



Oral lesions associated with the use of dental prostheses

Lesiones bucales asociadas al uso de prótesis estomatológicas

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ABSTRACT

Removable dental prostheses restore aesthetics and function after tooth loss, which contributes significantly to the quality of life of their wearers; however, paraprosthetic tissues are exposed to injuries when the instructions for use, care and hygiene are not followed. The objective was to analyze the behavior of the most frequent oral lesions associated with the use of dental prostheses. A bibliographic review was carried out; During the research process, methods of the theoretical level (analytical-synthetic, inductive-deductive, historical-logical analysis, system approach) and empirical (documentary analysis) were used. A total of 78 bibliographies, published in scientific journals or documents issued by international institutions or organizations, were analyzed. The research analyzed shows that the most frequent oral lesions associated with the use of removable dental prostheses are: underprosthesis stomatitis, traumatic ulcers and fissured epulis. These develop from a set of causal factors that act synergistically or not, such as: poor oral hygiene, misadjusted prostheses and prolonged use for more than 5 years. In the studies consulted, women were the most affected by this type of lesion, as well as patients over 60 years of age.

Keywords: Oral lesions; Removable dental prostheses; oral cancer; Subprosthetic stomatitis.

RESUMEN

Las prótesis estomatológicas removibles restauran la estética y función tras la pérdida dentaria, lo que contribuye significativamente a la calidad de vida de sus portadores; sin embargo, los tejidos paraprotéticos se exponen a lesiones cuando no se cumplen las instrucciones de uso, cuidado e higiene de las mismas. El objetivo fue: analizar el comportamiento de las lesiones bucales más frecuentes asociadas al uso de prótesis estomatológicas. Se realizó una revisión bibliográfica; durante el proceso de investigación se utilizaron métodos del nivel teórico (analítico-sintético, inductivo-deductivo, análisis histórico-lógico, enfoque de sistema) y empírico (análisis documental). Se analizaron un total de 78 bibliografías, publicadas en revistas científicas o documentos emitidos por instituciones u organismos internacionales. Las investigaciones analizadas arrojan que las lesiones bucales más frecuentes asociadas al uso de prótesis estomatológicas removibles son: estomatitis subprótesis, úlceras traumáticas y épulis fisurado. Estas se desarrollan a partir de un conjunto de factores causales que actúan sinérgicamente o no, como son: la higiene bucal deficiente, prótesis desajustada y el uso prolongado por más de 5 años. En los estudios consultados el sexo femenino fue el más afectado por este tipo de lesiones, así como los pacientes mayores de 60 años.

Palabras clave: Lesiones bucales; Prótesis estomatológicas removibles; Cáncer Bucal; Estomatitis subprótesis.

INTRODUCTION

Oral health and general health are interrelated in unidirectional and bidirectional ways, promoting positive synergisms. Conversely, the same occurs in the disease state; the presence of oral imbalances affects a person's general condition, and the general condition also affects oral disease, with 1 affecting the other or mutually worsening each other.(1)

According to the World Health Organization (WHO), edentulism is a physical disability, as it limits 2 essential functions for life: nutrition and the ability to interact socially. The prevalence of this disease in the international adult population ranges from 2% to 80%.(2) Its effects, in terms of functional deterioration and decreased quality of life, are considerable and costly.

According to the Statistical Yearbook of Health of the Republic of Cuba, 162 682 prosthesis consultations were performed in 2021 (3), 391 469 in 2022 (4), 353 788 in 2023 (5), and 461 465 in 2024 (6). These data suggest the growing impact of edentulism on the Cuban population.

The removable stomatological prosthesis is a rehabilitative treatment that restores functions of the stomatognathic apparatus, such as mastication, phonetics, and facial aesthetics, thereby favoring the individual's quality of life. The correct fabrication and adaptation of the prosthetic device to the oral cavity by professionals, as well as its use and care by the patient, constitute the essential aspects that guarantee the achievement of the functional and aesthetic objectives of the rehabilitation (7).

Poorly fabricated or inadequately maintained prostheses, which have inevitably lost their qualities because the wearer continues using them beyond the required time, contribute to the appearance of lesions in the oral tissues (8). An inflammatory lesion is a tissue that presents morphological changes, with greater probabilities of evolving into a potentially malignant lesion (9-11).

