

# Sleep disorder linked with changes to brain structure typical of dementia

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Obstructive sleep apnoea (OSA) is associated with changes to the structure of the brain that are also seen in the early stages of dementia, according to a study published in the *European Respiratory Journal*.

OSA, where the walls of the throat relax and narrow during sleep stopping breathing, is known to reduce levels of oxygen in the blood. The new study suggests that this drop in oxygen may be linked to a shrinking of the [brain's temporal lobes](#) and a corresponding decline in memory.

The researchers say the study provides evidence that screening older people for OSA and giving treatment where needed could help prevent dementia in this population.

The study was led by Professor Sharon Naismith from the University of Sydney, Australia. She said: "Between 30 and 50% of the risk for dementia is due to modifiable factors, such as depression, high blood pressure, obesity and smoking. In recent years, researchers have recognised that various sleep disturbances are also risk factors for dementia. We wanted to look specifically at [obstructive sleep apnoea](#) and its effects on the brain and cognitive abilities."

The researchers worked with a group of 83 people, aged between 51 and 88 years, who had visited their doctor with concerns over their memory or mood but had no OSA diagnosis. Each participant was assessed for their memory skills and symptoms of depression, and each was given an MRI scan to measure the dimensions of different areas of the brain.

Participants also attended a sleep clinic where they were monitored overnight for signs of OSA using polysomnography. This technique records brain activity, levels of oxygen in the blood, heart rate, breathing and movements.

The researchers found that patients who had low levels of oxygen in their blood while they were sleeping tended to have reduced thickness in the left and right temporal lobes of the brain. These are regions known to be important in memory and affected in dementia.

They also found that this alteration in the brain was linked with participant's poorer ability to learn new information. The researchers say this is the first time a direct link of this kind has been shown.

Conversely, patients with signs of OSA were also more likely to have increased thickness in other regions of the brain, which the researchers say could be signs of the brain reacting to lower levels of oxygen with swelling and inflammation.

OSA is more common in older people and has already been linked with heart disease, stroke and cancer, but it can be treated with a continuous positive airway pressure (CPAP) device, which prevents the airway closing during sleep.

Professor Naismith added: "We chose to study this group because they are older and considered at risk of dementia. Our results suggest that we should be screening for OSA in [older people](#). We should also be asking older patients attending sleep clinics about their memory and thinking skills, and carrying out tests where necessary.

"There is no cure for dementia so early intervention is key. On the other hand, we do have an effective treatment for OSA. This research shows that diagnosing and treating OSA could be an opportunity to prevent cognitive decline before it's too late."

Professor Naismith and her team are now working on research to find out whether CPAP treatment can prevent further cognitive decline and improve brain connectivity in patients with mild cognitive impairment.

Andrea Aliverti, Professor of Bioengineering at Politecnico di Milano, Italy, is Head of the European Respiratory Society's Assembly on Clinical Physiology and Sleep and was not involved in the research. He said: "We already know that as well as disrupting sleep, OSA can

increase the risk of [high blood pressure](#), type 2 diabetes, heart attack and stroke. This research adds to evidence that OSA is also linked to [dementia](#) and suggests a likely mechanism for the link. However, we can treat OSA and measures such as stopping smoking and losing weight can reduce the risk of developing the condition."

**More information:** Cross NE, Memarian N, Duffy SL, et al. Structural brain correlates of obstructive sleep apnoea in older adults at risk for dementia. *Eur Respir J* 2018; 52: 1800740  
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