



International Journal of Applied Dental Sciences

ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2023; 9(1): 47-50
© 2023 IJADS
www.oraljournal.com
Received: 10-10-2022
Accepted: 30-12-2022

Karla Griselda Vazquez Guerrero
Master's in Sciences Student,
Universidad Autonoma de Nuevo
Leon, Facultad de Odontologia,
Monterrey, Nuevo Leon, 64460 ZIP,
Mexico

Irene Meester
Profesor, Universidad de Monterrey,
Escuela de Medicina, Ciencias
Basicas, San Pedro Garza Garcia,
Nuevo Leon, 66238 ZIP, Mexico

Sheilla Del Carmen Roa Gonzalez
Profesor, Universidad Veracruzana,
Facultad de Odontología, Veracruz,
Veracruz, Mexico

Yolanda Morales Gonzalez
Profesor, Universidad Veracruzana,
Facultad de Odontología, Veracruz,
Veracruz, Mexico

Sergio Eduardo Nakagoshi Cepeda
Profesor, Universidad Autonoma de
Nuevo Leon, Facultad de
Odontologia, Monterrey, Nuevo Leon,
64460 ZIP, Mexico

Rene Hernandez Delgadillo
Profesor, Universidad Autonoma de
Nuevo Leon, Facultad de
Odontologia, Monterrey, Nuevo Leon,
64460 ZIP, Mexico

Claudio Cabral Romero
Profesor, Universidad Autonoma de
Nuevo Leon, Facultad de
Odontologia, Monterrey, Nuevo Leon,
CP 64460, Mexico

Itzel Alejandra Valdez Arenas
Dentistry student, Universidad
Autonoma de Nuevo Leon, Facultad
de Odontologia, Monterrey, Nuevo
Leon, 64460 ZIP, Mexico

Juan Manuel Solis Soto
Profesor, Universidad Autonoma de
Nuevo Leon, Facultad de
Odontologia, Monterrey, Nuevo Leon,
64460 ZIP, Mexico

Corresponding Author:
Karla Griselda Vazquez Guerrero
Master's in Sciences Student,
Universidad Autonoma de Nuevo
Leon, Facultad de Odontologia,
Monterrey, Nuevo Leon, 64460 ZIP,
Mexico

Alzheimer's disease: A dental approach

Karla Griselda Vazquez Guerrero, Irene Meester, Sheilla Del Carmen Roa Gonzalez, Yolanda Morales Gonzalez, Sergio Eduardo Nakagoshi Cepeda, Rene Hernandez Delgadillo, Claudio Cabral Romero, Itzel Alejandra Valdez Arenas and Juan Manuel Solis Soto

DOI: <https://doi.org/10.22271/oral.2023.v9.i1a.1656>

Abstract

Introduction: Maintaining oral health becomes a challenge when Alzheimer's disease progresses to the intermediate and late stages.

Objective: To analyze the literature on Alzheimer's disease and its relationship with dentistry in high impact journals, with a focus on etiology, diagnostic methods, treatment, dental clinical characteristics and dental management.

Methodology: The search was carried out in the databases PubMed, SCOPUS and Google Scholar, using the terms "Alzheimer's", "etiology", "diagnostic methods", "treatment", "dental clinical characteristics" and "dental management", together with logical Boolean operators OR and AND.

Results: It is important to know that the etiology of Alzheimer's disease is uncertain; the most widely used diagnostic methods for this disease are biomarkers. There is no drug capable of alleviating Alzheimer's disease. It is very common to find different oral diseases due to the lack of hygiene presented by patients suffering from Alzheimer's disease, so it is important to give education to their caregivers to perform oral hygiene.

Conclusion: Currently, the issue of the effects of Alzheimer's disease on dentistry has been neglected. It is important to pay more attention to it and to educate caregivers about the possible oral diseases involved in the future as a consequence of poor oral care.

