



REVIEW

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Alzheimer's disease: oral manifestations, treatment and preventive measures.

Abstract: In the treatment of patients with dementia types such as Alzheimer's, non-current and tough situations are faced. Treatment should be tailored to each stage of the disease and for each patient. In this type of disease, it is very important to involve families and caregivers to improve the patients' quality of life. The main goal with these patients is prevention. All oral manifestations caused by the lack of inadequate oral hygiene, xerostomia and manifestations derived from taking drugs should be controlled. The aim of this review is to describe the main oral manifestations which can result from this disease and the best treatment options taking into account the patients' clinical stages.

Keywords: *Alzheimer, Dementia, Oral health, Disease, Prevention.*

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INTRODUCTION.

Dementias are multifactorial diseases. They are characterized by an acquired and persistent deterioration of the intellectual function, with involvement of at least three areas of mental activity such as memory, language, visual-spatial, emotional skills, personality disorders and deficits in cognitive ability, being severe enough to interfere with the patient's daily life activities¹⁻⁶.

Age is the major risk factor in cases of dementia, being more commonly found in individuals aged 85 and over. Although, according to the literature, there are significant variations in prevalence, ranging from 3% for those 65 to 74-year-olds and 47% for those older than 85³. This prevalence implies the possibility of a dentist finding a person with dementia is considerable¹⁻⁶.

Among all dementia types, Alzheimer's disease comprises over 50% of cases, with a higher incidence in Afro-American and Hispanic people compared with the white population and a higher prevalence in women. In order of frequency, it is followed by vascular dementia with 16%, and the remaining 30% belonging to other dementias, such as frontotemporal, the Lewy body disease, mixed dementia and Creutzfeldt-Jakob³.

Dementia patients go through different clinical stages

with progressive deterioration ranging from the absence of cognitive impairment to severe cognitive impairment^{3,4,6}.

Alzheimer's disease is a progressive degenerative process in cognitive function of unknown origin. It involves a gradual and continuous deterioration of memory, orientation, emotional stability, abstract thinking, motor skills and personal care⁴⁻⁷.

The main clinical symptoms of the disease are 4: aphasia (loss of the ability to use speech and language), apraxia (loss of ability to perform learned and familiar movements), visual agnosia (inability to recognize familiar visual stimuli) and memory disorders⁴⁻⁷.

The course of the disease can vary from patient to patient, but it generally develops in 3 stages. In the first one, the most characteristic sign is the loss of memory and temporal disorientation, loss of spontaneity, and even deterioration in physical presence and hygiene. In the second phase, patients suffer a rapid loss of intellectual capacity, observation skills, sense of humor, self-recognition, language comprehensibility and motor skills deteriorate along with a partial or total loss of speech. In the last phase, also called terminal phase, the patient is apathetic, disoriented and without the ability to communicate and even sudden changes in mood, depression and behavioral problems as

well as verbal or physical aggression appear. Also, seizures or incontinence can occur in advanced stages⁴⁻⁷. Other authors such as Friedlander *et al.* proposed seven different stages of the natural process of self cognitive impairment of the disease³.

It is essential to make a correct diagnosis of these diseases through a good medical history which includes a complete physical, psychiatric and neurological evaluation in order to identify cognitive deficits and to rule out other pathologies with similar clinical manifestations, such as hypothyroidism, Cushing's syndrome, depression, vitamin B12 deficits, electrolyte imbalances, Parkinson's disease, neurosyphilis or HIV infection⁴⁻⁷.

The main oral manifestations of Alzheimer's disease are usually due to lack of proper maintenance of oral hygiene, improper control of bacterial plaque, xerostomia and those derived directly from drugs^{1,2,5-7}.

Oral care, treatment planning and behavior management in individuals with dementia should be designed taking into consideration the severity of the disease and should involve family members and caregivers¹⁻⁶.

The aim of this review is to describe the main oral manifestations which can result from this disease and the best treatment options taking into account the patients' clinical stages.

ORAL MANIFESTATIONS OF ALZHEIMER'S DISEASE.

In patients with Alzheimer's disease, there are several oral findings due to improper maintenance of oral hygiene as a result of the failure to remember its importance, an incorrect control of bacterial plaque, the presence of xerostomia and manifestations derived directly from medicines (gingival overgrowths in patients treated with anticonvulsant drugs)^{1-4,6,7}.

The deficiency in the oral hygiene patients with this disease can trigger a number of dental problems which include: caries, periodontal disease, gingivitis, halitosis and a progressive destruction of teeth which can eventually cause systemic consequences such as difficulty to feed

themselves adequately^{1-4,6,8}.

The decrease in salivary flow leads to alterations in the flora of the oral cavity, mucous membranes look smooth and pale and the tongue has a red and dry appearance with a tendency to crack. Patients may complain of burning mouth sensation, changes in speech, taste, swallowing disorders and halitosis. There is also the occurrence of ulcers by friction due to reduced adhesion of the prosthesis supported by the oral mucosa. Besides, reduced salivary flow leads to a reduction in salivary components allowing the occurrence of oral infections like candidiasis^{1-6,9-11}.

Candidiasis.

