Brain Health Matters: Integrating Alzheimer's Risk Reduction Strategies

April 24, 2025
1:30-3:30pm
Inland Northwest Dental Conference

Anne. O Rice RDH, BS, FAAOSH, CDP
anneorice@gmail.com
Anneorice.com

Alzheimer's disease poses a significant public health challenge, requiring ongoing research and comprehensive approaches to prevention, care, and support for those affected. While there is no one specific root cause there is an understanding that lifestyle, behavioral, and medical interventions is key to prevention. A compelling amount of scientific evidence has revealed that poor oral health is a risk factor for Alzheimer's disease (AD) independent of age, gender, and laboratory measures and has identified that diseases related to tooth loss, dental caries, periodontal diseases, gingivitis, and other diseases of the lip and oral mucosa are associated with a higher risk of AD. Discover evidence-based, safe strategies not only to improve your own brain health but to help your patients extend their brain span, reinforcing our role as healthcare providers.

- Recognize the scope of bacteria, yeast, and viruses in the development of Alzheimer's disease
- Discover how heart health, hearing loss, genetics, insulin resistance, diet, exercise and sleep impact the risk of cognitive decline
- Realize "red flag" risk factors that can be found on patients' medical histories and how dental providers can make a difference

Books:
XX Brain Lisa Mosconi PhD
The Menopause Brain Lisa Mosconi PhD
The New Menopause Dr. Mary Claire Haver
Brain Food Lisa Mosconi PhD
Thrive Ariana Huffington
Brain Body Diet Sarah Gottfried MD
The Nitric Oxide Solution Nathan Bryan PhD
The Healing Self Deepak Chopra MD, Rudolph Tanzi PhD
Super Genes Deepak Chopra MD, Rudolph Tanzi PhD

Instagram
@drkellyannniotis
@dr_mosconi
@the_cognition_dietician
@drmaryclaire

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(24)01296-0/abstract

The Clinical Practice of Risk Reduction for Alzheimer's Disease: A Precision Medicine Approach
https://www.sciencedirect.com/science/article/pii/S1552526018335131?via%3Dihub

Dementia Prevention in Clinical Practice
https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0042-1759580

https://www.frontiersin.org/articles/10.3389/froh.2021.674329/full

www.ind.org/learn

https://open.spotify.com/episode/2jzTlnqT4pVNbr8YMZ1WFM?si=9pTWoBOqQ56tM5GEoAmemA

Blennow, K., and H. Zetterberg. "Biomarkers for Alzheimer's Disease: Current Status and Prospects for theFuture." Journal of Internal Medicine 284, no. 6 (December 2018): 643–63. https://doi.org/10.1111/joim.12816.

Mattsson-Carlgren N, et al. Prediction of Longitudinal Cognitive Decline in Preclinical Alzheimer Disease Using Plasma Biomarkers. JAMA Neurol. 2023 Apr 1;80(4):360-369

Moir RD, Lathe R, Tanzi RE. The antimicrobial protection hypothesis of Alzheimer's disease. *Alzheimers Dement*. 2018;14(12):1602-1614. doi:10.1016/j.jalz.2018.06.3040

Makin S. The amyloid hypothesis on trial. Nature. 2018;559(7715):S4-S7. doi:10.1038/d41586-018-05719-4

https://www.alzpi.org

Barthélemy NR, Salvadó G, Schindler S, et al. Highly accurate blood test for Alzheimer's disease comparable or superior to clinical CSF tests. *Nat Med*. 2024. doi: 10.1038/s41591-024-02869-z

Shigemizu, D., et al., Prognosis prediction model for conversion from mild cognitive impairment to Alzheimer's disease created by integrative analysis of multi-omics data. *Alz Res Therapy* **12**, 145 (2020).

Geda YE, et al., Engaging in cognitive activities, aging, and mild cognitive impairment: a population-based study [published correction appears in J Neuropsychiatry Clin Neurosci. 2012 Fall;24(4):500. Lewis, Robert A [corrected to Roberts, Lewis A]]. *J Neuropsychiatry Clin Neurosci*. 2011;23(2):149-154. doi:10.1176/jnp.23.2.jnp149

Brookmeyer R, et al., Fore Casting The Global Burden Of Alzheimer's Disease. Alzheimers Dement 2007; 3(03):186–191

Zissimopoulos J, et al., The Value Of Delaying Alzheimer's Disease Onset. Forum Health Econ Policy 2014; 18 (01):25–39

Salat DH, et al., Prefrontal gray and white matter volumes in healthy aging and Alzheimer disease. Arch Neurol 1999;56(03):338–344

Murman DL. The impact of age on cognition. Semin Hear 2015;36 (03):111–121
Hou Y, et al. Ageing as a risk factor for neurodegenerative disease. Nat Rev Neurol 2019;15(10): 565–581

https://www.womenshealth.gov/heart-disease-and-stroke/stroke/stroke-and-women/how-does-stroke-affect-women-differently-men

