

Most Common Oral Alterations in the Elderly – A Review

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SUMMARY The population of Brazil is experiencing a fast and progressive aging process. Oral mucosa, which has a function as a barrier, is compromised by the aging process, allowing the action of predisposing agents. The older the population, the greater is the prevalence of lesions in oral mucosa. The causes may be neoplastic, infectious, bone pathologies, oral manifestations of systemic diseases, nutritional deficiencies, dental prostheses, medicaments, and bullous diseases, among others. Examination of the oral cavity should be carried out as an annual routine, and as a preventive measure for the entire elderly population, in order to reduce the morbidity and mortality from these diseases.

KEY WORDS: elderly; mouth; oral mucosa; oral health; geriatric dentistry

INTRODUCTION

The Brazilian population is undergoing a fast and progressive aging process, caused by a decline of mortality and fertility rates. According to data presented by the Brazilian Institute of Geography and Statistics (IBGE) and the 2000 census, the Brazilian population was 169,799,170 inhabitants, and of these, in absolute numbers, there were 9,935,100 individuals aged sixty-five and above (5.85%) (1). Projections by the Latin America Demographic Center estimate that this group will represent 14% by the year 2025 (2). It has been reported that the older the population is, the greater is the prevalence of lesions in oral mucosa. According to some authors, there is an approximate 47% increase in the elderly when compared to younger age groups (3,4).

Oral mucosa is capable of preventing entrance of harmful and infectious agents, and to respond to damage to its integrity as well as to promote an adequate immune and inflammatory response, protecting the body in this way (5,6). During the

aging process, the body undergoes significant changes, and these functions deteriorate as do the tissues of all the entire body, rendering these people more susceptible to diseases (2,7-9).

Besides aging, general predisposing factors must also be added, such as food, alcohol, coffee, tobacco, drugs, toxic substances, dental prostheses, chronic diseases, nutritional deficiencies, and others, increasing significantly the rate of buccal cavity alterations (7). Elderly patients present a large variety of lesions from different etiologies, including neoplasias, infections (mainly fungal and viral), oral manifestations of systemic diseases, bone alterations, diseases characterized or accompanied by pain in the oral cavity (bullous diseases, "burning mouth"), etc. (10). There also is a great number of melanotic stains in the elderly without apparent cause (4). Although not associated with high mortality, these alterations except for mouth cancer cause high morbidity, thus burdening significantly the quality of life of the elderly (11).

MAJOR ORAL DISEASES FREQUENTLY DIAGNOSED IN THE ELDERLY

Stomatodynia

It is a frequent manifestation in the elderly. Also named "burning mouth syndrome," it causes a feeling of pain or diffuse burning of buccal mucosa, usually worsening during the day. It may present a diffuse location or be situated only on the lips or tongue in which case it is called glossodynia (if only pain is present), glossopyrosis (if only burning is present), or burning tongue syndrome (if both pain and burning are present) (10,12). Typically, clinical examination is normal. Despite its etiology giving reasons for discussion, there are some factors related to its onset, such as psychogenic disturbances, cancerophobia, hormonal alterations (there is a high prevalence in postmenopausal women), xerostomia, candidiasis, vitamin deficiencies, especially of the B complex, allergic stomatitis (toothpaste), migratory glossitis, painful myofascial syndromes and others (10,12,13). In most cases patients suffering from stomatodynia present several complaints (12).

Vesiculoulcerative lesions

These lesions also affect the elderly, but in most cases the elementary lesion, a bulla, is hardly visible, due to the fact of the mucosa being in the permanent state of friction. Normally what is seen are erosions that may be extensive, affecting totally or partially the oral cavity. Thus, differential diagnosis with ulcerations consequential to traumas is important. The most common forms are herpes zoster, bullous pemphigoid and other bullous diseases, which, in addition to typical lesions, may also present exfoliative gingivitis (10,13).

