

MRI with a 32-element coil

C. Possanzini¹, M. Wantjes¹, M. Verheyen¹, S. Slegt¹, F. Visser², A. Jones², J. Overweg³

¹MR Development, Philips Medical Systems, Best, Netherlands, ²MR Application, Philips Medical Systems, Best, Netherlands, ³Division Technical Systems, Philips Research Laboratories, Hamburg, Germany

The rapid expansion of parallel imaging is supported by the development of phased-array surface coils, which allow to achieve an optimized signal to noise ratio (SNR) over a large field of view (FOV). The increasing number of elements allows faster dynamic scans with the consequent reduction of motion artifact effects on the images and it is particularly important to scan anatomical areas, as the heart or the abdomen, which are characterized by different types of motions (cardiac, respiratory and peristaltic).

A phased-array surface coil of 32 elements was built for abdominal applications. The coil is made in a modular approach by simply combining 16 times a 2-element Philips Flex-S surface coil. The Flex-S has been chosen for its extreme flexibility, which allows the use in different applications and in combination with other coils. The high impedance preamplifier implemented in the Flex-S elements minimizes the coupling among the elements. The 32 elements were placed in two arrays 4x4, one on the posterior (Fig. 1a) and one on the anterior part (Fig. 1b) and allow covering the desired FOV of 45x45cm² with a good SNR. The coupling between adjacent elements was further reduced by overlap. The achieved coupling factor was less than 0.5%. The central image in Fig.2 (not corrected for coil sensitivity) shows the good penetration depth of the coil circular elements with 11cm diameter.

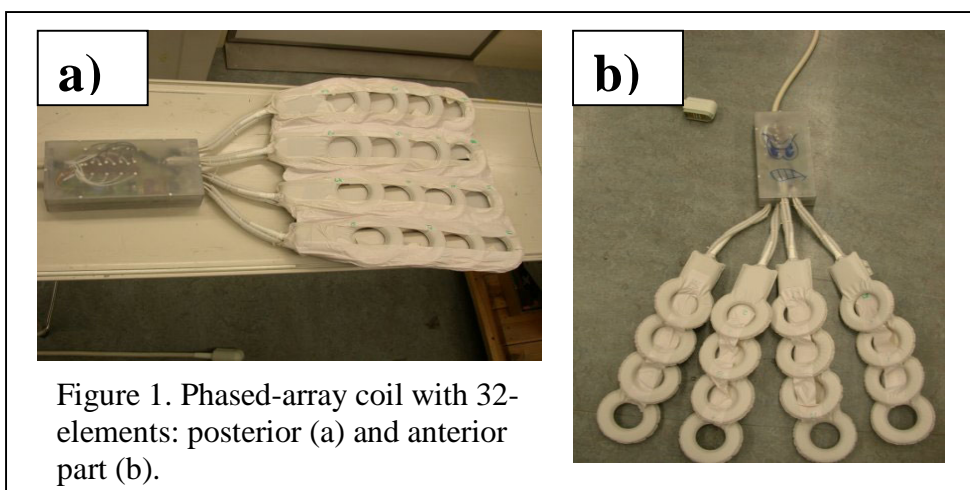


Figure 1. Phased-array coil with 32-elements: posterior (a) and anterior part (b).

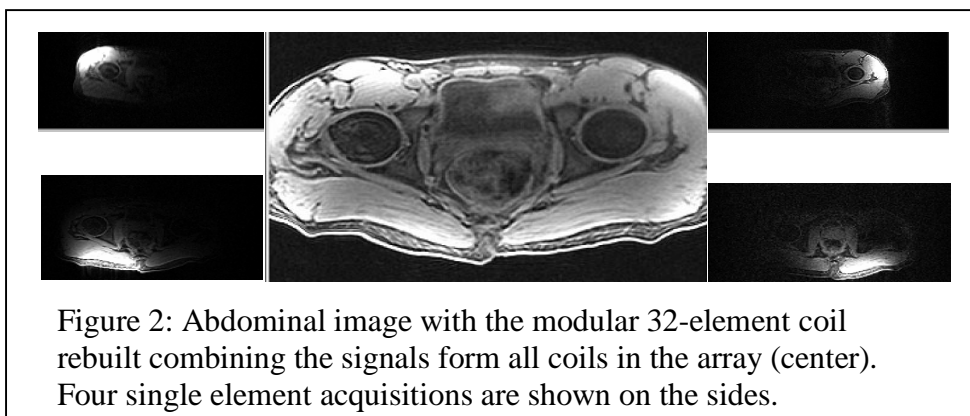


Figure 2: Abdominal image with the modular 32-element coil rebuilt combining the signals from all coils in the array (center). Four single element acquisitions are shown on the sides.