

Letter to the Editor

Letter to the editor regarding: Summary of the evidence on modifiable risk factors for cognitive decline and dementia: A population-based perspective

The article entitled “Summary of the evidence on modifiable risk factors for cognitive decline and dementia: A population-based perspective” was published recently by M Baumgart et al. in *Alzheimer's & Dementia* on behalf of the Alzheimer's Association. This article succinctly reviews the evidence for many putative modifiable risk factors of Alzheimer's disease (AD) and cognitive decline [1] and concludes that there is strong evidence for some risk factors, e.g. diabetes and obesity. However, although the article sampled a broad range of risk factors, it was not comprehensive. Considering the vast implications of this article for practice guidelines and AD research priorities, we suggest attention to another well-studied and modifiable risk for AD—periodontal disease.

Periodontal disease is a chronic polymicrobial disease of the tissues supporting the teeth. Others and we have studied the association between AD/cognition and periodontal disease using a variety of exposure indexes, study designs, and outcomes. In one longitudinal study of 597 subjects followed for 32 years, there was an association ($1.03 < \text{hazard ratio [HR]} > 1.09$) between pocket depth, alveolar bone loss, and tooth loss (indices of current and historical periodontal disease) and cognitive decline [2,3]. Another showed that periodontal inflammation predicted cognitive decline in 947 subjects with mild-to-moderate strength (odds ratio [OR] = 1.57 [95% confidence interval (CI), 1.01–2.45]) [4]. Other studies defining periodontal disease by immunologic parameters [5] also show strong prediction (OR = HR = 3.1; 95% CI, 1.5–6.4) [6]. Because of its convenient assessment, the most prevalent index of periodontal exposure is tooth loss (it is also the ultimate outcome of the untreated periodontal disease), and seven longitudinal studies

show increasing risk for AD/cognitive decline with increasing numbers of missing teeth (OR range: 1.05–2.38) [7,8]. Together, these studies provide strong evidence for a link between periodontal disease and AD/cognition.

Periodontal disease is thought to contribute to AD progression through multiple mechanisms [9] including inflammation, infection, and upregulation of the brain amyloid burden [10], and some of these mechanisms have been proposed for other chronic diseases such as diabetes [11]. Notably, Sparks [5] showed that high levels of immunoglobulin G antibodies to periodontal bacteria are present 10 years before conversion to AD, indicating the importance of periodontal infections in AD pathogenesis.

Periodontal disease is highly prevalent in the general population. In the United States, 46% of adults comprising 64.7 million people have periodontitis [12]. Thus, even low-to-moderate size risks produce a substantial burden on the population. Furthermore, periodontal disease can be successfully managed, suggesting that prevention and treatment could limit risk in a significant number of AD cases. As Robert Stewart (2015) recognized, oral health is often overlooked when assessing medical risks. Nevertheless, periodontal disease is an established and modifiable risk for AD, and deserves a place in this list.

Acknowledgments

This study was supported by NIH/NIA grants AG035137, AG032554, AG022374, and AG13616, NIH DE023139-02, Alzheimer's Association NIRG-12-173937 and NIH/NCATS UL1 TR000038.

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No conflict of interest is reported for A.R.K. and M.N.J. M.d.L. has a patent on a technology that was licensed to Abiant Imaging, Inc, by NYU, has a financial interest in this license agreement, hold stock, and stock options in the company. M.d.L. has received compensation for consulting services from Abiant Imaging.

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<http://dx.doi.org/10.1016/j.dadm.2015.08.003>