Candidiasis

Candidiasis is the most common infection of the oral cavity in elderly patients (Fig. 1). It is caused mainly by *Candida albicans*, that can be present in the oral cavity without any clinical alteration in 35% to 50% of the population (10,14). With aging, modifications that lead to the increased growth of this fungus occur, including high production of IL-2, decrease of histatin 5 (a protein present in the saliva with anti-candidal action), increase in the serum concentration of immunoglobulin G (IgG), and impaired granulocyte and lymphocyte functions (10). The elderly also usually present diseases and conditions that can promote its occurrence and recurrences, such as diabetes, immunodeficiencies, nutritional deficiencies, prolonged use of antibiotics, cytotoxic medication, corticosteroids,



Figure 1. Candidiasis of the tongue.

immunosuppressive agents, inadequate oral hygiene and use of dentures, showing the opportunistic character of this infection (10,14).

Clinically, its presentation varies, with differences also between some classifications:

chronic candidiasis – small white spots dispersed through the mouth;

pseudomembranous candidiasis – which can be acute (also called thrush) or chronic: creamy white grayish or white bluish plaques on an erythematous base. If not treated, it can develop into the atrophic form;

atrophic candidiasis – in this form the affected mucous membrane is atrophic and erythematous, and can be painful;

hyperplastic candidiasis – the involved mucosa is rough and hyperplastic, and can develop into leukoplakia, although some authors already consider it as leukoplakia.

Various studies provide data on the mutagenic and carcinogenic effect of *Candida albicans* (10,13-16). Besides these forms, some authors include another category, i.e. lesions associated with candidiasis, including stomatitis from denture use and angular cheilitis, which are the two most common forms in the elderly, with a prevalence of 19% and 25%, respectively (10).

Actinic cheilitis

It is an inflammatory and premalignant reaction of the lip, caused by prolonged and chronic exposure to sunlight (Fig. 2). It affects almost exclusively the lower lip, for being more exposed, and is more common in white males performing outdoor activities, such as farmers and fishermen. The lower frequency among the people of color is ascribed to the protecting effect of melanin, and in women to the use of lipsticks. The clinical picture consists of edema and light erythema, drying and fine desquamation, which develop into whitish stains with loss of the lip's uniform red color, making the borderline with the skin unclear. With continuing sun exposure, atrophy, crusts, and erosions appear. The presence of ulceration in the actinic cheilitis is indicative of malignant transformation (17,18).



Figure 2. Actinic cheilitis.

Leukoplakia

It is defined by the World Health Organization (WHO) "as a white plaque or patch that cannot be clinically or histopathologically characterized as any other disease" (Fig. 3) (10,19). It is rather a term for clinical use without presenting characteristic histopathology, and should not be used as a histopathologic term. So it is a morphological diagnosis that will, after investigation (biopsy), be of exclusion. Its clinical aspect is quite varied: small up to several centimeters, thin or thick, with a flat or irregular surface with its aspect varying from granular to papillary. Some authors subdivide them into different types (19). It is more common in the elderly, especially in males (13). It presents several etiologies: idiopathic, chronic irritation by tobacco and alcohol use, friction and constant heat, chemical irritation by toothpastes, etc. (13,19). Only about 10% to 20% present malignant



Figure 3. Leukoplakia of buccal mucosa.

transformation, but even so biopsy should always be performed (10,13). Their location is also important. When located in the mouth floor, ventral, or lateral surface of the tongue and soft palate, there is a higher chance for malignant transformation. Leukoplakias that appear at the top of the patient's alveolar crest with total prosthesis are usually benign (10,20).

Erythroplasias

These are red macules or plaques of soft and velvet-like texture in the oral mucosa that present a high risk of malignancy (13,19,20). Erythroplasia may also be associated with leukoplakia, then being called speckled leukoplakia (13) or erythro-leukoplakia (19). Different from leukoplakia, frequently benign, the histopathology of erythroplasia presents, in many cases, alterations that range from dysplasia to invasive carcinoma, and should thus always be submitted to biopsy. People in the sixth and seventh decade are more frequently affected, and the preferred locations are the mouth floor, retromolar area, tongue, and palate (13).