Keywords: Alzheimer's, "etiology", "diagnostic methods", "treatment", "dental clinical characteristics" and "dental management"

1. Introduction

Alzheimer's disease (AD) presents a serious global health problem with no cure to date, reflecting the complexity of its pathogenesis [1]. Currently, the prevalence of Alzheimer's disease, a devastating neurodegenerative disorder, is increasing [2]. The pathogenesis of AD begins several years before clinical onset [3]. AD, the leading cause of dementia in the elderly, is a neurodegenerative condition characterized by the accumulation of amyloid plaques and neurofibrillary tangles in the brain [4], it is a disorder that causes degeneration of brain cells [5]. It is considered the most common type of dementia and typically manifests itself through a progressive loss of episodic memory and cognitive function, which subsequently leads to deficits in language and visuospatial skills, often accompanied by behavioral disorders such as apathy, aggressiveness, and depression [6]. Due to the progressive aging of the population, AD is becoming a health burden of epidemic proportions for which there is currently no cure [7]. Maintaining oral health becomes a challenge when Alzheimer's disease progresses to the intermediate and late stages [8].

It is of utmost importance to know the dental management of patients with Alzheimer's disease. This review article aims to analyze the literature on Alzheimer's disease and its relationship to dentistry, specifically on etiology, diagnostic methods, treatment, dental clinical features, and dental management.

2. Materials and Methods

Articles on the subject published through the PubMed, SCOPUS and Google Scholar

databases were analyzed, with emphasis on the last 5 years. The quality of the articles was evaluated using guidelines, i.e., identification, review, choice and inclusion.

The quality of the reviews was assessed using the measurement tool for evaluating systematic reviews^[9]. The search was performed using Boolean logical operators AND, OR and NOT; with the keywords: "Alzheimer", "etiology", "diagnostic", "treatment", "management", "dental". The keywords were used individually, as well as each of them related to each other.

3. Results and Discussion

3.1 Etiology

The relationship between infections and the etiology of Alzheimer's disease, especially late-onset AD, has been continuously debated for the past three decades^[10]. Late-onset Alzheimer's disease is the most common form of dementia and, at present, its etiology is largely undetermined^[11]. The cause of most cases of Alzheimer's is still unknown^[12], except where genetic distinctions have been observed^[13, 14]. Aging in general is the major risk factor for Alzheimer's disease^[15, 16, 17].

It is important to know that the etiology of Alzheimer's disease is uncertain, as many factors are seen to be related to each other.

3.2 Diagnostic Methods

Clinical diagnosis of Alzheimer's disease can be difficult^[18]. Two main hypotheses were proposed as the cause of AD; cholinergic and amyloid^[5]. Diagnosis is based on clinical presentation meeting various criteria as well as fluid and imaging biomarkers^[14, 19]. Newer criteria aim to identify the disease in its early stages. AD-specific biomarkers, including identification of A β and tau deposits, glucose hypometabolism, and brain atrophy, are used to arrive to a diagnosis^[20]. The Alzheimer's disease neuroimaging initiative is an ongoing longitudinal multicenter study designed to develop clinical, imaging, genetic, and biochemical biomarkers for early detection and follow-up of Alzheimer's disease^[21]. It is diagnosed when the patient meets the criteria for dementia, in addition to an insidious onset and obvious worsening of symptoms over time^[22].

As for the diagnostic methods of Alzheimer's disease, the use of biomarkers are the most commonly used, such as neuroimaging. Another effective method is when the patient meets the criteria for dementia.

3.3 Treatment

AD care requires timely diagnosis and multidisciplinary management that includes the dental area^[23]. Importantly, treatment of periodontal disease could be a way to explore the prevention of AD^[24]. Currently, no safe and effective Alzheimer's disease drug is available to prevent, halt or reverse its progression.

There is no effective prevention, nor an etiopathogenic treatment that cures or stops the disease for the vast majority of patients^[12, 13, 25]. The use of Alzheimer's disease medications for the treatment of dementia symptoms has shown significant benefits. There are currently two specific groups of drugs that have an approved indication for AD; acetylcholinesterase inhibitors (ACEIs) (donepezil, galantamine, and rivastigmine) and noncompetitive N-methyl D-aspartate receptor antagonists (memantine)^[26, 27, 28].

Currently there is no drug capable of alleviating Alzheimer's disease, but there are drugs that are prescribed for people with

dementia that have shown good results.