Andrew Mk, Tierney Mc. The Puzzle Of Sex, Gender And Alzheimer's Disease: Why Are Women More Often Affected Than Men? Womens Health (Lond) 2018;14:1745506518817995

Davis EJ, et al. Sex-specific association of the X chromosome with cognitive change and tau pathology in aging and Alzheimer Disease. *JAMA Neurology*. 2021 Aug 23;e212806. doi: 10.1001/jamaneurol.2021.2806

Rettberg JR, Yao J, Brinton RD. Estrogen: a master regulator of bioenergetic systems in the brain and body. *Front Neuroendocrinol*. 2014;35(1):8-30. doi:10.1016/j.yfrne.2013.08.001

Rahman A, et al., Sex And Gender Driven Modifiers Of Alzheimer's: The Role For Estrogenic Control Across Age, Race, Medical, And Lifestyle Risks. Front Aging Neurosci 2019;11:315

Scheyer O, et al., Female Sex And Alzheimer's Risk: The Menopause Connection. J Prev Alzheimers Dis 2018;5 (04):225–230

Vinogradova Y, Dening T, Hippisley-Cox J, Taylor L, Moore M, Coupland C. Use of menopausal hormone therapy and risk of dementia: nested case-control studies using QResearch and CPRD databases. BMJ 2021;374(2182):n2182

Shumaker SA, Legault C, Kuller L, et al; Women's Health Initiative Memory Study. Conjugated equine estrogens and incidence of probable dementia and mild cognitive impairment in postmenopausal women: Women's Health Initiative Memory Study. JAMA 2004;291(24):2947–2958

Shumaker SA, Legault C, Rapp SR, et al; WHIMS Investigators. Estrogen plus progestin and the incidence of dementia and mild cognitive impairment in postmenopausal women: the Women's Health Initiative Memory Study: a randomized controlled trial. JAMA 2003;289(20):2651–2662

Mehta J, Kling JM, Manson JE. Risks, Benefits, and Treatment Modalities of Menopausal Hormone Therapy: Current Concepts. *Front Endocrinol (Lausanne)*. 2021;12:564781. Published 2021 Mar 26. doi:10.3389/fendo.2021.564781

Mosconi, L., Andy, C., Nerattini, M. et al. Systematic Review and Meta-analysis of Menopause Hormone Therapy (MHT) and the Risk of Alzheimer's Disease and All-cause Dementia: Effects of MHT Characteristics, Location, and APOE-4 Status. Curr Obstet Gynecol Rep 14, 6 (2025). https://doi.org/10.1007/s13669-024-00409-7

Henderson VW, St John JA, Hodis HN, et al. Cognitive effects of estradiol after menopause: a randomized trial of the timing hypothesis. Neurology 2016;87(07):699–708

Song YJ, Li SR, Li XW, et al. The effect of estrogen replacement therapy on Alzheimer's disease and Parkinson's disease in post-menopausal women: a meta-analysis. Front Neurosci 2020; 14:157 82

Zandi PP, et al; Cache County Memory Study Investigators. Hormone replacement therapy and incidence of Alzheimer disease in older women: the Cache County Study. JAMA 2002;288(17):2123–2129

Kantarci K, Lowe VJ, Lesnick TG, et al. Early postmenopausal transdermal 17β-estradiol therapy and amyloid-β deposition. J Alzheimers Dis 2016;53(02):547–556

LeBlanc ES, Janowsky J, Chan BK, Nelson HD. Hormone replacement therapy and cognition: systematic review and meta-analysis. JAMA

Saleh, R.N.M., et al., Hormone Replacement Therapy Is Associated With Improved Cognition And Larger Brain Volumes In At-Risk Apoe4 Women: Results From The European Prevention Of Alzheimer's Disease (Epad) Cohort. Alz Res Therapy 15, 10 (2023)

Nerattini, M. et al., Front. Aging Neurosci., 23 October 2023 Sec. Alzheimer's Disease And Related Dementias Volume 15 - 2023 | Https://Doi.Org/10.3389/Fnagi.2023.1260427

Pourhadi N, et al., Menopausal Hormone Therapy And Dementia: Nationwide, Nested Case-Control Study [Published Correction Appears In Bmj. 2023 Jun 29; 381:P1499]. *Bmj*. 2023; 381:E072770. Published 2023 Jun 28. Doi:10.1136/Bmj-2022-072770

Coughlan GT, et al., Association Of Age At Menopause And Hormone Therapy Use With Tau And B-Amyloid Positron Emission Tomography. *Jama Neurol*. 2023;80(5):462-473. Doi:10.1001/Jamaneurol.2023.0455

Yan Y, Wang X, Chaput D, et al. X-linked ubiquitin-specific peptidase 11 increases tauopathy vulnerability in women. *Cell*. 2022;185(21):3913-3930.e19. doi:10.1016/j.cell.2022.09.002