Generally, edentulous patients stop attending stomatological services for timely check-ups because they report being edentulous or without discomfort, except when they attend due to fracture or misfit of the prosthetic device. This circumstance prevents specialists from performing timely and preventive detection of conditions in the oral cavity, mainly inflammations and lesions (9,10).

Thus, covering the masticatory mucosa with any prosthesis that does not comply with biomechanical principles constitutes a non-physiological mechanical aggression to the tissue. The pressure, traction, and thrust thereby produced can cause tissue irritation. When these forces are of greater intensity, they represent a pathogenic stimulus that disrupts tissue equilibrium and leads to tissue irritation, accompanied by inflammatory reactions, such as denture stomatitis, fissured epulis, and traumatic ulcer.(11,12)

For this reason, these lesions, although benign, are a concern for the stomatologist who detects them. An ill-fitting prosthesis, in synergy with other risk factors, can cause these lesions to evolve into potentially malignant lesions.

A potentially malignant lesion is a morphologically altered tissue in which oral cancer may arise more easily than in equivalent normal-appearing tissue. Such lesions are reversible and include leukoplakia, erythroplakia, and inverted smoker's palate.(13)

According to the American Cancer Society Manual, cancer is defined as a neoformative process of polycellular and locotissular origin, characterized by cytological dedifferentiation, autonomy from local and general homeostasis, infiltrative properties with cytolysis of adjacent normal tissue, and the capacity to metastasize to other regions of the body.(13)

A risk factor is an attribute or characteristic that confers on the individual a variable degree of susceptibility to contracting a disease or health alteration. The main risk factors associated with the onset of oral cancer are: smoking, alcoholism, ingestion of hot, acidic, and spicy foods, ill-fitting dentures, sharp teeth, stress, poor oral hygiene, and constant sun exposure.(13)

Oral cancer is among the ten leading sites of cancer incidence in the world. According to the OMS, around 380 000 new cases of oral cancer are diagnosed each year. According to the Statistical Yearbook of Health of Cuba, in 2021 there were a total of 888 deaths from cancer of the lip, oral cavity, and pharynx. It constitutes the fourth cause of mortality from malignant tumors in males; that year there were 729 deaths for a rate of 12.2 x 100 000 men, while in females 159 deaths were reported for a rate of 2.8 x 100 000 women. The most affected in both sexes were patients aged 60-79 years, with 400 deaths for a rate of 40,3 in the case of males and 72 deaths in females for a rate of 7,1 (3).

In 2022, 776 deaths from cancer of the lip, oral cavity, and pharynx were reported among males, for a rate of 14.1 x 100 000 men; while among females there were 191 deaths, for a rate of 3.4 x 100 000 women. The most affected age group in both sexes was 60-79 years, with 426 male deaths for a rate of 47.5 and 111 female deaths for a rate of 11.(4)

In 2023, 730 deaths from cancer of the lip, oral cavity and pharynx were reported in the male

sex for a rate of 14,4 x 100 000 men; while in the female sex there were 203 deaths for a rate of 3,9 x 100 000 women. The most affected age group in both sexes was 60-79 years, with 386 male deaths for a rate of 40,8 and 93 female deaths for a rate of 8,7; in second place, the most affected age group was 40-59 years with 235 male deaths.(5)

In 2024, there were 816 deaths from cancer of the lip, oral cavity, and pharynx in the male sex for a rate of 16,7 x 100 000 men; while in females, 197 deaths were reported for a rate of 3,9 x 100 000 women. The most affected age group was 60-79 years, with 435 male deaths for a rate of 45,1 and 101 female deaths for a rate of 9,3.(6)

Chronic and repeated trauma at the same site over a prolonged period may contribute to the development of oral squamous cell carcinoma, as noted by Santana Garay (13-15).