3.4 Dental Clinical Characteristics

The oral microbiota may influence the risk of Alzheimer's disease through circulatory or neuronal access to the brain and interaction with periodontal disease, which often results in tooth loss, a factor associated with an increased risk of AD^[29, 30]. The most common oral diseases found in elderly patients, and even more so with dementia or some type of disability, are associated with the presence of bacterial plaque; dental caries and periodontal disease. This is mainly due to the difficulty in performing oral hygiene, dietary changes, and hyposalivation related to medication consumption^[31, 32]. Recent studies now support the existence of a direct relationship between periodontitis, a chronic inflammatory oral disease, and AD^[33]. A study by Dominy *et al.* has provided evidence for the causality of periodontitis in Alzheimer's disease^[34]. Periodontitis has gained increasing attention^[35], it is defined as a chronic inflammatory disease of infectious origin that manifests as a destruction of the supporting tissue of the teeth^[36].

It is very common to find different oral diseases due to the lack of hygiene as a consequence of Alzheimer's disease, among them, periodontal disease is the one that should be taken more care of.

3.5 Dental Management

Oral infections may play a role in AD^[37]. Older patients have multiple oral health problems related to oral soft tissues, such as gingival bleeding, periodontal pockets, mucosal lesions, and reduced salivary flow^[38]. The stomatologist, being part of the health care team, is empowered to perform home care for patients with severe dependency^[39]. Oral care of patients with AD is essential to maintain their quality of life and prevent diseases^[40], this care can be enhanced by oral care education of caregivers and regular professional dental care^[41, 42, 43]. Maintaining proper oral hygiene in patients is important since they suffer from progressive loss of manual dexterity as the disease progresses^[44].

In order to have more control over oral hygiene, it is important to educate caregivers of Alzheimer's patients so that they are responsible for performing toothbrushing, as well as to be vigilant about keeping appointments with the patient's dentist to maintain proper oral hygiene.

4. Conclusions

It is important to know that the etiology of Alzheimer's disease is uncertain, the most commonly used diagnostic methods are biomarkers, such as neuroimaging. There is currently no drug capable of alleviating Alzheimer's disease. One of the most frequent diseases is periodontal disease, a consequence of poor hygiene, so it is recommended that the caregiver be the person who performs tooth brushing.

5. Conflict of Interest

The authors of this manuscript declare that they have no personal, financial, or proprietary interest in any product, service, or company.

