

<Cardiovascular and whole-body MR imaging at 3T>

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High-field clinical MR imaging (MRI) is now practical, thanks to compact, actively shielded 3T magnets. While an increasing number of high field systems were installed worldwide over the last years, 3.0T has become widely accepted as the new goldstandard for neuro imaging. However, with the advent of built-in whole body radiofrequency transmission coil, 3.0T is no longer limited to neurologic applications. High-field MRI now offers a potential for whole body applications to invest the abundance of signal either in higher spatial resolution, e.g. in oncologic imaging, or in higher temporal resolution, e.g. in fast dynamic imaging, or in a combination of both. Increased vessel-tissue contrast and higher spatial resolution holds promise for vascular and cardiac applications.

However, when moving from neuro to whole-body applications, 3.0T MRI might be more challenging due to amplified radio-frequency (RF) power deposition issues, increased susceptibility artifacts, RF field distortions and body dielectric resonance. Furthermore, efficient myocardial motion suppression, i.e. robust R-wave triggering, might be impaired by the increased magneto-hydrodynamic effects.

Progress in dedicated coil design, hardware and software has made it possible to overcome these limitations and to implement cardiovascular and whole body applications on clinical 3.0T systems. Developments include 3.0T vector ECG, multielement receive coils, parallel imaging techniques and methods of RF-refocussing with variable lower flip angles.

Update information on 3.0T cardiovascular and whole-body MR imaging is presented and opportunities for research and clinical routine are discussed.