

MR kompatibles Assistenzsystem für bildgeführte perkutane Interventionen

MR compatible assistant system for image guided percutaneous Interventions

Oliver Wendt¹, T. Remmele², B. Gutmann², A. Melzer³, H. Fischer¹

¹Institut für Medizintechnik und Biophysik, Forschungszentrum Karlsruhe, Deutschland

²Innomedic GmbH, Herxheim, Deutschland

³FH Gelsenkirchen, Deutschland

Content of this presentation is an assistant system for image guided percutaneous interventions e.g. local drug injection, biopsies or tumor treatment inside MRI or CT scanner. The high performance of this fast and precise intervention system especially for the use inside closed bore high field MRI-scanner, based on special kinematics and designs, mri-compatible materials (polymers and ceramics), actuators and sensor systems. The system is driven with new MR-compatible pneumatic actuators which are applicable also for slow positioning movements (≤ 1 mm/s) and high positioning accuracy ($\leq 0,1$ mm). A safe position measurement of the axes movements within the MRI environment is guaranteed by the use of new optical linear and rotary sensor systems (absolute and incremental encoders) with high resolutions. As the preclinical evaluation has shown, the accuracy of the intervention device regarding instrument positioning is about ± 1 mm with an orientation of about $\pm 1^\circ$, so that difficult interventions could be carry out with a high precision. The system implements a user-interface for intervention planning on up-to-date CT or MR images. Online-control and real-time-interventions are possible due to the high MR compability of this device.

