Medical Xpress

Dental device for snoring may slow onset of Alzheimer's disease

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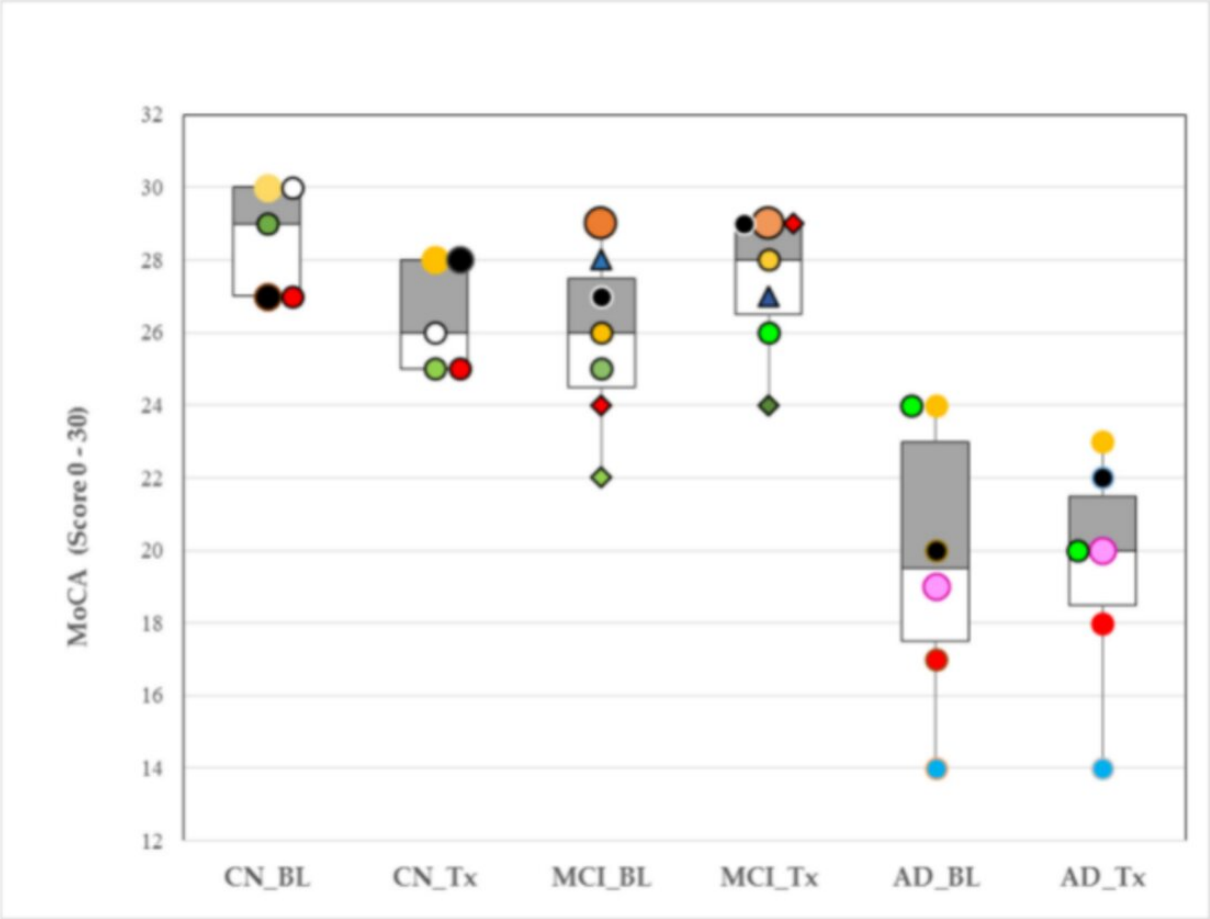

This figure shows changes in cognitive assessment scores for individuals in each group (CN=cognitively normal, MCI=mild cognitive impairment, AD=Alzheimer's disease) at the start of the study and after 4 weeks. Credit: Center for BrainHealth

A good night's sleep plays an essential role in regulating brain health by removing the waste material and toxins that accumulate. Although many things can disturb sleep, one of the most common causes is snoring or other breathing issues that cause obstructive sleep apnea. A team of researchers from Center for BrainHealth at The University of Texas at Dallas and Texas A&M University sought to understand the relationship between breathing rate during sleep and cognitive function, and how a snoring intervention affects brain health.