Removable prostheses are a valuable alternative for masticatory dysfunction; however, they are not exempt from causing oral injuries. These injuries, combined with the tissue susceptibility produced by aging or inadequate lifestyles, can generate significant alterations in the mucosa and the bones of the oral cavity, and above all, the appearance of lesions that can range from the simplest to malignant ones, causing a major health problem for individuals and society. Therefore, at present, removable prostheses can be considered risk factors. An ill-fitting removable prosthesis can generate irritations that initially cause symptoms such as pain; in addition, the irritation can advance and develop a pathology that is more difficult to treat. Poor hygiene promotes the proliferation of bacteria in the oral cavity and in the prosthetic device. In partially edentulous patients, it can cause caries in the teeth and periodontitis, degenerating the supporting tissues. In totally edentulous patients, it can cause the accumulation of biofilms on the artificial teeth and on the internal base of the prosthesis (16,17).

For the reasons described above, the authors established the following objective: to analyze the behavior of the most frequent oral lesions associated with the use of removable prostheses.

DEVELOPMENT

Prosthetic devices constitute a foreign body within the oral cavity and maintain a harmonious relationship with the contact tissues, forcing the tissues to react and adapt to new situations. However, negative cytological changes that may be harmful can occur in the supporting mucosa. Numerous studies have reported the appearance of oral lesions associated with the use of dental prostheses.

In Ecuador, a study was carried out with a sample of 307 patients with removable prostheses, where 52.8% of those examined presented subprosthetic stomatitis, with a predominance of females (61.0%) and the age group of 40 to 59 years with 54.6%. Grade II lesions were more frequent in patients with partial prostheses, with a time of use of more than 5 years. 76.2% stated that they did not have rest periods. Most of those examined were asymptomatic.(18)

A study conducted in Cienfuegos, Cuba, in 2016 reported that among 59 patients with subprosthetic stomatitis, 57.6% were female; grade I lesions were present in 37.3% of the females. Males accounted for 42.4% of the studied sample, with grade I stomatitis observed in 27.1% of the men. One case of grade III lesion occurred in a female aged 60-74 years. One analysis of risk factors showed poor oral hygiene in 81.4% of the sample; deficient prosthesis hygiene and continuous use of the prosthesis were found in 88.1%. Ill-fitting prostheses were reported in 71.2% of patients. Smoking was present in 47.5%, allergies in 18.6%, consumption of hot foods in 6.8%, and diabetes mellitus in 5.1%.(19) Patients aged 35-59 years accounted for 15.3%, and those aged 20-34 years for 3.4%.

In the authors' opinion, this condition can appear at any age in a removable denture wearer as long as the causal factors are present, and it can progress to grade III as it becomes chronic over the years, conferring a high risk of developing oral cancer.

In another study conducted in the same province in 2017, it was found that, of a total of 37 patients studied, 78.4% continuously used the prosthesis; grade II subprosthesis stomatitis predominated at 59.5%; and the greatest number of lesions was found between 11 and 20 years of prosthesis use, accounting for 51.4% of the patients.(20)

In a study carried out in a dental clinic in Cienfuegos in 2020 in 48 patients wearing dental prostheses with the presence of lesions, the most affected were women, with 70.9%. The age group most affected by oral lesions associated with the use of dental prostheses was 65-69 years old, with 45.4%. Subprosthetic stomatitis accounted for 90.2% of all lesions, followed by fissured epulis (7.8%). The presence of lesion was associated in 54.5% of cases with the time of use of 5-9 years. Continuous use and the presence of mismatched prostheses were more frequently evidenced, represented in 76.4% and 70.9%, respectively.(21)

Cardentey and colleagues conducted a study in Havana with 83 patients who presented with denture stomatitis, where a predominance of grade II lesions was found at 53.1%, as well as a duration of use of 5 to 9 years and continuous use in 66.3% (17).

One case of a 44-year-old male patient who attended consultation to renew his prosthesis was reported in Cuba. On oral examination, he presented a lesion of 10 years' evolution. He was diagnosed with fissured epulis, which was caused by an ill-fitting upper partial prosthesis with one fractured retainer whose end chronically injured the gingiva until it evolved into an epulis.(22)

Likewise, a case has been reported from Ecuador of a 58-year-old female, wearer of a maxillary complete denture with a use time of 7 years, who attended to have the lower denture made; on intraoral examination, a lesion compatible with fissured epulis was detected in the floor of the left maxillary vestibular sulcus. The biopsy revealed a well-differentiated and infiltrating squamous cell carcinoma (CCE).(23) The Greek term epulis means "on the gingiva"; currently, the appropriate term is prosthesis-induced fibrous hyperplasia. Overextended dentures in the mobile tissues of the oral mucosa produce chronic irritation; the most frequently affected areas are the vestibular sulci, although they may be observed in the frenulum; fractured or ill-fitting dentures can cause lesions on the gingiva.

