



Phase Contrast MRI with Dual Velocity-Encoded Projection Reconstruction Acquisition

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WARF: P04462US

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a dual VENC projection reconstruction acquisition strategy that prevents aliasing of blood velocity during phase contrast MRI studies.

Overview

Phase contrast (PC) MRI studies are advantageous because they don't require a contrast agent and can provide quantitative information on blood flow. However, if blood velocity exceeds the maximum velocity (VENC) encoded by the flow sensitization gradients, blood velocity can be aliased to an artificially low value.

Dr. Mistretta previously developed an MRI technique, called Phase contrast Imaging using Projections (PIPR), which creates PC images by acquiring interleaved projection data without the use of phase encoding gradients (see WARF reference number P99144US). This technique provides 2-D PC images in the same amount of scan time as traditionally faster TOF techniques, but it doesn't address the VENC problem.

The Invention

UW-Madison researchers have now developed a dual VENC projection reconstruction acquisition strategy to prevent aliasing of blood velocity during phase contrast MRI studies. The method forms a series of imaging time frames that are each composed of a large set of projections acquired at a low velocity encoding value (low VENC). Interleaved with these time frames is a much smaller set in which projection data is acquired at a high velocity encoding value (high VENC). The high VENC acquisitions are then used to identify and correct regions of aliasing in the final angiographic image. In essence, by enabling the use of lower VENC values without the fear of causing aliasing artifacts, this strategy can provide images with enhanced velocity-to-noise ratios over those possible with other PC techniques.

Applications

- PC imaging of blood flow

Key Benefits

- Can provide phase contrast MRI images with higher velocity-to-noise ratios than are possible with other PC techniques
- Further enables the use of PC imaging, which is less invasive than contrast-enhanced MR angiography
- Reduces or eliminates aliasing artifacts without lengthening scan time beyond approximately 15 percent

- [Kevin Johnson](#)

Related Technologies

- [For information on Mistretta's original phase contrast MRI technique, see WARF reference number P99144US.](#)

Tech Fields

- [Medical Imaging : MRI](#)

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