

# Poor balance may indicate changes in brain volume

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Historically, the brain has been known to change with age and disease. But now, researchers from Japan have found that the volume of a specific brain region is correlated with physical balance.

In a study recently published in *Gait & Posture*, researchers from the University of Tsukuba have revealed that the volume of the hippocampus is correlated with a measure of balance ability in healthy older people.

The hippocampus is involved in consolidating memory information about navigation, spatial awareness, and motor sequences. Recent studies have indicated that information from the [vestibular system](#), which regulates balance and the position of the body, is important for both hippocampal function and spatial memory. Although changes in the hippocampus have been linked to vestibular dysfunction, the [relationship](#) between balance and hippocampal volume is not well understood, which the researchers at the University of Tsukuba aimed to address.

"Postural balance requires the integration of different [brain](#) systems," says senior author of the study Professor Tetsuaki Arai. "To comprehensively examine the [brain regions](#) associated with balance, we wanted to first assess the characteristics of healthy older individuals."

To do this, the researchers asked a group of 30 healthy older adults to undergo tests of balance, cognition, and [magnetic resonance imaging](#), which enabled them to evaluate hippocampal volume. Balance was measured using the index of postural stability (IPS) with the participants standing on various types of surfaces in "eyes open" and "eyes closed" conditions.

"The results were surprising," explains author Professor Miho Ota. "We found a [strong relationship](#) between balance function and the volume of specific regions of the hippocampus, known as the hippocampal subfields." This relationship was strongest for balancing on a soft surface with eyes closed.

"This study is the first to evaluate the connection between hippocampal

volume and balance function in healthy older adults, and we obtained novel information about the nature of this relationship," says Professor Tetsuaki Arai.

The findings indicate that it may be possible to use the IPS to explore the relationship between vestibular function and balance in people with dementia. Furthermore, this study sets the stage for future research evaluating whether treatments for balance disorders can increase hippocampal volume, as well as whether [hippocampal volume](#) can be used to predict the outcomes of therapeutic interventions for balance disorders in people with dementia.

**More information:** Ryotaro Ide et al, Relationship between hippocampal subfields volume and balance function in healthy older adults, *Gait & Posture* (2023). [DOI: 10.1016/j.gaitpost.2023.02.003](https://doi.org/10.1016/j.gaitpost.2023.02.003)

Provided by University of Tsukuba

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