

Co-Relation Between Chronic Periodontitis and Cerebrovascular Disease

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Received: June 20, 2023; **Published:** June 22, 2023

Chronic periodontitis is a microbial, chronic progressive inflammatory diseases of teeth leading to gingival inflammation, attachment and bone lose leading to mobility and teeth loss. Chronic periodontitis mainly due to poor oral hygiene, predisposing factors such as diabetes, immunocompromised patients, chemotherapy and radiotherapy patients, patients on immunosuppressants, leukemia, steroids, patients on smoking and chewing tobacco. The key microbes involved in chronic periodontitis are *Prevotella intermedia*, *Treponema denticola*, *Porphyromonas gingivalis*, *Tannerella forsythia* and *A. actinomycetemcomitans*. Altered oral microbiota in patients with chronic periodontitis is known as dysbiosis. Chronic periodontitis later leads to systemic inflammation results in release of inflammatory mediators such as cytokines, chemokines, growth factors, proteolytic enzymes by chronic inflammatory cells such as macrophages, mast cells and neutrophils leads to various cellular and vascular changes to cerebrovascular diseases.

Pathogen associated molecular patterns (PAMP's) recognized by pattern recognition receptors (PRR) present on antigen presenting cells on macrophages and dendritic cells belongs to Toll like receptors (TLR) activate NF-KB and STAT-3 key transcription factors work together involved in inflammatory changes. Dysregulated constitutive activation of a NF-KB, a key ubiquitous transcription factor leads to release of cytokines from chronic inflammatory cells such as macrophages release IL-4, IL-5, IL-13, IL-17, TGF- β involved in cell injury, tissue damage, immune modulation, fibrosis and cell death. IL-1, TNF- α , IL-6 and EGF in turn activate NF-Kb, STAT-3 key transcription factors in inflammatory microenvironment induced transcription of inflammatory mediators such as ROS and RNS free radicals due to oxidative stress from chronic inflammatory cells such as macrophages, proteolytic enzymes such as Mmp's_{2,9} from chronic inflammatory cells involved in extracellular matrix degradation induced cell damage, T regulatory cells (Tregs) involved in immune modulation formed from Th1 cells mediated by TGF- β release IL-10, Bregs (B regulatory cells) involved in immune modulation formed from B cells release IL-10 mediated by TGF- β involved in tissue damage, fibrosis, angiogenesis, amyloid protein deposition, ischemia, cognitive decline and dementia in neurodegenerative diseases like Alzheimer's disease, Parkinson's disease, multiple sclerosis and stroke.

Thorough understanding of chronic inflammatory mediators such as chemokines, cytokines and proteolytic enzymes in pathogenesis of chronic periodontitis involve in cell injury, tissue damage, and immune modulation helpful for identification of early biomarkers for early detection and prevention of cerebrovascular diseases (Alzheimer's disease, Parkinson's disease, stroke, multiple sclerosis), and therapeutic target for future therapeutic strategy.

Volume 22 Issue 7 July 2023

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