Bateman RJ, et al. Autosomal-dominant Alzheimer's disease: a review and proposal for the prevention of Alzheimer's disease. Alzheimers Res Ther 2011;3(01):1

Cruts M, Van Broeckhoven C. Presenilin mutations in Alzheimer's disease. Hum Mutat 1998;11(03):183–190

St George-Hyslop PH, Haines JL, Farrer LA, et al; FAD Collaborative Study Group. Genetic linkage studies suggest that Alzheimer's disease is not a single homogeneous disorder. Nature 1990;347 (6289):194–197

Winblad B, Amouyel P, Andrieu S, et al. Defeating Alzheimer's disease and other dementias: a priority for European science and society. Lancet Neurol 2016;15(05):455–532

Kulminski Am, et al., Definitive Roles Of Tomm40-Apoe-Apoc1 Variants In The Alzheimer's Risk. *Neurobiol Aging*. 2022;110:122-131. Doi:10.1016/J.Neurobiolaging.2021.09.009

Kulminski AM, Philipp I, Shu L, Culminskaya I. Definitive roles of TOMM40-APOE-APOC1 variants in the Alzheimer's risk. *Neurobiol Aging*. 2022;110:122-131. doi:10.1016/j.neurobiolaging.2021.09.009

LifeExtension.com salivary testing for APOE4

Mitchell BL, et al., Exploring The Genetic Relationship Between Hearing Impairment And Alzheimer's Disease. Alzheimers Dement (Amst) 2020;12(01):E12108

Zheng Y, et al., Hearing Impairment And Risk Of Alzheimer's Disease: A Meta-Analysis Of Prospective Cohort Studies. Neurol Sci 2017;38(02):233–239

Bagheri F, et al., Alzheimer's Disease And Hearing Loss Among Older Adults: A Literature Review. Int J Psychol Behav Sci 2018;8(05):77–80

App NIOSH SLM by EA LAB

Soundly.com

Liang J, Et Al "Association Between Onset Age Of Coronary Heart Disease And Incident Dementia: A Prospective Cohort Study" J Am Heart Assoc 2023; Doi: 10.1161/Jaha.123.031407.

Miyauchi S, Nishi H, Ouhara K, et al. Relationship Between Periodontitis and Atrial Fibrosis in Atrial Fibrillation: Histological Evaluation of Left Atrial Appendages. *JACC Clin Electrophysiol*. 2023;9(1):43-53. doi:10.1016/j.jacep.2022.08.018

Sczepanik Fsc, et al., Periodontitis Is An Inflammatory Disease Of Oxidative Stress: We Should Treat It That Way. Periodontol 2000. 2020;84(1):45-68. Doi:10.1111/Prd.12342

Wang Q, et al., Homocysteine and Folic Acid: Risk Factors for Alzheimer's Disease-An Updated Meta-Analysis. Front Aging Neurosci. 2021; 13:665114. Published 2021 May 26. doi:10.3389/fnagi.2021.665114

Joseph R, et al., Elevated plasma homocysteine levels in chronic periodontitis: a hospital-based case-control study. J Periodontol. 2011;82(3):439-444. doi:10.1902/jop.2010.100271

Penmetsa GS, et al., Analysis of Plasma Homocysteine Levels in Patients with Chronic Periodontitis Before and After Nonsurgical Periodontal Therapy Using High-Performance Liquid Chromatography. Contemp Clin Dent. 2020;11(3):266-273. doi:10.4103/ccd.ccd_650_18

Bhardwaj S, et al., Effect of non-surgical periodontal therapy on plasma homocysteine levels in Indian population with chronic periodontitis: a pilot study. J Clin Periodontol. 2015;42(3):221-227. doi:10.1111/jcpe.12374

Chen Ly, et al., Association Of Atrial Fibrillation With Cognitive Decline And Dementia Over 20 Years: The Aric-Ncs (Atherosclerosis Risk In Communities Neurocognitive Study). *J Am Heart Assoc*. 2018;7(6):E007301. Published 2018 Mar 7. Doi:10.1161/Jaha.117.007301

Miyauchi S, et al., Relationship Between Periodontitis And Atrial Fibrosis In Atrial Fibrillation: Histological Evaluation Of Left Atrial Appendages. Jacc Clin Electrophysiol. 2023;9(1):43-53. Doi:10.1016/J.Jacep.2022.08.018

Bunch TJ. Atrial Fibrillation and Dementia. *Circulation*. 2020;142(7):618-620. doi:10.1161/CIRCULATIONAHA.120.045866

Frank J. Wolters, Hazel I. Zonneveld, Silvan Licher, Lotte G.M. Cremers, on behalf of the Heart Brain Connection Collaborative Research Group, M. Kamran Ikram, Peter J. Koudstaal, Meike W. Vernooij, M. Arfan Ikram Neurology Aug 2019, 93 (9) e917-e926; DOI: 10.1212/WNL.0000000000008003

