

# Imagerie ultrasonore du cerveau chez les jeunes adultes sains

RECHERCHESANTÉ-SCIENCES-TECHNOLOGIE





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## **Ultrasound Measures of Brain Pulsatility Correlate with Subcortical Brain Volumes in Healthy Young Adults**

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### **Abstract**

Increasing evidence suggests that brain pulsatility is involved in the pathophysiology of various neurological and psychiatric disorders. However, it remains unclear whether high brain pulsatility is damaging to or protective of the brain in normal conditions, and this could depend on the age of the individual and the methods used to measure brain pulsatility. The goal of our study was to investigate associations between subcortical volumes and brain pulsatility as assessed with ultrasound in healthy young adults using both a conventional method (transcranial Doppler pulsatility index [TCD-PI]) and the innovative method of tissue pulsatility imaging (TPI), which allows a high level of detection of small brain movements (micrometers). Twenty-five females aged 18-55 with no history of significant medical disorder underwent magnetic resonance imaging and ultrasound assessment. The volumes of six subcortical regions known to be particularly sensitive to change in cerebral blood flow were measured and compared with brain pulsatility as assessed with TCD-PI and TPI. TCD-PI and TPI measures positively correlated with all subcortical regions, with the caudate nucleus having the strongest association. Linear regressions found that TCD-PI and TPI measures of brain pulsatility explained 16% to 67% of the variance of the subcortical volumes. Our results suggest that a greater pulsatility as assessed with ultrasound in healthy young adults may constitute a protective factor for brain structure. Ultrasound measures of brain pulsatility may be appropriate to provide costless, non-invasive, portable and highly sensitive markers of cerebral blood flow pulsatility related to brain structure.

## Keywords

Brain pulsatility; Brain volume; Tissue pulsatility imaging; Transcranial Doppler.

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