It should be noted that both patients were aware of the lesions in their oral cavity and reported that they simply did not pay attention to them. In the authors' opinion, these cases demonstrate the urgent need to educate patients about lesions associated with the use of prostheses, so that they are aware of the risk to their life that this type of lesion can pose. Furthermore, these reported cases demonstrate that fractured or ill-fitting prostheses used for a prolonged period and not immediately repaired constitute a dangerous risk factor for the formation of chronic and malignant lesions.

Oral squamous cell carcinoma (CEB) represents 95 % of all oral cancers. Currently, it is considered a disease with a high mortality rate, and ranks sixth among causes of death.(13)

This disease is destructive and metastatic, capable of mutilating the sufferer by affecting the functions of the stomatognathic apparatus, such as phonation, mastication, and deglutition. It psychologically affects the patient due to the aesthetic and functional sequelae it generates, impacting their quality of life and their family and social environment.

Various studies agree that ill-fitting prostheses constitute a high-risk factor for the development of potentially malignant lesions and oral cancer in the different populations analyzed. 13,77,78

In the opinion of the authors of this research, there is a greater probability of prosthesis misfit the more years it is used and when used without rest periods, since the irrigation of the supporting tissues is affected and therefore their nutrition through oxygen and essential micronutrients, which manifests as bone loss with the inevitable misfit of the prosthesis. Therefore, rest of 6 to 8 hours is recommended, preferably during sleep hours, but if this is not possible for the patient, it can be done in intervals throughout the day; the important thing is not to skip this essential step. In addition, massage with the fingertip pad over the entire support area is recommended to promote tissue circulation.

In the study by Yero-Mier conducted in a stomatological clinic in Sancti Spíritus in 2020, titled "Paraprosthetic lesions in geriatric patients with removable prostheses" in one sample of 97 patients, it was reported that 49,5 % corresponded to patients aged 60 to 69 years and 66 % were female. The most frequent paraprosthetic lesions were subprosthesis stomatitis (55,6 %) and traumatic ulcer (31,9 %).(27)

In one study conducted at a Camagüey polyclinic in 180 patients older than 60 years, in 2014, 60 % were female and 40 % male. The predominant age group was 60 to 64 years. Subprosthesis stomatitis (33,19 %), traumatic ulcer (24,70 %), and fissured epulis (16,19 %) were the most manifested lesions. 63,96 % of the lesions were associated with ill-fitting prostheses. The period of prosthesis use up to 5 years was when more lesions appeared.(28)

One study conducted in another Camagüey polyclinic was reported in 2018 to describe the influence of stomatological prostheses as a risk factor for the appearance of premalignant and malignant lesions in the oral cavity. The study universe consisted of 88 patients wearing total and partial acrylic prostheses referred with suspicion of premalignant or malignant lesions, where 57,9 % of the premalignant or malignant lesions developed in the residual alveolar ridge. Of the prostheses in use, 77,2 % were ill-fitting and 23,8 % presented some type of fracture. 81,3 % of the prosthetic devices were inadequately cleaned and 43,7 % of the patients in the sample used their prostheses for 24 hours.(29)

In one systematic review conducted on a sample of 35 international publications to determine the main oral mucosal lesions associated with the use of stomatological prostheses in completely edentulous patients, the lesions were denture stomatitis (71,43 %), traumatic ulcer (28,57 %), and epulis fissuratum (54,29 %), with denture stomatitis being the most prevalent due to a set of factors

such as poor oral hygiene (17,14 %), ill-fitting complete denture (14,29 %), and prolonged use (14,29 %), with the female sex being the most affected by this type of lesion (65,71 %), as well as patients over 70 years of age (22,86 %).⁽³⁰⁾