6. Financial Support

PAICYT 112 CS 2022, UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN

7. References

1. Paudel YN, Angelopoulou E, Piperi C, Othman I, Aamir

- K, Shaikh MF. Impact of HMGB1, RAGE, and TLR4 in Alzheimer's Disease (AD): From Risk Factors to Therapeutic Targeting. *Cells*. 2020;9(2):383.
2. Rusek M, Pluta R, Ułamek-Kozioł M, Czuczwar SJ. Ketogenic Diet in Alzheimer's Disease. *Int J Mol Sci*. 2019 Aug 9;20(16):3892.
 3. Parnetti L, Chipi E, Salvadori N, D'Andrea K, Eusebi P. Prevalence and risk of progression of preclinical Alzheimer's disease stages: a systematic review and meta-analysis. *Alzheimers Res Ther*. 2019;11(1):7.
 4. Cortes-Canteli M, Iadecola C. Alzheimer's Disease and Vascular Aging: JACC Focus Seminar. *J Am Coll Cardiol*. 2020;75(8):942-951.
 5. Breijyeh Z, Karaman R. Comprehensive Review on Alzheimer's Disease: Causes and Treatment. *Molecules*. 2020;25(24):5789.
 6. Silva MVF, Loures CMG, Alves LCV, de Souza LC, Borges KBG, Carvalho MDG. Alzheimer's disease: risk factors and potentially protective measures. *J Biomed Sci*. 2019;26(1):33.
 7. Crous-Bou M, Minguillón C, Gramunt N, Molinuevo JL. Alzheimer's disease prevention: from risk factors to early intervention. *Alzheimers Res Ther*. 2017;9(1):71.
 8. Gao SS, Chu CH, Young FYF. Oral Health and Care for Elderly People with Alzheimer's Disease. *Int J Environ Res Public Health*. 2020;17(16):5713.
 9. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, *et al*. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*. 2017;358:j4008.
 10. Sochocka M, Zwolińska K, Leszek J. The Infectious Etiology of Alzheimer's Disease. *Curr Neuropharmacol*. 2017;15(7):996-1009.
 11. Robinson N, Grabowski P, Rehman I. Alzheimer's disease pathogenesis: Is there a role for folate? *Mech Ageing Dev*. 2018;174:86-94.
 12. Stanciu GD, Luca A, Rusu RN, Bild V, Beschea Chiriac SI, Solcan C, *et al*. Alzheimer's Disease Pharmacotherapy in Relation to Cholinergic System Involvement. *Biomolecules*. 2019;10(1):40.
 13. DeTure MA, Dickson DW. The neuropathological diagnosis of Alzheimer's disease. *Mol Neurodegener*. 2019;14(1):32.
 14. Khan S, Barve KH, Kumar MS. Recent Advancements in Pathogenesis, Diagnostics and Treatment of Alzheimer's Disease. *Curr Neuropharmacol*. 2020;18(11):1106-1125.
 15. Vega IE, Cabrera LY, Wygant CM, Velez-Ortiz D, Counts SE. Alzheimer's Disease in the Latino Community: Intersection of Genetics and Social Determinants of Health. *J Alzheimers Dis*. 2017;58(4):979-992.
 16. Scheltens P, Blennow K, Breteler MM, de Strooper B, Frisoni GB, Salloway S, *et al*. Alzheimer's disease. *Lancet*. 2016;388(10043):505-17.
 17. Armstrong R. Risk factors for Alzheimer's disease. *Folia Neuropathol*. 2019;57(2):87-105.
 18. Høgh P. [Alzheimer's disease]. *Ugeskr Laeger*. 2017;179(12):V09160686.
 19. Weller J, Budson A. Current understanding of Alzheimer's disease diagnosis and treatment. *F1000Res*. 2018;7:F1000 Faculty Rev-1161.
 20. Lloret A, Esteve D, Lloret MA, Cervera-Ferri A, Lopez B, Nepomuceno M, *et al*. When Does Alzheimer's Disease Really Start? The Role of Biomarkers. *Int J Mol Sci*. 2019;20(22):5536.
 21. Weiner MW, Veitch DP, Aisen PS, Beckett LA, Cairns NJ, Green RC, *et al*. Alzheimer's Disease Neuroimaging Initiative. The Alzheimer's Disease Neuroimaging Initiative: a review of papers published since its inception. *Alzheimers Dement*. 2012;8(1 Suppl):S1-68.
 22. Hane FT, Robinson M, Lee BY, Bai O, Leonenko Z, Albert MS. Recent Progress in Alzheimer's Disease Research, Part 3: Diagnosis and Treatment. *J Alzheimers Dis*. 2017;57(3):645-665.
 23. Atri A. The Alzheimer's Disease Clinical Spectrum: Diagnosis and Management. *Med Clin North Am*. 2019;103(2):263-293.
 24. Borsa L, Dubois M, Sacco G, Lupi L. Analysis the Link between Periodontal Diseases and Alzheimer's Disease: A Systematic Review. *Int J Environ Res Public Health*. 2021;18(17):9312.
 25. López Locanto Ó. Pharmacological therapy of Alzheimer's disease and other dementias. *Arch. Med Int*. 2015;37(2):61-67.
 26. Möllers T, Perna L, Stocker H, Ihle P, Schubert I, Schöttker B, *et al*. Alzheimer's disease medication and outcomes of hospitalisation among patients with dementia. *Epidemiol Psychiatr Sci*. 2019;29:e73.
 27. Orueta Sánchez R. Medications for Alzheimer's disease under discussion. The role of the family doctor. *Rev Clin Med Fam*. 2019;12(3):113-114.
 28. Gómez Tejada JJ, Hernández Pérez C, Iparraguirre Tamayo AE. Palliative treatments for Alzheimer's Disease. 2020;59(275):59-60.
 29. Dibello V, Lozupone M, Manfredini D, Dibello A, Zupo R, Sardone R, *et al*. Oral frailty and neurodegeneration in Alzheimer's disease. *Neural Regen Res*. 2021;16(11):2149-2153.
 30. Yang B, Tao B, Yin Q, Chai Z, Xu L, Zhao Q, *et al*. Associations Between Oral Health Status, Perceived Stress, and Neuropsychiatric Symptoms Among Community Individuals With Alzheimer's Disease: A Mediation Analysis. *Front Aging Neurosci*. 2022;13:801209.
 31. Mejía Pérez PM, Arbeláez Lelió D, Múnera MC. A review of dental management for geriatric patients with dementia. *Rev. CES Odont*. 2017;30(1):51-67.
 32. Hamza SA, Asif S, Bokhari SAH. Oral health of individuals with dementia and Alzheimer's disease: A review. *J Indian Soc Periodontol*. 2021;25(2):96-101.
 33. Liccardo D, Marzano F, Carraturo F, Guida M, Femminella GD, Bencivenga L, *et al*. Potential Bidirectional Relationship Between Periodontitis and Alzheimer's Disease. *Front Physiol*. 2020;11:683.
 34. Yang CH, Huang PC, Fang CY. Does periodontitis really play a role in dementia? - Novel evidence from molecular insights. *J Dent Sci*. 2021;16(1):530-531.
 35. Laugisch O, Johnen A, Bueglin W, Eick S, Ehmke B, Duning T, *et al*. Oral and Periodontal Health in Patients with Alzheimer's Disease and Other Forms of Dementia - A Cross-sectional Pilot Study. *Oral Health Prev Dent*. 2021;19(1):255-261.
 36. Pazos P, Leira Y, Domínguez C, Pías-Peleteiro JM, Blanco J, Aldrey JM. Association between periodontal disease and dementia: A literature review. *Neurología*. 2018;33:602—613.
 37. Rolim Tde S, Fabri GM, Nitri R, Anghinah R, Teixeira MJ, Siqueira JT, *et al*. Evaluation of patients with Alzheimer's disease before and after dental treatment.