Microorganisms of the *Candida* genus are present in the oral cavity of about 50% of the population without causing disease, yet, when acting as infectious agents, they may cause *candidiasis*¹².

Bacteria accumulating in the removable prosthesis are an important factor in the pathogenesis of stomatitis caused by prosthesis¹³. In the prostheses, there is a biofilm formed by fungi, bacteria and sloughed epithelial cells which acts as a reservoir for the oral microorganisms¹³.

Chronic atrophic candidiasis is an inflammation of the mucosa which is located underneath the acrylic prosthesis¹², *Candida albicans* being the main etiological agent of this infection^{12,14}.

Proper routine cleaning of the prosthesis is necessary for preventing stomatitis caused by these microorganisms and to keep healthy supporting tissue^{12,14}.

In elderly or patients with mobility problems, chemicals to clean the prosthesis may be helpful. Commercial products available today can be divided into five groups: alkali peroxides, alkaline hypochlorite, dilute organic and inorganic acids, disinfectants and enzymes. Immersion cleaning is the most common technique due to its convenience. Besides cleaning, this procedure decontaminates the prosthesis through the destruction of microorganisms by cleaning chemicals¹³.

There are studies comparing the occurrence of *Candida* yeast on denture with metal alloy and resin, being most prevalent in resin. The aging of the acrylic resin

leads to deterioration characterized by increased porosity, making the surface more and more rough, promoting colonization of microorganisms¹².

According to Gusmão *et al.*¹², people who do not remove their prosthesis at night have a higher prevalence of *Candida* yeast.

Prevalence of stomatitis related to the use of dentures varies between 25 and 66.7% and it is more often in older people or those who have reduced motor skills living in nursing homes¹⁴.

Candida treatment consists of directly applying an antifungal to the affected area or to the right surface of the prosthesis. This treatment may be compromised by the difficulty for application in disabled patients. Therefore, we should always administer the treatment that is easier to implement and requires less frequent applications. The most often used drug to inhibit the growth of *Candida* is Nystatin, it is the most used antifungal in dentistry, with topical or systemic application¹⁴.

Xerostomia.

Saliva serves to lubricate and protect the oral cavity; it helps to form the food bolus and facilitates swallowing and speech. Regarding teeth, it has a mechanical cleaning action, reduces the amount of oral microorganisms, neutralizes acids of the bacterial metabolism of the biofilm (buffering capacity) and provides inorganic ions of calcium phosphate to the hard dental tissue during remineralization¹⁵.

It was long believed that the decrease in salivary flow was produced by age and disability of the salivary glands to produce saliva. Today, literature supports the fact that some drugs also contribute significantly to the reduction of saliva production. This reduction or absence of salivary flow may occur by the interference caused by the autonomic nervous system or by direct action on the acinar cells⁸.

Medication plays an important role in reducing the unstimulated salivary flow, while a dry mouth is associated with other factors such as anxiety and stress. Anti-hypertensives and antidepressants belong to the group of

drugs which are likely to adversely interfere with the production of saliva⁸.

The effects produced by the drugs often occur more easily in the elderly. It is believed that this occurs by a strong expression of the drug as a result of decreased serum albumin and the half-life of drugs in the blood of older people is higher due to its elimination. Its elimination may be affected by renal dysfunction and a slow metabolism¹⁰.

Patients with Alzheimer's disease have xerostomia due to anticholinergic and anxiolytic drugs¹⁰. In cases of Parkinson's dementia, antiparkinsonian drugs are also categorized as one of the most xerostomizing¹⁰.

DENTAL TREATMENT AND PREVENTION MEASURES

The goal of treatment in the oral cavity will be prevention according to each stage of illness the patient's physical and emotional capacity. The patient's oral health should be improved for a better quality of life and thus avoid an increased risk of heart disease (bacteremia) or bacterial pneumonia aspiration⁴⁻⁷.

When diagnosing a condition of such nature, a review and complete rehabilitation of the oral cavity should be conducted, since failure to maintain good oral health can lead to malnutrition increasing the risk of oral infections⁴⁻⁷.

Preventive measures aimed at controlling bacterial plaque, xerostomia and use of removable dentures should be taken⁴⁻⁷.

Firstly, the patient's motor skills to maintain proper control of bacterial plaque must be considered. Because of the patient's motor difficulties to keep bacterial plaque under control, the assistance of professional hygiene in the dental clinic and caregivers or family in the patient's home will be required^{1-4,6,7}.

Regarding the mechanical treatment of the plate, studies recommend the use of electric toothbrushes with fluoridated toothpaste¹⁶.

Using a chemical control adjunct to mechanical plaque is fundamental. Mouthwash should be used as long as the patient retains the ability to rinse. The most widely

used antiseptic chlorhexidine is 0.12 at 0.2%. In cases where the patient retains the ability to rinse, there are other presentations of chlorhexidine such as spray, gel or varnish with a maximum time of 15 days to avoid dental staining⁴⁻⁷. This antimicrobial tenfold reduced plaque. The presence of alcohol is contraindicated in cases such as mucositis, radiation sensitive tissues of the head and neck, and immunocompromised patients and those with composite resin restorations^{13,17}.

