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MultiVane XD is the next generation motion-free imaging

Motion-free imaging achieved through extended reconstruction algorithm

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MultiVane XD – next generation motion-free imaging

Philips is committed to driving clinical performance by providing premium image quality. Our goal is to consistently deliver diagnostic information in an efficient time slot. MultiVane XD is one of the pillars this builds on; it provides superb motion-free imaging by using robust motion correction. It can be combined with dS SENSE for a high-speed exam.

MultiVane XD, a robust option that offers more

The Philips MultiVane technique has been in use for some years and has now found an improved successor in MultiVane XD. In MultiVane, data are collected in concentric rectangular blades rotated around the k-space origin. The central region of k-space is sampled for every blade, so the center of k-space is oversampled.

At the heart of MultiVane XD is an extended reconstruction algorithm[1]. It contains a smart way of analyzing and correcting blades such that image distortions due to both translational and rotational components of rigid body motion are removed. Additionally, the k-space center of blades corrupted with through-plane motion is removed to further decrease motion artifacts.

MultiVane XD can be combined with dS SENSE in all directions to increase acquisition speeds.

MultiVane XD image quality was tested in a study at Barrow Neurological Institute using Ingenia 3.0T[1]. In 99% of image comparisons in volunteers with no motion, small motion or moderate motion, the MultiVane XD image was rated equal to or better than the standard MultiVane image.
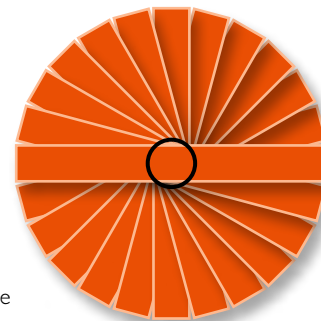
MultiVane XD protocol considerations

In addition to T2W-TSE, FLAIR and T1-FLAIR protocols that were already available with MultiVane, T2*-FFE imaging is now enabled by MultiVane XD. MultiVane XD protocols are available for several anatomies.
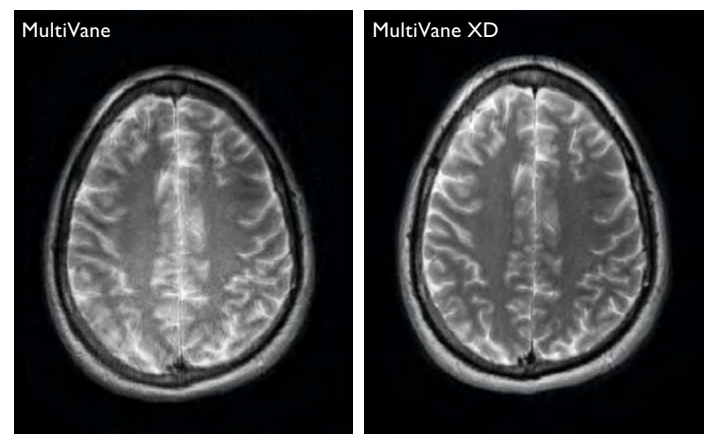
With the extended algorithm[1], the gross motion correction is more robust. It can be switched on in the Motion tab. It is recommended to use minimum or small WFS to prevent water/fat displacement in combination with MultiVane XD.

