinsic stain;

● Grade 3 - presence of BP covering more than 2/3 of the examined surface.

After the examination, the values were added and divided by the number of surfaces examined, to result in the index value for that patient. With the establishment of the IHO-S, the quality of the patient's oral hygiene can be classified as [7]:

● Good: IHOS between 0.0 and 0.6;

● Regular: IHOS between 0.7 and 1.8;

● Bad: IHOS between 1.9 and 3.0.

The IHO-S was performed in the immediate preoperative period (T0), by one of the calibrated evaluators. The data obtained were analyzed with the help of Microsoft Excel® (Microsoft, United States of America) and Statistical Package for Social Sciences® (SPSS®) programs, with t-tests for independent samples and chi-squared being performed, with the purpose of to identify whether there are significant differences between specific age ranges.

Results

The sample of the present study consisted of 40 male patients and 4 females; due to the difficulty in

attracting female subjects to participate in the research, the 4 women were removed during the data analysis so that a statistical bias was not generated.

Table 1 shows the IHO-S values (Mean = 0.74; Standard Deviation = 0.47), as well as the age of the patients, who were in a range between 18 and 55 years (M = 30.90; SD = 9.85).

Table 1. Descriptive analysis of patients evaluated according to age and IHO-S.

	N	Minimum	Maximum	Mean	Standard Deviation
Age	40	18.0	55.0	30.900	9.8496
OHI-S	40	.00	2.00	.7418	.47063
Valid N	40	-	-	-	-

According to the IHO-S, Table 2 illustrates the percentage and number of patients in each classification of the Index. It can be observed that 21 patients had good oral hygiene, 18 had regular hygiene and only 1 had poor hygiene.

Table 2. Quality of oral hygiene according to the IHO-S classification.

Classification	N	%
Good (0,0 - 0,6)	21	52.5
Regular (0,7 – 1,8)	18	45.0
Poor (1,9 – 3,0)	1	2.5
Total	40	100.0

In addition, in order to verify whether the IHO-S differed for people in different age groups, a t-test for independent samples was performed. Two groups were established, based on the median, with intervals between 18 and 28 years (Group 1) and 29 to 55 years (Group 2). The t test indicated that there was no significant difference between groups (t = -0.349, p = 0.68). The chi-square test was also performed between the same age groups, which showed that there was no significant difference either ($x2$ (2) = 3.084, p = 0.214).

Discussion and Conclusion

Facing the need to categorize individuals and groups according to their oral hygiene, a study proposed by Greene and Vermillion [2] developed the Simplified Oral Hygiene Index in order to help as a resource in the study of: periodontal disease and calculus epidemiology, evaluation of toothbrushing, evaluation of oral health

practices in communities and short- and long-term health education activities.

The IHO-S is considered a method of easy application, fast (approximately 1 minute per person) and with satisfactory precision for the assessment of groups and individuals, and it can be used safely [2]; therefore, it was chosen for the assessment of oral hygiene of patients in this study.

The absence of adequate oral hygiene provides favorable conditions for bacterial growth in the dental plaque so that the oral health condition reflects on the patient's health status. A greater quantity and differentiation of dental biofilm can provide interactions between native bacteria and respiratory pathogens, favoring the development of infections [7]. Thus, the dental surgeon is the responsible professional for spreading knowledge of oral hygiene to patients, caregivers and auxiliary staff, so that this is incorporated into the hospital routine. This action is important, as the dental biofilm of hospitalized patients is colonized by more virulent microorganisms than those found naturally in healthy individuals, consequently the risk of infection is high [8].

Patients affected by facial trauma may suffer injuries, in addition to bone tissue, in their adjacent tissues, making it difficult to clean the oral cavity, with a consequent increase in the amount of bacterial plaque. Cleaning the oral cavity contributes to the reduction of biofilm and, consequently, prevents the occurrence of secondary infections, providing a better healing process [9]. In addition, studies have shown that the use of mouthwashes associated with conventional methods of oral hygiene can influence the wound healing, the decrease in the level of bacterial plaque, and also reduce postoperative pain [10-11].

Studies have also shown that poor oral hygiene was an important variable in determining the outcome of treatment after fracture management. It was found that patients who made the association of smoking and poor oral hygiene had bone loss after ten years compared to non-smokers. It seems that patients with poor oral hygiene and substance abuse combined have a strong relationship with post-operative complications after the treatment of mandible fracture, increasing them significantly [12].

In contrast to previous exports, a study comparing the association of bacteremia with maxillofacial surgeries reports that neither gingival inflammation nor oral hygiene affect the occurrence of bacteremia, suggesting that the level of oral hygiene care is not a direct risk factor for bacteremia after surgical procedures [13].

The presence of an unfavorable oral condition impairs the prognosis of patients with systemic impairment, so that oral infections may contribute to the establishment of systemic inflammatory manifestations. Therefore, oral hygiene is not restricted to a matter of comfort and well-being, but rather to a procedure that enables the prevention of the development of diseases caused by pathogens originating from the oral cavity [14].

In order to prevent oral infections to cause systemic consequences, it is extremely important the presence of a dentist in the hospital environment, so that the diagnosis of oral changes can be made and the consequent assistance of the medical therapy; whether in emergency procedures such as trauma or abscesses, procedures that prevent the aggravation of the systemic disease or the establishment of a hospital infection and curative procedures, such as the adequacy of the patient's oral environment [15].

Studies have shown that a greater number of maxillofaial traumas was associated with male patients aged between 18 and 28 years. In addition, motorcycle accidents, physical violence and alcohol consumption were expressed as the most common etiological factors in that order, with the maxilla followed by the mandible of the most affected bones [16], corroborating the fact that this research presents a greater number of men in detriment of the number of women.

In the present study, 21 patients (52.5%) had good oral condition, 18 patients (45%) had regular condition and only 1 (2.5%) had poor oral condition, in agreement with a study that associates bacteremia with procedures of maxillofacial surgeries in which he obtained that 83.9% of his sample group was categorized between good and regular oral condition [13].

During a search performed in the Pubmed and Google Scholar databases with the descriptors "IHO-S" AND "maxillofacial fractures" and "oral hygiene" AND "maxillofacial fractures", in the last five years, we did not obtain any search results that could make the correlation of them, which indicates the absence of studies in patients with maxillofacial fractures, emphasizing the importance of this study for the knowledge of the quality of oral hygiene in patients of the aforementioned profile.

In addition, in this study, it was not possible to carry out the IHO-S assessment at the time of admission of the patients, a factor that could give us greater accuracy of the initial oral health status, since the dentists who perform daily follow-up of patients between the periods of admission and surgical treatment follow the protocol of the

Maxillofacial Surgery and Traumatology Service (CTBMF) of the Irmandade Beneficente da Santa Casa da Misericórida in Fortaleza, which consists of recommendations to patients regarding the importance of oral hygiene.

In conclusion, the oral hygiene assessment of patients evaluated according to the IHO-S was considered good, according to the IHO-S, however, as many had regular hygiene, there is a need for monitoring and professional intervention to stimulate oral hygiene. In addition, for those patients who obtained the worst results, actions that emphasizes the removal of bacterial biofilm should be carried out, seeking to reduce the problems that these poor results can cause. There was no significant difference between age ranges specified in the study.

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