Qiang YX, Deng YT, Zhang YR, et al. Associations of blood cell indices and anemia with risk of incident dementia: A prospective cohort study of 313,448 participants. *Alzheimers Dement*. 2023;19(9):3965-3976. doi:10.1002/alz.13088

Patel MD, Shakir QJ, Shetty A. Interrelationship between chronic periodontitis and anemia: A 6-month follow-up study. J Indian Soc Periodontol. 2014;18(1):19-25. doi:10.4103/0972-124X.128194a fib

Miyauchi S, Kawada-Matsuo M, Furusho H, et al. Atrial Translocation of *Porphyromonas gingivalis* Exacerbates Atrial Fibrosis and Atrial Fibrillation. *Circulation*. Published online March 18, 2025. doi:10.1161/CIRCULATIONAHA.124.071310

Heart Disease and Stroke Statistics 2022 Update
https://www.ahajournals.org/doi/10.1161/CIR.0000000000001052

Lane, C.A. et al., (2019) Associations Between Blood Pressure Across Adulthood And Late-Life Brain Structure & Pathology In The Neuroscience Sub Study Of The 1946 British Birth Cohort (Insight 46): An Epidemiological Study. Lancet Neurol. S1474-4422 (19) 30228-5

Gilsanz P, et al., Female Sex, Early-Onset Hypertension, And Risk Of Dementia. Neurology. 2017; 89(18):1886-1893. Doi:10.1212/Wnl.0000000000004602

Desvarieux M, Et Al., Periodontal Bacteria And Hypertension: The Oral Infections And Vascular Disease Epidemiology Study (Invest). J Hypertens. 2010;28(7):1413-1421. Doi:10.1097/Hjh.0b013e328338cd36

Muñoz Aguilera E, Et Al., Association Between Periodontitis And Blood Pressure Highlighted In Systemically Healthy Individuals: Results From A Nested Case-Control Study. Hypertension. 2021;77(5):1765-1774. Doi:10.1161/Hypertensionaha.120.16790

Sierra C. Hypertension and the Risk of Dementia. *Front Cardiovasc Med*. 2020;7:5. Published 2020 Jan 31. doi:10.3389/fcvm.2020.00005

https://www.heart.org/en/health-topics/high-blood-pressure

https://www.rdhmag.com/patient-care/patient-education/article/55018346/on-the-pulse-of-cardiovascular-wellness-through-dental-treatment

Guimarães Henriques JC, et al., Panoramic radiography in the diagnosis of carotid artery atheromas and the associated risk factors. *Open Dent J*. 2011;5:79-83. doi:10.2174/1874210601105010079

Desvarieux M, Demmer RT, Jacobs DR Jr, et al. Periodontal bacteria and hypertension: the oral infections and vascular disease epidemiology study (INVEST). *J Hypertens*. 2010;28(7):1413-1421. doi:10.1097/HJH.0b013e328338cd36

Omron or Withing Blood pressure cuffs bicep

Rivier CA, Renedo D, de Havenon A, et al. Poor Oral Health Is Associated with Worse Brain Imaging Profiles. Preprint. medRxiv. 2023;2023.03.18.23287435. Published 2023 Mar 18. doi:10.1101/2023.03.18.23287435

Barnes LL et al., Trial Of The Mind Diet For Prevention Of Cognitive Decline In Older Persons [Published Online Ahead Of Print, 2023 Jul 18]. *N Engl J Med*. 2023;10.1056/Nejmoa2302368. Doi:10.1056/Nejmoa2302368

DASH diet-Dietary Approaches to Stop Hypertension

Craighead DH, et al., Time-Efficient Inspiratory Muscle Strength Training Lowers Blood Pressure and Improves Endothelial Function, NO Bioavailability, and Oxidative Stress in Midlife/Older Adults With Above-Normal Blood Pressure. J Am Heart Assoc. 2021 Jul 6;10(13):e020980. doi: 10.1161/JAHA.121.020980. Epub 2021 Jun 29. PMID: 34184544.

Journal of AD Raji, Cyrus A. et al. 'Exercise-Related Physical Activity Relates to Brain Volumes in 10,125 Individuals'. 1 Jan. 2023 : 1 – 11.

150 min. week/ loose visceral fat/ Zone 2 training
220-age x 60-70% = heart rate

del Pozo Cruz B, Ahmadi M, Naismith SL, Stamatakis E. Association of Daily Step Count and Intensity With Incident Dementia in 78 430 Adults Living in the UK. *JAMA Neurol.* 2022;79(10):1059–1063. doi:10.1001/jamaneurol.2022.2672

Brini S, et al., Physical Activity In Preventing Alzheimer's Disease And Cognitive Decline: A Narrative Review. Sports Med 2018;48(01):29–44

Dehghani, F., et al., Probiotics supplementation and brain-derived neurotrophic factor (BDNF): a systematic review and meta-analysis of randomized controlled trials. *https://doi.org/10.1080/1028415X.2022.2110664* (2022) doi:10.1080/1028415X.2022.2110664.