MultiVane data collection in k-space

MultiVane

MultiVane XD

References

1. Pipe JG, Gibbs WN, Li Z, Karis JP, Schar M, Zwart NR
    Revised motion estimation algorithm for PROPELLER MRI
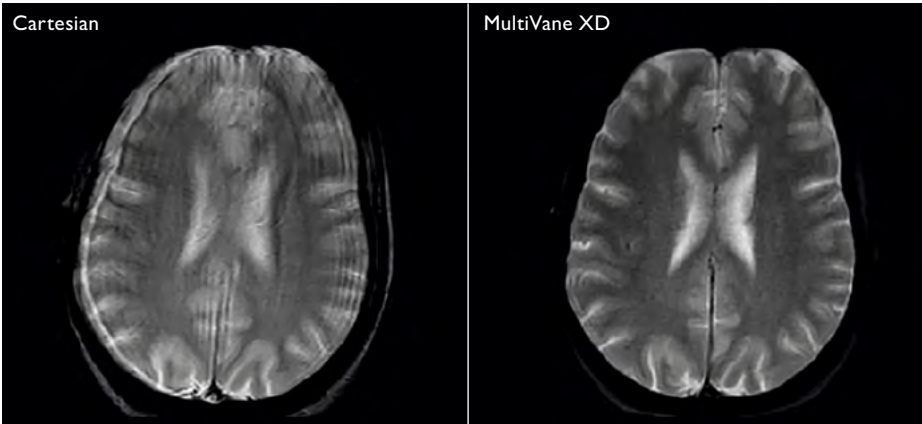   Magn Reson Med. 2013 Sep 4. doi: 10.1002/mrm.24929 (Epub ahead of print)
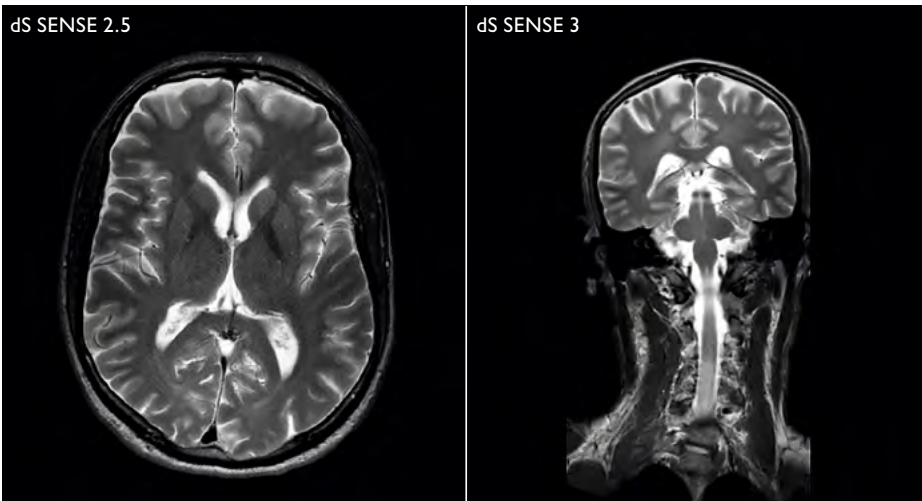
MultiVane XD in brain

Cartesian | **MultiVane XD**

Cartesian vs. MultiVane XD
Comparison between normal Cartesian imaging and MultiVane XD in a volunteer moving his head clearly shows the high quality motion correction of MultiVane XD in these Ingenia 1.5T FFE images.
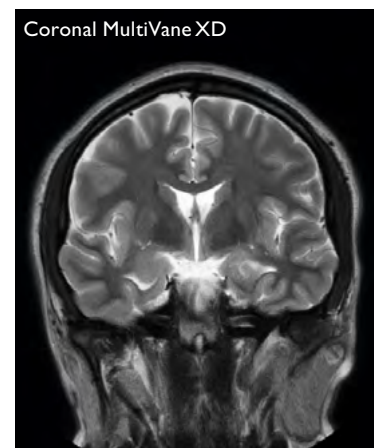
dS SENSE 2.5 | **dS SENSE 3**

MultiVane XD compatible with dS SENSE
Ingenia 3.0T. Courtesy of Barrows Neurological Imaging, Phoenix, Arizona, USA.