Oral lichen planus

It seems to be rather a pattern of reaction than a disease (20), being defined as a persistent inflammatory chronic mucocutaneous reaction of unknown etiology (14). Its prevalence is estimated to 0.1%-2.0% of the general population, but with peaks in advanced ages (14,20). Tobacco smoking and emotional stress are risk factors for its onset (14). WHO recognizes seven different clinical forms of oral lichen planus: reticular, papular, in plaques, atrophic, erosive, ulcerated and bullous (21,22). Some authors, however, do not recognize the ulcerated form, considering it a consequence of rupture of a lesion of the bullous form (23-25).

The reticular form is most common and usually asymptomatic. It is characterized by a whitish net in the affected areas, but may present in the form of a plaque when located on the tongue (clinically confusing it with leukoplakia), or also with an annular pattern (10,14,25). The erosive form presents ulcerated and atrophic areas in the mucous membrane that require biopsy and histopathologic examination with immunofluorescence for differential diagnosis with bullous autoimmune diseases. It is also painful, especially on exposure to spicy or acid foods, which can make the ingestion of foods for some elderly still more difficult. In most cases, the distribution of lichen planus lesions is symmetrical and located more frequently in the mucous membrane of the posterior area of the oral cavity, gums, tongue, lips, and rarely the palate (10,25). The mechanism of its malignant potential has not yet been fully unveiled, but its malignant transformation was observed in 1.5% of cases over a 7.5-year period (14,20,26,27).

Geographic tongue

Geographic tongue results from the loss of the filiform papillae in small plaques in the dorsal tongue surface, which change in days or weeks. It is not painful, but some patients report altered sensitivity or discomfort. It is clinically characterized as an irregular lesion of flat and red surface with whitish borders (28).

Oral neoplasia

Oral cancer typically occurs in the elderly and its incidence grows with increasing age, being considered by some authors a disease of the elderly (Figs. 4, 5 and 6) (19,27,29). It presents different epidemiology in different areas of the world. In some Asian countries, it is the most common



Figure 4. Squamous cell carcinoma of the lip.

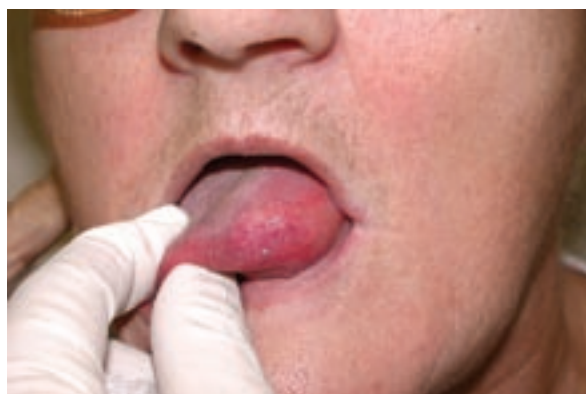


Figure 5. Squamous cell carcinoma of the tongue.

cancer, being more prevalent above all in places where the habit of chewing betel (a plant originating from India) or tobacco is frequent. The United States statistical data show that cancer of the oral cavity and oropharynx accounts for about 3% and 2% of all malignancies in men and women, respectively (19,30). The American Cancer Society estimated 28,900 new cases of oral cancer to be diagnosed and approximately 7,400 people to die from this neoplasia by 2002. However, what calls most attention in these data is the fact that over 90% of these tumors are squamous cell carcinomas that grow starting from the epithelium of the mucosa (19,29), and are mainly located on the lips, tongue and mouth floor (30); in other words, they present an accessible location, allowing for easier detection through direct visualization (19,29,31). Thus, in spite of the progress in medical sciences, with new surgical techniques, different chemotherapy and radiotherapy regimes, the survival rates have not improved significantly in the last decades, remaining at an average of 50%-55%, depending on the country (19,32).



Figure 6. Squamous cell carcinoma of buccal mucosa.

