

MEETING ABSTRACT

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Susceptibility phantom for compatibility testing of SPECT components for a SPECT/MR hybrid system

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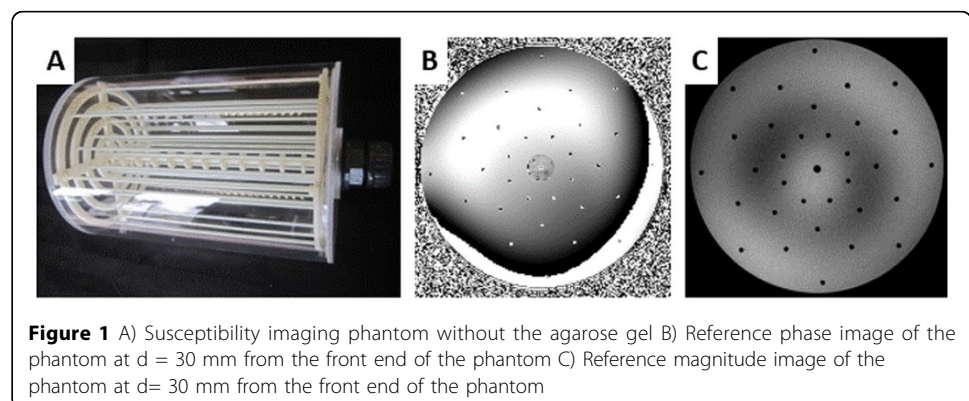
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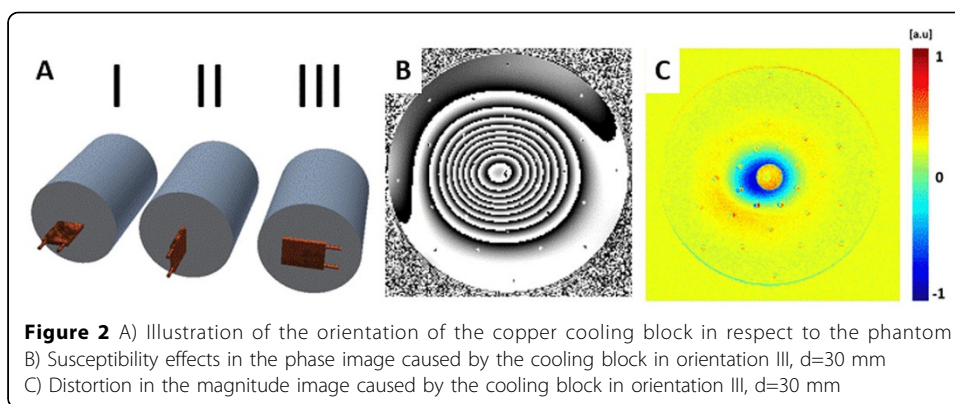
A susceptibility phantom was designed and built from an acrylic glass cylinder (inner diameter: 170 mm, length: 250 mm). A reference structure consisting of 32 rods (diameter: 3 mm) was placed inside the phantom (Figure 1A) together with a plastic scale with marks every 20 mm. The phantom was filled with agarose gel ($\epsilon_r = 75$, $\sigma = 0.73$ S/m) to mimic human tissue [2].

Amplitude and phase images were acquired with a gradient echo technique at 7.0 T (5 echoes TE=5/10/15/20/25/30 ms). A reference image was acquired with the phantom placed longitudinally in the magnets isocenter without the object under test (OUT). Subsequently, the OUT was positioned at the front end of the phantom (Figure 2A) and a series of transversal images covering the entire phantom was acquired. A post-processing algorithm was used to evaluate image. This setup was employed to examine the MR compatibility of a copper cooling block (52 x 74 x 8 mm³).

No distortion was found to be at $d = 30$ mm, $d = 30$ mm and $d = 200$ mm for three different orientations of a copper cooling block.

The proposed setup supports the assessment of susceptibility effects induced by SPECT components. Our results demonstrate that the orientation and position of SPECT





components in an MR environment need to be carefully taken into account during the design process of an integrated SPECT/MR device to avoid image distortion.

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