Dr. Daniel Gräfe
Winner of the 2019 Guy Sebag Research Award

As astonishing as the conventional MRI technique is, a fundamental prerequisite is that the depicted structures remain stationary during the imaging process. This challenge has more recently been overcome by real-time MRI. This is facilitated by latest developments in mathematics, IT hardware as well as MR technology. As a result, images can be acquired with a temporal resolution of about 20 milliseconds. This allows macro-movements to be frozen.

Despite restrictions on clinical workflow due to the Corona pandemic, the utility of real-time MRI in children has already been demonstrated in several publications in 2020 as part of the Guy Sebag Grant 2019: A Pictorial Review of the diverse applications is currently in press (Pediatric Radiology 2020). Previously, it was shown that thin-sliced volume scanning of the entire brain is possible within 15 seconds (Pediatric Radiology 2020), leading to a significant reduction in anesthesia for cerebral MRI (paper in review). Furthermore, it was possible to determine the T1 relaxation time of the infant brain rapidly yet highly accurately using real-time technology (Pediatric Radiology 2020).

Several further projects are currently in progress at various stages at our institute and indicate the large portfolio of real-time MRI: Cardio-MRI without sedation in free-breathing without ECG; quantification of thoracic decompression in patients with funnel chest; visualization the movement of the soft palate in speech disorders or at last cerebral diffusion imaging without significant susceptibility artifacts.

Without the Guy Sebag Research Grant, I would not have been able to establish the real-time technology in our institute. This grant enabled me to overcome the initial hurdle (IT hardware and license fees) to launch the projects. Since real-time MRI does not require additional running expenses, the Guy Sebag Research Grant will lastingly support my scientific research with this versatile method for many years.