Poor oral hygiene can lead to the loss of most teeth. This fact would cause the need for a removable prosthesis. However, adaptation and use in patients with dementia is very limited because of their cognitive impairment and motor deficits⁴⁻⁷.

Secondly, the consequences of xerostomia should be prevented by using local salivary stimulants (gum with xylitol, parasympathomimetic drugs or salivary substitutes)⁴⁻⁷.

In advanced stages, the dental treatment becomes increasingly difficult, sometimes requiring the use of general anesthesia to avoid general medical risks⁴⁻⁷.

DISCUSSION.

Currently, aging leads to an increase in the incidence of dementia in our society. This increases the likelihood of having to treat people who suffer it. Literature agrees that Alzheimer's disease is the most common type of dementia in the elderly, followed by vascular dementias¹⁻⁷.

Referring to the prevalence of these diseases, an increased susceptibility to suffer them is seen in old age, this being the main risk factor⁶. Additionally, Friedlander *et al.*³ concluded that there is a higher incidence in Afro-American and Hispanic people and a higher prevalence in women. There are even studies linking the possible onset of dementia with the patient's dental hygiene prior to AD¹⁸. In this study, a reduced risk of dementia was observed in subjects with lower educational level due to the absence of infectious foci¹⁸.

According to literature, early diagnosis is essential to favorably modify the disease although healing is virtually impossible. It also helps in ruling out other diseases^{1-4,6,7}.

In Alzheimer's disease, apart from impaired cognitive function, patients' daily activities are affected. In literature, there is a coincidence in the presence of clinical signs, such as apraxia and apathy, as responsible for causing such people to have a disinterest, neglect themselves and experience inability to run a proper oral hygiene technique at intermediate stages of the disease^{4,7}.

Poor oral hygiene and oral health lead to the appearance of a series of oral manifestations, such as coronal and root cavities⁴, periodontal disease, gingivitis, halitosis, prosthesis induced ulcers and even the presence of fungal infections (candidiasis)^{1,3,5,6}. That is why preventive measures must be taken and family members must be educated to avoid possible complications due to poor oral hygiene³⁻⁴.

Silvestre *et al.*⁷ specifies a classification of oral manifestations that can be caused by AD. They are classified in manifestations derived from oral hygiene, xerostomia, drugs and various other causes.

For greater plaque removal, several scientific articles, such as Verma *et al.*¹⁶ and Visschere *et al.*¹⁹, recommend the use of electric toothbrushes for these patients. Nevertheless, I seri *et al.*¹³ and Silvestre *et al.*⁷ recommend a plaque chemical adjuvant to mechanical treatment. These articles recommend chlorhexidine 0.12%, modifying its presentation depending on the patient^{5,13,16,19}.

AD patients are treated with drugs which improve cognitive performance, such as acetylcholinesterase inhibitors, and others to relieve the rest of symptoms such as NSAIDs, anticonvulsants, anxiolytics and antioxidants^{1-4,7}. Literature agrees on the presence of xerostomia and gingival hyperplasia as the main manifestations derived from drug treatment^{7,8,10,15,20}.

Candidiasis and xerostomia are not exclusively caused by AD, but they appear more frequently due to a set of characteristics favoring such clinical situations in patients with AD, like advanced age, intake of drugs which can decrease salivary flow and lack of self-hygiene due to cognitive degradation^{8,12}.

Regarding removable dentures, there are several factors

which increase the risk of stomatitis or chronic atrophic candidiasis¹³. One of them is the presence of the prosthesis during sleep¹² and the material it is made of, resin being related to the growth of *Candida*¹², the mobility of removable prosthesis⁷ and improper cleaning of dental prostheses¹³.

CONCLUSION.

Currently, there is an increase in life expectancy, increasing the possibility of treating people with Alzheimer's disease

or other dementia in Dentistry.

This requires adequate training of professionals to provide a quality service. Early diagnosis is crucial to prevent all the complications of the disease and begin treatment to reduce its progression.

Further randomized controlled studies with an acceptable follow-up period to reinforce the use of the treatments described in this review and future innovative treatments to help improve the quality of life of our patients are needed.

Enfermedad de Alzheimer: manifestaciones orales, tratamiento y medidas preventivas.

Resumen: En el tratamiento a pacientes con demencias tipo Alzheimer se afrontan situaciones infrecuentes y comprometidas. El tratamiento debe personalizarse para cada estadio de la enfermedad y para cada paciente. En este tipo de enfermedades es muy importante involucrar a los familiares y cuidadores para mejorar la calidad de vida del enfermo. El principal objetivo con estos pacientes es la prevención. Se deben controlar todas las manifestaciones orales

provocadas por la falta de una inadecuada higiene oral, la xerostomía y las manifestaciones derivadas por los fármacos que consumen.

El objetivo de esta revisión es describir cuáles son las principales manifestaciones orales que pueden derivar de esta enfermedad y las mejores opciones de tratamiento teniendo en cuenta las etapas clínicas en las que se encuentran los pacientes.

Palabras clave: *Alzheimer, Demencia, Salud oral, Enfermedad, Prevención*

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