In Brazil, oral neoplasia acquires importance due to lip cancer, for being a tropical country with a major part of its economy based on rural activities, where workers are exposed to sunlight for hours. The incidence is higher in whites, with a greater predominance in the lower lip *versus* upper lip. Statistical data of the Health Ministry and National Cancer Institute for 2002 show that, in Brazil, mouth cancer is the fourth most common cancer in males and seventh in females. National data show incidence rates of around 15.8 cases per 100,000 inhabitants for the city of Porto Alegre, south of Brazil, followed by Belém, north of Brazil with 12.4 cases *per* 100,000, as places with the highest rates for the male population. These rates differ for women, with the highest rate in Fortaleza, northeast of Brazil, with 4.1 cases *per* 100,000, 4.0 cases *per* 100,000 in Belém, but only 1.3 cases *per* 100,000 in Porto Alegre. As to mortality rates in Brazil related to oral cancer, they varied from 0.48 to 0.70 *per* 100,000 for men and women, respectively, in the period from 1979 to 1998 (30).

Each individual's own intrinsic factors submitted to the aggression of the external factors of physical, chemical and biological agents, depending on the time of exposure during lifetime, damage the nuclear deoxyribonucleic acid (DNA), leading to chromosomal fractures, mutations and other alterations of the genetic material, generating malignant tumors that attack the mouth (30). The main risk factors are advanced age, use of tobacco, use of alcoholic beverages, nutritional deficiencies, dietary habits, infections, mainly viral, immunosuppression, poor buccal hygiene, chronic irritation, etc. (19,27,30,32). These factors are elaborated below.

Epidemiologic studies around the world prove that tobacco is still one of the main risk factors for cancer of the oral cavity. It is irrelevant whether tobacco is smoked (be it as cigarette, pipe, cigar, or straw cigarette), chewed (rolled tobacco) or aspirated (snuff). Tobacco is the most powerful carcinogenic substance to which human beings voluntarily expose their body. There are around 4,700 poisonous substances found in tobacco and in the smoke of a simple cigarette. Of these poisonous substances, 60 present known cancerous action, standing out the polycyclic hydrocarbons and tobacco-specific nitrosamines, such as N-nitrosonornicotine, found in tar. Carcinogenic substances such as nickel and cadmium, radioactive elements such as carbon 14 and polonium 210, besides pesticide residues used in tobacco

farming, like DDT, are also detected (30). Depending on the type and amount of tobacco used, their users present a five- to nine-fold probability of developing oral neoplasias than tobacco non-addicts and the risk increases sixteen-fold in the so-called heavy tobacco smokers using 80 or more cigarettes a day. This probability will also depend on the daily amount of tobacco used and duration of the exposure period, reducing the risk with giving up smoking, when it becomes practically equal to a non-smoker if the individual is free from tobacco for 10 or more years (19,29,30,33).

Researches accomplished in the USA show that individuals that chew tobacco, also called users of smokeless tobacco, present a risk between four and fifty times greater of developing cancer in the oral cavity, depending on the duration of consumption. When chewing tobacco, residues fall between the cheek and the tongue, and stay there for a prolonged time, favoring the action of the cancerous substances on oral mucosa (30,34). It is opportune to remind that tobacco also causes other buccal problems besides cancer that can worsen the quality of life of the elderly. The most frequent manifestations are nicotinic stomatitis, gingivitis of different grades, including acute necrotizing ulcerative gingivostomatitis, periodontitis, pigmentary alterations, leukoplakia and erythro-leukoplakia, hypertrophy of the filiform papillae, etc. (35). Additionally, during the act of smoking, there is an intense liberation of heat from the tip of the cigarette, with temperatures varying between 835 to 884 degrees centigrade, that act chronically, potentializing the aggression onto oral mucosa (30).

The habit of using hot beverages and food is usually not considered as an important isolated factor, although there is thermal aggression to the cells of the mucosa. No cause-effect relation has been established between the use of spices and neoplasia either (30). The consumption of alcoholic beverages increases from three to nine times the risk of cancer in the oral cavity (19,30,33,36,37). Although the mechanism by which alcohol triggers cancer is not well established, several facts exist that can elucidate the issue. Studies show that direct action of alcohol on oral mucosa causes a decrease of epithelium thickness, an increase of the permeability of the mucous membrane and decrease of saliva flow. It is known that saliva is capable to reduce the mutagenic activity of certain carcinogens (36). Additionally, acetaldehyde, one of its metabolites, can cause mutations in cell DNA if it has contact with (30). Experiments also suggest

that alcohol inhibits the capacity of DNA repair, increasing even more the susceptibility to the carcinogens from the environment (36). Therefore, alcohol consumption also presents an extremely important synergic action with tobacco, increasing the risk by thirty-five times (19,30,33,36,37).