The findings were published recently in *Geriatrics* by the team that included BrainHealth researchers Sandra Bond Chapman, Ph.D., chief director; Namrata Das, Ph.D., MD, MPH, a research neuroscientist in Alzheimer's disease; and Jeffrey Spence, Ph.D., director of biostatistics. Lead researcher Preetam Schramm, Ph.D., a Visiting Scholar at Texas A&M University, designed the interventional study and provided the sleep science expertise.

The team discovered that maximum breathing rate can be used to distinguish healthy individuals from people with mild cognitive impairment and those with Alzheimer's disease. The researchers also found that a dental device to reduce snoring improves cognitive function in individuals who suffer from mild cognitive impairment.

The team's pilot study included 18 individuals aged 55-85 with a history of snoring. About one third of participants had mild cognitive impairment and another third had Alzheimer's disease. To examine how breathing rate relates to an individual's cognitive function, participants slept at home while portable recorders collected data on their breathing rate, heart rate and snoring. Clinicians from Center for BrainHealth assessed the participants' memory, executive function, and attention.

The team found that the maximum breathing rate during uninterrupted periods of sleep can differentiate healthy individuals from individuals

with either Alzheimer's disease or mild cognitive impairment. "We saw three distinct patterns amongst the groups of people, meaning we can look for a breathing pattern that might predispose individuals to having dementia," said Emet Schneiderman, Ph.D., a co-author on the study and Professor in the Department of Biomedical Sciences at Texas A&M University College of Dentistry. Determining breathing rate is cheaper and faster than other existing assessments for measuring an individual's cognitive function and could be an effective testing alternative.

The researchers also looked at whether the myTAP oral appliance, which snaps into the mouth at night to prevent snoring, affects breathing rate and cognitive function. For four weeks, participants wore the device at night and snoring decreased. After the intervention period, cognitive function—especially in the domain of memory—no longer differed between healthy individuals and individuals with mild cognitive impairment. This suggests better sleep improves cognition in individuals with mild cognitive impairment. "If we can make significant changes for individuals with mild cognitive impairment, we can slow the onset of Alzheimer's disease," said Das, now a postdoctoral fellow at McLean Hospital, Harvard Medical School.

Though the team did not notice an overall difference in the cognitive function of participants with Alzheimer's disease, researchers are hopeful that the intervention could work. On the individual level, half of the participants with Alzheimer's disease saw improvements in their cognitive function. "Brain neurogenesis is a slow process, so perhaps these individuals may need a longer time period with the intervention to see any significant cognitive changes," noted Das.

Alternatives to medicine for treating snoring, like dental appliances, could help individuals sleep better and improve their cognitive function. Sleep medications give individuals the impression that they've slept well, when in reality the brain never enters a deep phase of the sleep essential

for the housekeeping process to rid the body of toxins.

And it now appears that alternative treatments, like this dental appliance, might produce meaningful changes in cognition before mild cognitive impairment progresses to Alzheimer's disease. "Oral appliances could have a wide range of applications since sleep is affected by many different things across many different age groups," said Das. "Maybe appliances could help individuals sleep better, reducing mental health symptoms caused by poor sleep before they get serious decline in neurocognitive symptoms."

More information: Preetam Schramm et al, Snoring Remediation with Oral Appliance Therapy Potentially Reverses Cognitive Impairment: An Intervention Controlled Pilot Study, *Geriatrics* (2021). DOI: 10.3390/geriatrics6040107

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