

How Ultrasound Imaging Could Revolutionize Brain Imaging: A Review of its Potential as an Alternative to MRI and CT

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Medical imaging is constantly evolving, with ultrasound remaining a versatile and reliable method for visualizing the human body. While ultrasound is well-known for its applications in cardiac, abdominal, and pelvic imaging, its use in brain imaging has been limited due to the skull's attenuation of ultrasound waves. Nonetheless, recent technological advancements have renewed interest in ultrasound's potential to transform brain imaging. These advancements, along with ultrasound's inherent advantages such as real-time imaging, non-invasiveness, and cost-effectiveness, suggest that it could be a strong alternative to traditional brain imaging techniques like Magnetic Resonance Imaging (MRI) and Computed Tomography (CT). This review examined the significant potential of ultrasound in brain imaging, offering a comparative analysis with MRI and CT, and discussing its strengths and limitations. It thoroughly reviewed recent technological improvements, current clinical applications, and future research possibilities. By addressing the drawbacks of MRI and CT, such as high costs and limited accessibility, this review highlights how ultrasound can become a viable and innovative option in brain imaging, promoting safer, more affordable, and widely accessible diagnostic methods.

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