No less important is the fact that alcohol interferes in the body as a whole, and its chronic use can lead to malnutrition (alcoholics), besides affecting the hepatic capacity to work with poisonous and carcinogenic components, thus causing an immunosuppressive effect (36). Fifty to seventy percent of all deaths from tongue, oral cavity, pharynx and esophagus cancer are attributed to excessive alcohol consumption (19,30,33,36,37).

Regular use of fruits and fresh vegetables has been considered as a protecting factor against mouth cancer, with individuals that maintain such a diet presenting a 20% to 80% decrease in the risk of developing mouth cancer (19,30). Furthermore, patients with cancer present a decrease of blood vitamin C and it is known that its administration in large doses improves immune defenses. When cells are pretreated with vitamin A and then exposed to x-rays and ultraviolet rays or to chemical carcinogens, it strongly reduces their susceptibility to these agents. Selenium is also a powerful antioxidant and acts alone or in synergism with vitamin E (30). Two extensive literature reviews, Winn from 1995 (38) and Zain from 2001 (39) show that the ideal diet should be rich in vitamins C, E, B₁₂, A, beta carotene and some minerals such as calcium and selenium. The protecting effect of foods is attributed to their antioxidant activities (30). Antioxidants act through reduction of the reactions of free radicals that cause mutations in DNA, alterations in lipid peroxidation of cellular membranes, and alterations in enzymatic activities. The micronutrients also act through inhibition of the formation of carcinogenic endogenous substances and of the expression of oncogenes, among others (39).

Poorly adjusted dental prostheses or dentures with suction chambers for better adhesion, broken teeth, dental remains, constantly acting for years in the oral mucosa, lead to the formation of small ulcers and hyperplastic lesions. Such a continuous action can be a cofactor for the development of mouth cancer, by favoring the action of other carcinogens such as tobacco and alcohol. Oral ulcers, even if transitory, allow for the most direct contact of the cancerous substances in general, favoring deeper and extensive aggression to the mucous membrane. As for inflammatory or traumatic fibrous hyperplasia, it is a benign lesion, however,

it can ulcerate, becoming extremely painful and uncomfortable for the patient. They are usually located in the gingival-labial and gingival-jugal furrow; these lesions rarely develop into a malignant tumor form (30). Recent evidence reinforces the relationship between human papillomavirus (HPV) and carcinoma of the oral cavity and oropharynx. The HPV-16 and HPV-18 subtypes have already been detected in over 22% and 14% of buccal cancer cases, respectively (19). In India, studies show that mouth tumors present a high incidence of HPV in the affected tissues and normal mucosa adjacent to the tumor. Other viruses such as herpes virus type 6, cytomegalovirus, hepatitis virus type C, Epstein Barr and HLTV (virus of leukemia and T lymphoma in humans) are suspected to be promoters or inductors of buccal cancer (30).

According to some authors, chronic stomatitis caused by *Candida albicans* in irritated areas, by friction or under the denture, and/or exulcerated by prostheses, would induce a predisposition to mouth cancer. There also are studies relating *Helicobacter pylori* to MALT lymphoma (developed in lymphoid tissue found in mucous membrane) in the mouth and stomach. Studies also indicate that biological agents act by unblocking the tumoral suppressive action of the p53 of nuclear DNA (30).

The chronic action of solar radiation on the lips, mainly lower lip, has been shown to be a decisive factor in the appearance of actinic cheilitis and carcinomas in this location, mainly in sunny areas like Brazil (19).

Although it is still a controversial issue, some studies show that a precarious oral hygiene is an additional risk factor for mouth cancer (40,41).