Prasedya ES, Ambana Y, Martyasari NWR, Aprizal Y, Nurrijawati, Sunarpi. Short-term E-cigarette toxicity effects on brain cognitive memory functions and inflammatory responses in mice. *Toxicol Res*. 2020;36(3):267-273. Published 2020 Feb 4. doi:10.1007/s43188-019-00031-3

Bartochowski Z, Et Al., Dietary Interventions To Prevent Or Delay Alzheimer's Disease: What The Evidence Shows. Curr Nutr Rep 2020; 9(03):210–225

De Marchi F. et al., New Insights Into The Relationship Between Nutrition And Neuroinflammation In Alzheimer's Disease: Preventive And Therapeutic Perspectives, Cns & Neurological Disorders - Drug Targets 2023; 22 Doi.Org/10.2174/1871527322666230608110201

Morris Mc, et al., Dietary Fat Composition And Dementia Risk. Neurobiol Aging 2014;35(Suppl 2):S59–S64

Zielińska Ma, Et Al., Vegetables And Fruit, As A Source Of Bioactive Substances, And Impact On Memory And Cognitive Function Of Elderly. Postepy Hig Med Dosw 2017; 71(00):267–280

Norwitz NG, et al., Precision nutrition for Alzheimer's prevention in ApoE4 carriers. Nutrients 2021;13 (04):1362Corley BT, Carroll RW, Hall RM, Weatherall M, Parry-Strong A, Krebs JD. Intermittent fasting in Type 2 diabetes mellitus and the risk of hypoglycaemia: a randomized controlled trial. Diabet Med 2018;35(05):588–594

5 most brain boosting foods: water, fish eggs, fatty fish, dark leafy greens, extra virgin olive oil

PUFA-polyunsaturated fats
Omega 3 fatty acids

Kruse, A.B., Kowalski, C.D., Leuthold, S. *et al.* What is the impact of the adjunctive use of omega-3 fatty acids in the treatment of periodontitis? A systematic review and meta-analysis. *Lipids Health Dis* **19**, 100 (2020). https://doi.org/10.1186/s12944-020-01267-x

Wolters, F. et al., on behalf of the Heart Brain Connection Collaborative Research Group, M. Kamran ikram, et al., Neurology Aug 2019, 93 (9) e917-e926; DOI: 10.1212/WNL.0000000000008003

Wang Y, et al., Oxidative Stress and Antioxidant System in Periodontitis. *Front Physiol*. 2017;8:910. Published 2017 Nov 13. doi:10.3389/fphys.2017.00910

Sczepanik Fsc, Grossi Ml, Casati M, Et Al. Periodontitis Is An Inflammatory Disease Of Oxidative Stress: We Should Treat It That Way. Periodontol 2000. 2020;84(1):45-68. Doi:10.1111/Prd.12342

Malcangi G, et al., Benefits Of Natural Antioxidants On Oral Health. Antioxidants (Basel). 2023; 12(6):1309. Published 2023 Jun 20. Doi:10.3390/Antiox12061309

MIND diet https://www.healthline.com/nutrition/mind-diet

Bartochowski Z, et al., Dietary interventions to prevent or delay Alzheimer's disease: what the evidence shows. Curr Nutr Rep 2020;9(03):210–225

Barnes Ll, et al., Trial Of The Mind Diet For Prevention Of Cognitive Decline In Older Persons [Published Online Ahead Of Print, 2023 Jul 18]. *N Engl J Med*. 2023; 10.1056/Nejmoa2302368. Doi:10.1056/Nejmoa2302368

Li X, et al., Link Between Type 2 Diabetes And Alzheimer's Disease: From Epidemiology To Mechanism And Treatment clin Interv Aging 2015;10:549–560 Tabassum S, Misrani A, Yang L. Exploiting Common Aspects Of Obesity And Alzheimer's Disease. Front Hum Neurosci 2020; 14:602360

Terzo S, et al., From Obesity To Alzheimer's Disease Through Insulin Resistance. J Diabetes Complications 2021;35(11):108026

Bendlin BB. Et al., Antidiabetic Therapies And Alzheimer Disease. Dialogues Clin Neurosci 2019; 21(01):83–91

Sabia S, et al., Fayosse A, Dumurgier J, Et Al. Association Of Sleep Duration In Middle And Old Age With Incidence Of Dementia. Nat Commun 2021;12(01):2289

Nedergaard M, Goldman Sa. Glymphatic Failure As A Final Common Pathway To Dementia. Science 2020;370(6512):50–56

