Poor oral health may contribute to declines in brain health

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Taking care of your teeth and gums may offer benefits beyond oral health such as improving brain health, according to preliminary research to be presented at the American Stroke Association's International

Stroke Conference 2023. The meeting, to be held in person in Dallas and virtually, Feb. 8-10, 2023, is a world premier meeting for researchers and clinicians dedicated to the science of stroke and brain health.

Studies have shown that gum disease, missing teeth and other signs of poor oral health, as well as poor brushing habits and lack of plaque removal, increase stroke risk. According to the American Stroke Association, stroke is the number 5 cause of death and a leading cause of disability in the United States. Previous research has also found that gum disease and other oral health concerns are linked to heart disease risk factors and other conditions like high blood pressure.

"What hasn't been clear is whether poor oral health affected brain health, meaning the functional status of a person's brain, which we are now able to understand better using neuroimaging tools such as magnetic resonance imaging or MRI," said study author Cyprien Rivier, M.D., M.S., a postdoctoral fellow in neurology at the Yale School of Medicine in New Haven, Connecticut. "Studying oral health is especially important because poor oral health happens frequently and is an easily modifiable risk factor—everyone can effectively improve their oral health with minimal time and financial investment."

Just as healthy lifestyle choices impact the risk of heart disease and stroke, they also affect brain health, which includes one's ability to remember things, think clearly and function in life. Three in five people in the U.S. will develop brain disease in their lifetime, according to latest estimates from the American Stroke Association, a division of the American Heart Association.

Between 2014 and 2021, researchers in this study analyzed the potential link between oral health and brain health among about 40,000 adults (46% men, average age 57 years) without a history of stroke enrolled in the U.K. Biobank. Participants were screened for 105 genetic variants

known to predispose persons to have cavities, dentures and missing teeth later in life, and the relationship between the burden of these genetic risk factors for poor oral health and brain health was evaluated.

Signs of poor brain health were screened via MRI images of the participants' brains: white matter hyperintensities, defined as accumulated damage in the brain's white matter, which may impair memory, balance and mobility; and microstructural damage, which is the degree to which the fine architecture of the brain has changed in comparison to images for a normal brain scan of a healthy adult of similar age.

The analysis found:

- People who were genetically prone to cavities, missing teeth or needing dentures had a higher burden of silent cerebrovascular disease, as represented by a 24% increase in the amount of white matter hyperintensities visible on the MRI images.
- Those with overall genetically poor oral health had increased damage to the fine architecture of the brain, as represented by a 43% change in microstructural damage scores visible on the MRI scans. Microstructural damage scores are whole-brain summaries of the damage sustained by the fine architecture of each brain region.

"Poor oral health may cause declines in brain health, so we need to be extra careful with our oral hygiene because it has implications far beyond the mouth," Rivier said. "However, this study is preliminary, and more evidence needs to be gathered—ideally through clinical trials—to confirm improving oral health in the population will lead to brain health benefits."

The analysis was limited by the fact that the UK Biobank includes only

people who reside in the U.K., and they are predominantly of European ancestry (94% of the U.K. Biobank participants reported their race as white vs. 6% reported as mixed, Black British, Asian British or other). In addition, more research among people from diverse racial and ethnic backgrounds is needed.

American Stroke Association, a division of the American Heart Association, Stroke Council member and volunteer expert Joseph P. Broderick, M.D., FAHA, a professor at the University of Cincinnati Department of Neurology and Rehabilitation Medicine and director of the University of Cincinnati Gardner Neuroscience Institute in Cincinnati, Ohio, said while the study results don't demonstrate that dental hygiene improves brain health, the findings are "intriguing" and should prompt more research.

"Environmental factors such as smoking and health conditions such as diabetes are much stronger risk factors for poor oral health than any genetic marker—except for rare genetic conditions associated with poor oral health, such as defective or missing enamel," Broderick said. "It is still good advice to pay attention to oral hygiene and health. However, since people with poor brain health are likely to be less attentive to good oral health compared to those with normal brain health, it is impossible to prove cause and effect. Also, genetic profiles for increased risk of oral health may overlap with genetic risk factors for other chronic health conditions like diabetes, hypertension, stroke, infections, etc. that are known to be related to brain imaging markers." Broderick was not involved in this study.

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