Navarro-Nápoles et al. conducted one investigation in 2016 in a dental clinic in Santiago in a sample of 110 patients with removable prostheses, where 52,7 % of the patients had used their prostheses for more than 5 years, 58,2 % of the prostheses were ill-fitting, 83,3 % did not remove them for sleeping, poor oral hygiene predominated in males at 67,7 %, and 30,9 % smoked. Regarding patients' knowledge about oral hygiene, and the use and care of prostheses, 45,6 % reported not knowing that ill-fitting prostheses caused damage to health, and 38,2 % did not know that in that state they constituted a risk factor for the development of lesions or premalignant conditions.³²

At the Puentes Grandes Stomatological Clinic, Havana, a total of 150 geriatric patients wearing prostheses were treated from 2016-2018; with the purpose of characterizing compliance with biomechanical principles, care and conservation of the acrylic prosthesis in the aforementioned population. Female representatives (66%) and those in the age group between 60 and 74 years old (65.3%) predominated; in addition to the regular category (53.3%) in terms of the care and conservation of the prosthesis.³⁷

In a study carried out in 2020 in Sancti Spiritus in 50 patients over 19 years of age with partial prostheses, only 6% presented a good level of knowledge and 30% efficient oral hygiene; after the intervention, these variables were improved to 52% and 82%, respectively. 60% of the prostheses showed signs of poor hygiene, a parameter that decreased to only 4% after the intervention. ⁽³¹⁾ Similar results regarding the level of knowledge were reported by the research carried out at the "Celia Sánchez Manduley" Grandparents' Home, in Matanzas, where a quasi-experimental study was carried out in 63 elderly people where 66.7% presented poor oral hygiene before the intervention, a parameter that was reduced to only 7.9% after the intervention. Among their results regarding the level of knowledge, they indicate that only 1.6% had knowledge about the injuries associated with the use of prostheses and only 6.3% knew about prosthesis hygiene; 100% had no knowledge about the frequency of visits to the stomatologist; only 17.5% knew about the correct use and care of the prostheses. Once the intervention was applied, the level of knowledge in all aspects was considerably raised. ⁽³⁶⁾

Various studies indicate that the most frequent complications in rehabilitative treatment with removable prostheses are due to insufficient knowledge about the care and hygiene of the prostheses. In a removable prosthesis with poor hygiene, accumulation of oral biofilm with pathogen growth can be found, which generates halitosis, denture stomatitis, abundant tartar, and poor aesthetics, fractures of the appliance, and even systemic diseases such as bacterial endocarditis and respiratory diseases.⁽³⁹⁻⁴⁷⁾

The continuous use of prostheses prevents the oral mucosa from receiving the necessary rest in response to the tissue changes caused by the rehabilitative appliance; it also causes degeneration of the salivary glands and mechanical blockage of the excretory ducts, thus decreasing salivary secretion, its pH, and the buffer action of saliva, thereby favoring the accumulation of dentobacterial plaque. For this reason, many researchers give great importance to the daily wearing time and recommend a rest period of 6 to 8 hours per day, so that the tissues can oxygenate, recover, and the tongue can achieve self-cleaning. Artificial dentures, by remaining for long periods of time, can cause pain and instability during chewing, factors that, together with others, can lead to the development of lesions in the tissues that are in contact with the prosthetic appliance. ²⁹

In turn, prolonged use can act as a hyperplastic agent (increasing epithelial thickness) or lead to a break in continuity that favors the action of other promoting agents such as tobacco, alcohol, *Candida albicans*, and human papillomavirus.²⁹

Data reported by Navarro-Nápoles³² indicate that when the prosthesis is not in the mouth, it is advisable to store it in water; this prevents impacts and deformations, while also hydrating and better preserving the materials of which it is composed. This contrasts with the experience of the authors of the present article, who argue that keeping the prosthesis in a container with water overnight promotes the proliferation of pathogenic microorganisms on the device, as well as the adhesion of debris present in the water to its surface, given the porous surface of the acrylic material. For this reason, they recommend keeping the prosthesis in a dry and safe place, cleaning it before sleeping, and placing it in water for 5 minutes to hydrate it before insertion into the oral cavity. The oral cavity should be cleaned by brushing the teeth, cheeks, and tongue prior to placing the device. They also recommend brushing the oral tissues and the prosthesis after each meal with a toothbrush and toothpaste. They advise against the use of abrasive products or cleaning with volatile organic compounds, which deteriorate the prosthetic material and accumulate on its surface, releasing harmful chemical substances that can be absorbed by oral tissues.