Pase MP, Himali JJ, Grima NA, et al. Sleep architecture and the risk of incident dementia in the community. Neurology 2017;89(12): 1244–1250

Yo-El S Ju, et al., Slow wave sleep disruption increases cerebrospinal fluid amyloid-β levels, Brain, Volume 140, Issue 8, August 2017, Pages 2104-2111, https://doi.org/10.1093/brain/awx148

Lal C, et al., The Link between Obstructive Sleep Apnea and Neurocognitive Impairment: An Official American Thoracic Society Workshop Report. *Ann Am Thorac Soc*. 2022;19(8):1245-1256. doi:10.1513/AnnalsATS.202205-380ST

Wang Y, et al., One Year of Continuous Positive Airway Pressure Adherence Improves Cognition in Older Adults With Mild Apnea and Mild Cognitive Impairment. Nurs Res. 2020;69(2):157-164. doi:10.1097/NNR.0000000000000420

André C, Et Al., Association Of Sleep-Disordered Breathing With Alzheimer Disease Biomarkers In Community-Dwelling Older Adults: A Secondary Analysis Of A Randomized Clinical Trial. Jama Neurol. 2020;77(6):716-724. Doi:10.1001/Jamaneurol.2020.0311

Zacharias HU, Et Al., Association Between Obstructive Sleep Apnea And Brain White Matter Hyperintensities In A Population-Based Cohort In Germany. Jama Netw Open 2021; 4 (10) E2128225-E2128225

Guay-Gagnon M, Vat S, Forget MF, et al. Sleep apnea and the risk of dementia: A systematic review and meta-analysis. *J Sleep Res*. 2022;31(5):e13589. doi:10.1111/jsr.13589

Comparative effectiveness of CPAP and mandibular advancement device (mad) therapy on sleep apnea-specific hypoxic burden (sashb) in OSA patients Vanderveken, Olivier M et al. Chest, volume 166, issue 4, a6232 - a6234

Jung JY, Kang CK. Investigation on the Effect of Oral Breathing on Cognitive Activity Using Functional Brain Imaging. Healthcare (Basel). 2021;9(6):645. Published 2021 May 29. doi:10.3390/healthcare9060645

Srichards KC, Et Al., Cpap Adherence May Slow 1-Year Cognitive Decline In Older Adults With Mild Cognitive Impairment And Apnea. J Am Geriatr Soc. 2019;67(3):558-564. Doi:10.1111/Jgs.15758

Qian, L., Rawashdeh, O., Kasas, L. *et al.* Cholinergic basal forebrain degeneration due to sleep-disordered breathing exacerbates pathology in a mouse model of Alzheimer's disease. *Nat Commun* **13**, 6543 (2022). https://doi.org/10.1038/s41467-022-33624-y

Andrade AG, Bubu OM, Varga AW, Osorio RS. The Relationship between Obstructive Sleep Apnea and Alzheimer's Disease. Journal of Alzheimer's Disease. 2018;64(s1):S255-S270. doi:10.3233/JAD-179936

Miklossy J. Historic Evidence To Support A Causal Relationship Between Spirochetal Infections And Alzheimer's Disease. Front. Aging Neurosci. 2015;7:46. Doi: 10.3389/Fnagi.2015.00046.

Sparks Stein P., Et Al., Serum Antibodies To Periodontal Pathogens Are A Risk Factor For Alzheimer's Disease. Alzheimer's Dement. 2012; 8:196–203. Doi: 10.1016/J.Jalz.2011.04.006

Holmer J., Et Al., Association Between Periodontitis And Risk Of Alzheimer's Disease, Mild Cognitive Impairment And Subjective Cognitive Decline: A Case-Control Study. J. Clin. Periodontol. 2018;45:1287–1298. Doi: 10.1111/Jcpe.13016.

Chen C.-K., Et Al., Association Between Chronic Periodontitis And The Risk Of Alzheimer's Disease: A Retrospective, Population-Based, Matched-Cohort Study. Alzheimer's Res. Ther. 2017;9:56. Doi: 10.1186/S13195-017-0282-6

Borsa L, Et Al., Analysis The Link Between Periodontal Diseases And Alzheimer's Disease: A Systematic Review. *Int J Environ Res Public Health*. 2021;18(17):9312. Published 2021 Sep 3. Doi:10.3390/Ijerph18179312

Beydoun M, Et Al. Clinical And Bacterial Markers Of Periodontitis And Their Association With Incident All-Cause And Alzheimer's Disease Dementia In A Large National Survey. *Journal Of Alzheimer's Disease*. 2020;75(1):157-172. Doi: 10.3233/JAD-200064.

