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Letter to British Dental Journal,

64 Wimpole Street,
London, W1G 8YS.

Section: Special care dentistry

Title: Direction of risk: periodontitis to dementia or converse?

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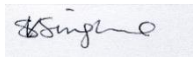
Sir, we are writing in response to the publications that the BDJ, supports describing the association between dementia and periodontal disease. It is fairly well established that those suffering with Alzheimer's disease (AD) and dementia are found to have a greater incidence of periodontal disease than those who do not. The evidence published in the BDJ appears to support dementia being a risk factor for periodontal disease. This is an observation based behavioural change associated with dementia.

We propose to support that periodontal disease is a risk factor for AD.

We would argue that epidemiological and laboratory based investigations suggest periodontitis only becomes a risk factor for AD some 10 years after it is initially diagnosed. This would imply that studies conducted in less than 10-year cohort such as the one by Stewart et al. [2013]¹ would provide inconclusive results. A β deposition in human brain occurs decades before the clinical symptoms appear and Gil Montoya and colleagues 2017 report implies the increase in A β deposition in human brains correlates with severe periodontal disease. This model considers AD pathology developing from a pattern of innate immune responses mounted by pathogens overtime. It is therefore plausible to suggest that the pathogen load (poor oral hygiene, as reflected by pocket depth) is the likely risk for AD at any age. *In vivo* infection models of periodontitis are supporting this view by recapitulating hallmark lesions in the expected anatomical area of the brain with AD-like phenotype via innate signaling cascades summarized in Singhrao and Olsen [2019].² The cysteine proteases (gingipains) of *P. gingivalis*, cannot be ignored considering the tau protein that binds microtubules in the neurons is its substrate.³ This consideration has not yet been incorporated into case control and/or cohort studies. In the meantime, the UK NHS England provides a recommendable oral health toolkit for the elderly to maintain better oral hygiene with the aim of delaying/preventing AD. In addition, the "Eatwell" diet appears to be an integral part of

dementia free old age and we request for daily exercise and sleep hygiene to be incorporated into the broader picture of prevention.⁴

Signature of the authors


e-signature of Dr A. Harding

E-signature of Dr S.K. Singhrao

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3. Dominy SS, Lynch C, Ermini F et al. Porphyromonas gingivalis in Alzheimer's disease brains: Evidence for disease causation and treatment with small-molecule inhibitors. *Sci Adv* 2019; **5**: aau3333
4. Harding A, Gonder U, Robinson SJ, Crean S, Singhrao SK. Exploring the association between Alzheimer's disease, oral health, microbial endocrinology and nutrition. *Front Aging Neurosci* 2017; **9**: 398.