Standard TSE | **MultiVane XD**

Coronal MultiVane XD
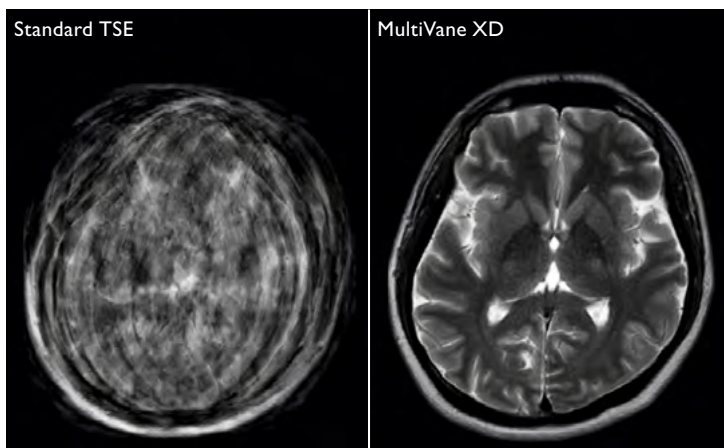
Moving subject imaging
Standard TSE was done with dS SENSE factor 1.5, scan time 1:18 min. The MultiVane XD scan was done with dS SENSE factor 2, scan time 1:24 min. Ingenia 3.0T.
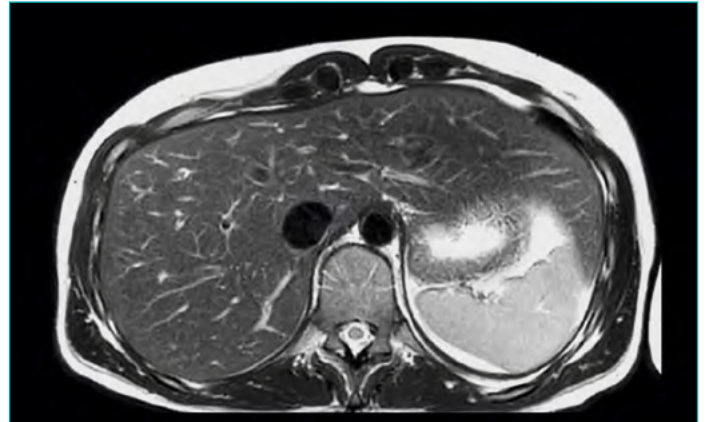
Ingenia 3.0T, dS SENSE factor 2, scan time 1:36 min.

Liver imaging with MultiVane XD

Also in liver imaging, MultiVane XD provides excellent image quality for both T2-weighted and fat suppressed imaging. It is compatible with use of dS SENSE parallel imaging, which helps to accelerate MultiVane XD scans.

MultiVane XD for liver imaging is available on 1.5T and 3.0T systems with dStream digital imaging. Robust protocols are available on these systems.
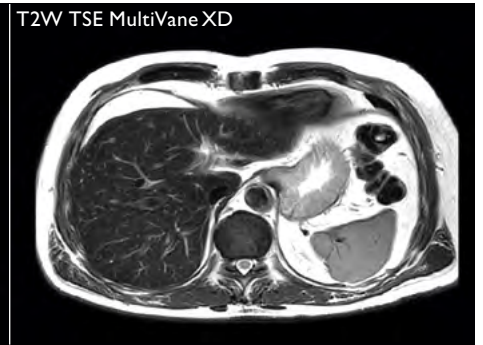

T2W MultiVane XD on Ingenia 1.5T.
Voxels 1.0 × 1.0 × 5.0 mm, dS SENSE factor 2, scan time 2:36 min.

This Ingenia 3.0T example compares MultiVane XD with dS SENSE to MultiVane without SENSE with the same voxel sizes to illustrate that the MultiVane XD scan is faster and overall image quality is better.

T2W TSE MultiVane

Voxels 1.1 × 1.1 × 5.0 mm
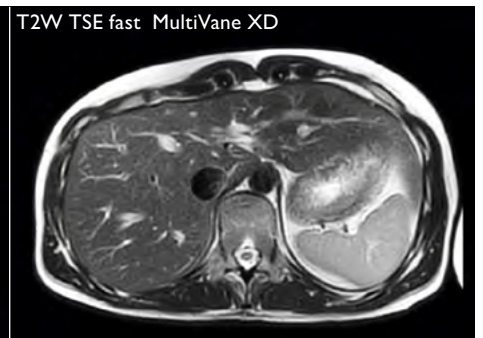Without SENSE, scan time 4:33 min.

T2W TSE MultiVane XD

Voxels 1.1 × 1.1 × 5.0 mm
SENSE factor 2, scan time 3:30 min.

In this example, the Ingenia 1.5T MultiVane XD scan is faster and shows better image quality and resolution than the single shot scan of the same patient.

T2W TSE Single shot

Voxels 1.4 × 1.6 × 6.0 mm
SENSE factor 2, scan time 1:45 min.

T2W TSE fast MultiVane XD

Voxels 1.5 × 1.5 × 5.0 mm
SENSE factor 2, scan time 1:03 min.

Summary

MultiVane XD provides robust motion correction. It can be combined with dS SENSE for a high speed exam. It is available on systems delivered after the second quarter of 2014.