Likewise, when the patient removes the prosthesis, it is advisable to massage the supporting mucosa, thereby improving blood supply, which will decrease tissue resorption. It is important for both patients and their caregivers to be aware of the advantages provided by these care considerations regarding the prosthesis.

Once the prostheses have been installed by the specialist, precise indications on the use and care of the prostheses should be given to the patient, and compliance with these indications should be monitored in subsequent follow-up appointments. In addition, they should be warned of the consequences of not complying with these indications.

Many patients are not aware of the damage caused by these risk factors and are unable to modify their behavior accordingly. Individuals need to be taught, and in this way they can develop and refine perceptual actions, as well as other aspects of this complex biopsychosocial process. To help improve the oral health of the population, it is necessary to educate them so that they discover and recognize the risk factors that affect their health; then medical care will be more effective.^{13,31,36,48}

Considering the previously analyzed aspects, the authors of this research concur with various researchers that insufficient knowledge among wearers of stomatological prostheses about their use, care, and conservation leads to their deterioration and misfit, with the consequent appearance of this type of lesion.

Despite the continuous efforts made by stomatology professionals to disseminate oral health care, the authors of this study believe that these efforts are still insufficient to increase knowledge about the use and care of stomatological prostheses and to promote appropriate attitudes toward oral health.

The authors of this study consider it essential to educate every patient receiving prosthetic rehabilitation on the importance of oral hygiene and denture care, on preserving the prosthesis, on performing oral self-examination, on attending periodic visits to the stomatologist, and on recognizing lesions associated with the use of prostheses.

In most studies on the subject, it is reported that its genesis is multifactorial, and among the possible causes are trauma caused by the denture, which includes the continuous use of the prosthesis, its poor hygiene, the irritant reaction and allergy to the base material, dietary factors, mycotic infection in which an important role is attributed to *Candida albicans*, stress, age, sex, salivary pH, harmful habits of the patient such as smoking and consumption of hot foods, use of irritant substances for cleaning prostheses, and systemic factors, including predisposing ones.⁶²⁻⁶⁵

Research conducted on the subject suggests that in women its appearance becomes more frequent due to increased capillary fragility from the second decade of life and to the presence of psychosomatic alterations, both those induced by stress and the menstrual period and those appearing during and after the climacteric, which influence oral tissues by altering irrigation, salivary flow, and the rate of circulating antibodies.

The greater involvement in females is attributed to their higher concern for aesthetics, which prompts them to seek prosthetic rehabilitation and retain the prosthetic device in the mouth for as long as possible, thereby increasing the likelihood of developing the condition. Additionally, because women attend stomatological consultations more frequently, the condition is detected more often in women than in men. Furthermore, women tend to use their prostheses for longer periods, as they do not accept being seen without them.

Several authors agree that the misadjusted prosthesis is a traumatogenic factor, even considering it the main cause of subprosthetic stomatitis.^{53,58,62}

Continuous use of the prosthesis has been shown to cause degeneration of the salivary glands and, consequently, mechanical blockage of their excretory ducts, thereby decreasing salivary secretion and pH due to reduced salivary buffer capacity.^{20,53,60}

Cardentey et al.¹⁷ found the greatest number of subprosthetic stomatitis cases in patients who used the prosthesis continuously.

CONCLUSIONS

The analyzed investigations show that the most frequent oral lesions associated with the use of removable dental prostheses are denture stomatitis, traumatic ulcers, and fissured epulis. These lesions develop from a set of causal factors that act synergistically or independently, including poor oral hygiene, ill-fitting prosthesis, and prolonged use for more than 5 years. In the studies consulted, the female sex was the most affected by this type of lesion, as well as patients older than 60 years.

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