Gil-Montoya JA, Et Al., Is Periodontitis A Risk Factor For Cognitive Impairment And Dementia? A Case-Control Study. J Periodontol. 2015;86(2):244-253. Doi:10.1902/Jop.2014.140340

Kitazawa M. Et Al., Lipopolysaccharide-Induced Inflammation Exacerbates Tau Pathology By A Cyclin-Dependent Kinase 5-Mediated Pathway In A Transgenic Model Of Alzheimer's Disease. J Neurosci. 2005;25:8843–53.

Lee JW, Et Al., Neuro-Inflammation Induced By Lipopolysaccharide Causes Cognitive Impairment Through Enhancement Of Beta-Amyloid Generation. J Neuroinflammation. 2008;5:37–50.

Verma A, et al., Gingivalis-Lps Induces Mitochondrial Dysfunction Mediated By Our Study Has Provided Evidence That P. Gingivalis-Lps Triggered Oxidative Stress Resulting In Mitochondrial Dysfunction And Neuroinflammation

Ke J, et al., Mitochondrial Dysfunction: A Potential Target For Alzheimer's Disease Intervention And Treatment. Drug Discov Today. 2021;26(8):1991-2002. Doi:10.1016/J.Drudis.2021.04.025

McGeer PL, et al., Inflammation, autotoxicity and Alzheimer disease. Neurobiol Aging. 2001;22:799–809.

Dantzer R, et al., Neural and humoral pathways of communication from the immune system to the brain: parallel or convergent? Auton Neurosci. 2000;85:60–5.

Miller AJ, Luheshi GN, Rothwell NJ, Hopkins SJ. Local cytokine induction by LPS in the rat air pouch and its relationship to the febrile response. Am J Physiol. 1997;272:857–61.

Vigasova D, Et Al., Nemergut M, Liskova B, Damborsky J. Multi-Pathogen Infections And Alzheimer's Disease. *Microb Cell Fact*. 2021;20(1):25. Published 2021 Jan 28. Doi:10.1186/S12934-021-01520-7

Miklossy J. Alzheimer's Disease - A Neurospirochetosis. Analysis Of The Evidence Following Koch's And Hill's Criteria. J Neuroinflammation. 2011;8:90. Published 2011 Aug 4. Doi:10.1186/1742-2094-8-90

Tang Z, et al., Treponema Denticola Induces Alzheimer-Like Tau Hyperphosphorylation By Activating Hippocampal Neuroinflammation In Mice. J Dent Res. 2022;101(8):992-1001. Doi:10.1177/00220345221076772

Mendes, R.T. et al., (2016). Endothelial Cell Response To Fusobacterium Nucleatum. Infection And Immunity. 84. Iai.01305-15. 10.1128/Iai.01305-15.

Yan C, et al., Fusobacterium Nucleatum Infection-Induced Neurodegeneration And Abnormal Gut Microbiota Composition In Alzheimer's Disease-Like Rats. Front Neurosci. 2022; 16:884543. Published 2022 Sep 16. Doi:10.3389/Fnins.2022.884543

Wu H, et al., The Periodontal Pathogen Fusobacterium Nucleatum Exacerbates Alzheimer's Pathogenesis Via Specific Pathways. Front Aging Neurosci. 2022; 14:912709. Published 2022 Jun 23. Doi:10.3389/Fnagi.2022.912709

Noble J.M., et al., Serum IgG antibody levels to periodontal microbiota are associated with incident Alzheimer disease. PLoS ONE. 2014;9: e114959. doi: 10.1371/journal.pone.0114959

Kamer A.R., et al., TNF-Alpha and Antibodies to Periodontal Bacteria Discriminate between Alzheimer’s Disease Patients and Normal Subjects. J. Neuroimmunol. 2009; 216:92–97. doi: 10.1016/j.jneuroim.2009.08.013

Laugisch O. et al., Periodontal Pathogens and Associated Intrathecal Antibodies in Early Stages of Alzheimer’s Disease. J. Alzheimers Dis. 2018; 66:105–114.

Jungbauer G, et al., Periodontal microorganisms and Alzheimer disease - A causative relationship? Periodontol 2000. 2022;89(1):59-82. doi:10.1111/prd.12429

Dayakar, et al., Mundoor & Bhat, Shivanand & Nithya, K & Lakshmi, Bakia. (2021). Prevotella Intermedia -An Overview And Its Role In Periodontitis. Journal Of Advanced Clinical And Research Insights. 8. 10.15713/Ins.Jcri.336.