EVALUATION OF THE ORAL CAVITY

It should be kept in mind that self-examination of oral conditions by the elderly may often diverge from the actual clinical state. Several surveys prove this assumption, including those made in cooperation with the Oral Health Program (PanAmerican Health Organization) in different Latin America countries, showing that, even in countries with programs aimed for the elderly, the true reason for this group not to seek health service is the lack of perception of its necessity. The patient evaluates him- or herself by different criteria, whereas a professional will seek for the presence or absence of disease. The elderly have an altered perception in line with their personal values; the importance for the elderly is the presence of symptoms that,

besides inconveniencing, are not seen as a natural consequence of aging (42,43). Besides, elderly women tend to have a more optimistic vision of their oral health than elderly men (42).

Attention should also be paid to the presence or absence of teeth. In several countries, the number of elderly with total or partial loss of teeth is much higher than one may imagine. In Europe, it can reach 74%-79% in England, 83% in The Netherlands, and up to 85% in Scotland. A survey carried out by Hunt *et al.* in rural areas of the State of Iowa, USA, in 1995 revealed significant levels: about 39% of study subjects had no teeth at all. What calls attention, however, is that these individuals, for not having teeth, did not feel any need to see the dentist regularly, unless the denture broke or some problem appeared, forgetting that the prosthesis itself may cause problems in some of them, besides problems that would normally occur (44).

It is important to emphasize that an individual who uses a total prosthesis has only 25% of the masticatory capacity compared to the individual with all his natural teeth, which interferes with the process of digestion (2).

Consequently, a great part of the people in advanced age use some kind of dental prosthesis (45). There is a large number of lesions in the oral mucosa caused directly or indirectly by the constant use of a denture, that are, actually, acute or chronic reactions of various causes, e.g., microorganisms from the bacterial plaque of the denture, a reaction to the components of the denture basis, or due to direct mechanical trauma (46). Lesions caused by the use of a denture usually occur when there is poor denture hygiene and a prolonged duration of wearing dental prosthesis does not necessarily mean illness of the oral cavity, if there is a state of good oral hygiene and maintenance of the denture.

Budtz-Jorgensen, in 1981, after a long review of the literature, verified that stomatitis caused by denture was the most common manifestation and its main location was the palate in 50% of denture users, either partial or completely removable (46). Similar results were also obtained by Osterberg *et al.* in Sweden in 1985 (47). Stomatitis is an inflammatory reaction of the mucous membrane, characterized by erythema that can be clinically divided into:

type I: localized inflammation or small points of hyperemia;

type II: diffuse erythema; and

type III: "non-neoplastic" papillary hyperplasia with varied degrees of inflammation.

Overlapping of the above types is quite common (46). Besides, the presence of candidiasis located in the space between the mucosa and the prosthesis seems to have a definite role by causing reactive inflammation to the associated infection (45,47). The alterations of mechanical etiology are traumatic ulcers, hyperplasia of the mucous membrane due to alveolar atrophy, and inflammatory hyperplasia of the oral mucosa. In general, all of them are related to the degree of stability and retention of the prosthetic denture (45,46,48). Other common manifestations include allergic reactions to the material used in denture manufacture, including the controversy if acrylic resin for a period longer than six years becomes pathogenic or not; acute or chronic infections such as candidiasis; angular cheilitis; alveolar fibrosis; oral carcinomas; etc. (45,46). Additionally, there are predisposing factors that can avoid or propitiate the appearance of some manifestations, such as appropriate oral hygiene, averting infections, use of nonporous materials in the prosthesis to reduce the accumulation of substances, denture wearing for longer periods, and also diseases and associated medications (46).

COMMENTS

Due to the great quantitative growth in this age group of such peculiar characteristics, there is the need for dermatologists and dentists to be more aware of the conditions of oral health in this population group in Brazil (49), thus being capable to diagnose and differentiate several pathologies.

In the USA, it has been verified that the elderly visit the doctor more frequently (80% once a year) than the dentist (only 43% once a year) (11,32,42,50), giving the doctors a unique opportunity to detect oral abnormalities (11).

The appropriate examination of the oral cavity tissues, therefore, should be included in the annual routine as a preventive measure for the entire elderly population (6), thus reducing the morbidity and mortality of these diseases (50), because an early diagnosis is the key for control of oral diseases, especially oral cancer (33).

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