- Arq Neuropsiquiatr. 2014;72(12):919-24.
38. Delwel S, Binnekade TT, Perez RSGM, Hertogh CMPM, Scherder EJA, Lobbezoo F. Oral hygiene and oral health in older people with dementia: a comprehensive review with focus on oral soft tissues. *Clin Oral Investig.* 2018;22(1):93-108.
 39. Nápoles-González I. Stomatologic management of the geriatric dependent patient. *Archivo Médico Camagüey.* 2021;25 (6):2.
 40. Sánchez Morales U, Ramírez Fernández DM, Argüelles Guerrero CA. Dental care of the patient with Alzheimer's disease. Case report. *Rev. Asoc. Odontol Argent* 2020;108:138-142.
 41. Haya Fernández MC, Blasco Garrido I, Cabo Pastor MB. Dental management of the geriatric patient with cognitive impairment. *Av Odontoestomatol.* 2015;31(3):117-127.
 42. Delwel S, Binnekade TT, Perez RS, Hertogh CM, Scherder EJ, Lobbezoo F. Oral health and orofacial pain in older people with dementia: a systematic review with focus on dental hard tissues. *Clin Oral Investig.* 2017 Jan;21(1):17-32.
 43. Fuentes N, Coronado J. Systematic review on the prevention of oral diseases in older adults. *Rev Venez Invest Odont IADR.* 2021;9(2): 90-120.
 44. Desta NT. Pathophysiological association between periodontal disease and Alzheimer's disease: Importance of periodontal health in the elderly. *J Oral Biosci.* 2021;63(4):351-359.

How to Cite This Article

Karla GVG, Irene M, Sheilla DCRG, Yolanda MG, Sergio ENC, Rene HD, Claudio CR, Itzel AVA, Juan MSS. Alzheimer's disease: A dental approach. *International Journal of Applied Dental Sciences.* 2023;9(1):47-50.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.