Maitre Y, Et Al., Evidence And Therapeutic Perspectives In The Relationship Between The Oral Microbiome And Alzheimer's Disease: A Systematic Review. Int J Environ Res Public Health. 2021; 18(21):11157. Published 2021 Oct 24. Doi:10.3390/Ijerph182111157

Cairns DM, Itzhaki RF, Kaplan DL. Potential Involvement Of Varicella Zoster Virus In Alzheimer's Disease Via Reactivation Of Quiescent Herpes Simplex Virus Type 1. *J Alzheimers Dis*. 2022;88(3):1189-1200. Doi:10.3233/JAD-220287

Itzhaki RF, Lathe R, Balin BJ, et al. Microbes and Alzheimer's Disease. *J Alzheimers Dis*. 2016;51(4):979-984. doi:10.3233/JAD-160152

Tzeng NS, Chung CH, Lin FH, et al. Anti-herpetic medications and reduced risk of dementia in patients with herpes simplex virus infections-a nationwide, population-based cohort study in Taiwan [published online February 27, 2018]. Neurotherapeutics. doi:10.1007/s13311-018-0611-x

Devanand DP, Et Al., Antiviral Therapy: Valacyclovir Treatment Of Alzheimer's Disease (VALAD) Trial: Protocol For A Randomised, Double-Blind,Placebo-Controlled, Treatment Trial. BMJ Open. 2020;10(2):E032112. Published 2020 Feb 6. Doi:10.1136/Bmjopen-2019-032112

Hyde VR, Zhou C, Fernandez JR, et al. Anti-herpetic tau preserves neurons via the cGAS-STING-TBK1 pathway in Alzheimer's disease. Cell Rep. 2025;44(1):115109. doi:10.1016/j.celrep.2024.115109

Lopatko Et Al., Herpesvirus Infections, Antiviral Treatment, And The Risk Of Dementia—A Registry-Based Cohort Study In Sweden. Alzheimer's Dement. 2021; 7: E12119. Doi.Org/10.1002/Trc2.12119

Moskvin, S. V. (2021). Low-Level Laser Therapy for Herpesvirus Infections: A Narrative Literature Review: LLLT for herpesvirus. Journal of Lasers in Medical Sciences, 12, e38

Barros AWP, et al., Is low-level laser therapy effective in the treatment of herpes labialis? Systematic review and meta-analysis. Lasers Med Sci. 2022;37(9):3393-3402. doi:10.1007/s10103-022-03653-6

angie@laserrdh.com

Cappuyns I, Gugerli P, Mombelli A. Viruses in periodontal disease - a review. *Oral Dis*. 2005;11(4):219-229. doi:10.1111/j.1601-0825.2005.01123.x

https://www.o2nosefilters.com/product/o2-micro-nose-filters/

https://www.todaysrdh.com/gene-editing-research-hints-at-possible-treatment-for-cold-sores/

Valacyclovir, Acyclovir, Famciclovir

Sitavig

https://www.medicalnewstoday.com/articles/how-a-candida-infection-could-trigger-mechanisms-tied-to-alzheimers#Potential-implications-for-developing-new-treatment-strategies

Lei, S., Li, J., Yu, J. et al. Porphyromonas gingivalis bacteremia increases the permeability of the blood-brain barrier via the Mfsd2a/Caveolin-1 mediated transcytosis pathway. Int J Oral Sci 15, 3 (2023). https://doi.org/10.1038/s41368-022-00215-y

Salhi L, Al Taep Y, Salmon E, Van Hede D, Lambert F. How Periodontitis or Periodontal Bacteria Can Influence Alzheimer's Disease Features? A Systematic Review of Pre-Clinical Studies. Journal of Alzheimer's Disease. 2023;96(3):979-1010. doi:10.3233/JAD-230478

Hajishengallis, G., Chavakis, T. Local and systemic mechanisms linking periodontal disease and inflammatory comorbidities. Nat Rev Immunol 21, 426–440 (2021). https://doi.org/10.1038/s41577-020-00488-6

Joanna E L'Heureux, Anne Corbett, Clive Ballard, David Vauzour, Byron Creese, Paul G Winyard, Andrew M Jones, Anni Vanhatalo, Oral microbiome and nitric oxide biomarkers in older people with mild cognitive impairment and *APOE4* genotype, *PNAS Nexus*, Volume 4, Issue 1, January 2025, pgae543

Orr Me, et al., Oral Health And Oral-Derived Biospecimens Predict Progression Of Dementia?. Oral Dis. 2020;26(2):249-258. Doi:10.1111/Odi.13201

Oli MW, Otoo HN, Crowley PJ, et al. Functional amyloid formation by Streptococcus mutans. Microbiology (Reading). 2012;158(Pt 12):2903-2916. doi:10.1099/mic.0.060855-0

Qi X, et al., Dose-Response Meta-Analysis On Tooth Loss With The Risk Of Cognitive Impairment And Dementia. J Am Med Dir Assoc. 2021;22(10):2039-2045. Doi:10.1016/J.Jamda.2021.05.009

Ono Y, et al., Occlusion And Brain Function: Mastication As A Prevention Of Cognitive Dysfunction. J Oral Rehabil. 2010;37(8):624-640. Doi:10.1111/J.1365-2842.2010.02079.X

Appliance cleaning
https://www.tastyclean.com/shop/
https://www.steraligner.com
https://drbdentalsolutions.com