

# Sleep apnea in children may stunt brain development

[Tim Newman](#) Saturday 18 March 2017

Sleep apnea, a common condition in which breathing briefly stops during the night, may reduce the amount of gray matter in a child's brain, finds a recent study. Although further research is needed, the results are worrying.



*Sleep apnea's effect on the developing brain is currently little understood.*

Sleep apnea is estimated to affect around 5 percent of all children.

The condition is most commonly caused by the muscles in the throat relaxing and obstructing the airways, thereby producing pauses in breathing during the night. This subtype is called [obstructive sleep apnea](#).

As the throat closes and air is prevented from entering the body, the brain senses the danger and wakes the person up; the muscles then contract, and the blockage is removed.

These interruptions can happen between 5 and 30 times each hour for the

entire night.

The breaks in breathing and consequent arousals are so brief that, more often than not, the individual is unaware that they have even occurred.

## **Sleep apnea's impact on the brain**

A recent study set out to investigate the effect of sleep apnea on the brains of 7- to 11-year-olds. In total, 16 children with obstructive sleep apnea were evaluated at the University of Chicago's pediatric sleep laboratory. All children underwent neurocognitive tests and were scanned using [MRI](#).

The study team was headed up by Dr. Leila Kheirandish-Gozal, director of pediatric clinical sleep research at the University of Chicago. The team worked in conjunction with researchers from the University of California at Los Angeles, who analyzed the images.

The test results and brain scans were compared with a further nine children without sleep apnea, matched for gender, age, weight, and ethnicity. They also compared the children with sleep apnea with a database of 191 MRI scans in a pre-existing National Institutes of Health (NIH) database.

Once the analysis was complete, the results were striking. The children with obstructive sleep apnea had substantial reductions in the volume of gray matter - the information processing part of the brain. These [gray matter losses](#) appeared in a range of brain regions, including:

- **Frontal cortex**, which is involved in problem-solving, movement, language, memory, impulse control, and judgment.
- **Prefrontal cortex**, which processes complex behaviors, personality, and planning.
- **Parietal cortex**, which integrates sensory input.

- **Temporal lobe**, which manages hearing and selective listening.
- **Brainstem**, which controls respiratory and cardiovascular functions.

"The images of gray matter changes are striking. We do not yet have a precise guide to correlate loss of gray matter with specific cognitive deficits, but there is clear evidence of widespread neuronal damage or loss compared to the general population."

*Dr. Kheirandish-Gozal*

## **Many more questions to answer**

Although reduction in gray matter was measured, the impact of these deficits cannot yet be assessed. Also, because the children's brains were not scanned before the obstructive sleep apnea began, it is impossible to know when and how the damage occurred.

As co-author Dr. David Gozal says, "MRI scans give us a bird's eye view of the apnea-related difference in volume of various parts of the brain, but they don't tell us, at the cellular level, what happened to the affected neurons or when." He continues: "The scans don't have the resolution to determine whether brain cells have shrunk or been lost completely."

Although the study was only conducted on a small number of children with sleep apnea, the findings are concerning. Substantial loss of gray matter is likely to have an impact on cognitive performance. As Dr. Gozal says:

"If you're born with a high IQ - say 180 - and you lose 8-10 points, which is about the extent of IQ loss that sleep apnea will induce on average, that may never become apparent. But if your IQ as a child was average, somewhere around 90-100, and you had sleep apnea that went untreated and lost 8-10 points, that could potentially place you one standard deviation below normal.

No one wants that."

Future research will be needed to back up and expand on the current results, published this week in the journal *Scientific Reports*. There are now many more questions that are begging an answer, such as, importantly, can these changes be reversed?

Because sleep apnea is a treatable disorder, parents who are concerned that their child may have the condition should not delay in having it checked out by an expert.

[Learn how sleep apnea may drive tumor growth by promoting blood vessel formation.](#)