New imaging techniques increase the diagnostic quality of MR brain studies

Signa EXCITE 1.5T MR

Diagnostic challenge

Producing high resolution neuro images without artifacts

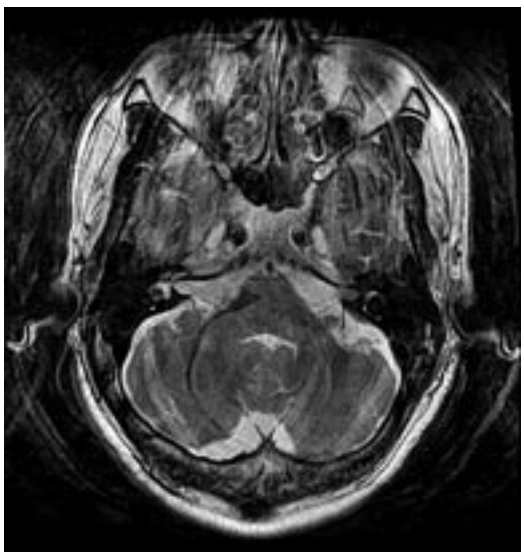
Lawrence N. Tanenbaum, M.D., Section Chief of MR, CT and Neuroradiology, Edison Imaging, Edison, N.J. reports that various factors including motion and patient variability can significantly affect image quality in brain MR exams. "Typically, about one-fifth of MR cases will have some kind of artifact that interferes with optimal image quality and occasionally interpretation," says Tanenbaum. As resolution increases on today's examinations and scan times increase somewhat, artifacts such as ghosting are more likely to occur. In addition, diffusion-weighted echo-planar imaging techniques can suffer from artifacts related to inherent region susceptibility effects or artifacts caused by dental work or implanted metal devices.

The Signa EXCITE MR Solution

Propeller T2-weighted and Propeller diffusion-weighted imaging

In 2002, GE Medical Systems introduced EXCITE™ to the 1.5T Signa® system, the first end-to-end redesign of the MR imaging pipeline. EXCITE technology improved signal-to-noise ratio (SNR), resolution and speed, driving clinical productivity and image quality, while also setting the stage for advanced applications. The first of these advances, released in 2003, is Propeller T2-weighted and Propeller diffusion-weighted imaging.

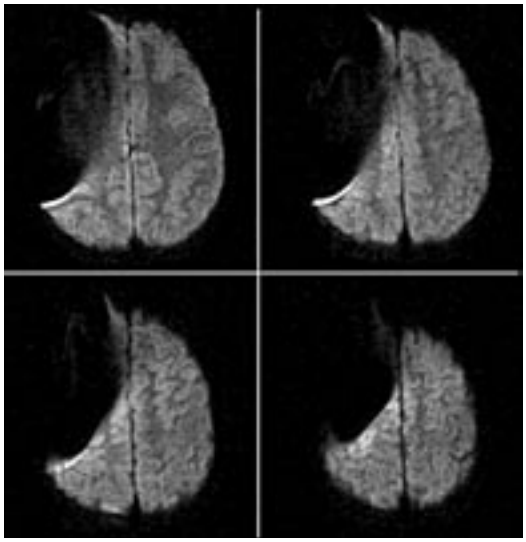
Propeller is a revolutionary data acquisition technology that leverages the image processing power of the EXCITE data pipeline, as it requires five times the data processing of conventional T2 or diffusion-weighted imaging. EXCITE, with its robust processing power, makes Propeller clinically viable. Propeller uses radial blades to acquire



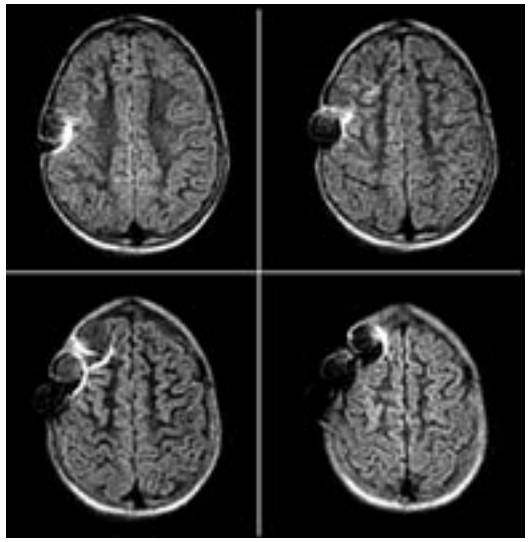
Without Propeller

With Propeller

FSE T2 brain study with Propeller (right) and conventional FSE. High resolution SNR Propeller studies are resistant to motion artifacts and ghosting.



Without Propeller – EPI diffusion study suffers from severe susceptibility artifact due to retained metal after surgery.



With Propeller – Propeller FSE diffusion study demonstrates dramatically reduced artifact and improved diagnostic information.

the data, which rotate in K-space, thus oversampling the center of K-space. It then combines the blades in a unique way to assemble the final image. It significantly reduces the tissue-to-air image distortions of diffusion-weighted imaging, and dramatically reduces the sensitivity to patient motion in T2 imaging.

Edison Imaging, uses Propeller routinely in brain MR studies. "With Propeller, we always get great images. It takes patient variability out of the equation. Resolution is higher, SNR is higher, and we eliminate artifacts. It's a win-win," says Tanenbaum.

Propeller produces T2-weighted images that are universally superb. It can resist motion artifacts and produce high-resolution images at very high signal-to-noise ratio. Propeller can also perform diffusion-weighted imaging. It allows for higher resolution and delivers images without the artifacts characteristic of traditional echo planar imaging (EPI). For example, exams on patients with implanted metal devices or with lesions at the skull base, which tend to suffer from artifacts with EPI, can be completed virtually free of artifacts with Propeller.

"Propeller is so impressive that it replaces traditional FSE T2-weighted imaging techniques. In many circumstances, Propeller will likely become a dominant technique for diffusion-weighted imaging."

Edison Imaging at JFK Medical Center, located in the New Jersey Neuroscience Institute in Edison, N.J., provides a complete spectrum of diagnostic imaging services, including MR imaging of the brain.

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