

## Positioning Focus Shim In Phase Direction Impacts Image Quality In DWI Sequences

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### BACKGROUND

When acquiring images for a head to toe whole body scan on a simultaneous PET/MRI scanner (SIGNA, GE Healthcare, Waukesha, WI), an axial diffusion weighted imaging (DWI) series is usually prescribed for body screening. The area from the pelvis to the thighs is an area of the body that is more susceptible to B0 inhomogeneity because of tissue to air transition. As DWI images are susceptible to artifacts due to B0 inhomogeneity, local shimming is required to minimize B0 inhomogeneity and improve image quality. It is critical that the shimming is performed on the imaging area only to maximize B0 homogeneity within that area. This abstract will address using focused shimming in the Anterior-Posterior direction to acquire better quality images with no artifacts.

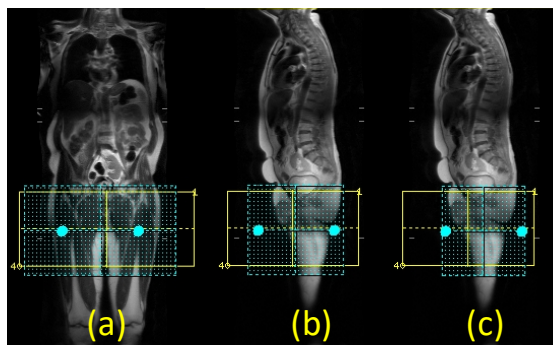
### TEACHING POINT

Axial DWI images are prone to artifacts due to magnetic field inhomogeneity especially in large field of views during a whole-body scan. Local shimming on the area of interest will decrease these artifacts by increasing the B0 homogeneity.

Five volunteers were scanned twice using different local shimming methods. In the first scan the focused shim box was only adjusted in the left-right (L/R) direction to match the region of the interest i.e. the imaging volume (Figure 1-a,b). In the second scan, the focused shim box was adjusted in both L/R and anterior-posterior (A/P) directions to match the volume of imaging (Figure 1-c). Images for both sequences were acquired using the same protocol. Images of Axial DWI where focused shim was adjusted to the volume of imaging in both R/L and A/P directions, showed improved image quality compared to the images acquired with focused shim adjusted to the volume of imaging only in L/R direction.

### SUMMARY

Using the Axial DWI sequence without shimming or without focused shimming causes artifacts in images due to the inhomogeneity of the magnetic field. Focusing the area of interest and adjusting the shim box in both L/R and A/P directions, allows acquisition of improved DWI images in the AP view.



**Figure 1 caption:** The box with yellow borders show the imaging volume and the gridded green box shows the focused shim volume. (a) The focused shim volume is adjusted in the L/R direction to the imaging volume. (b) The focused shim volume is left at its default location (which is the center) in the A/P direction. (c) The focused shim box is adjusted in the A/P direction to match the region of interest.