



Professor Michael Ditchfield is the Head of Paediatric Imaging at Monash Medical Centre and the Professor of Paediatric Imaging at Monash University (Clayton, Australia), has a conjoint appointment at the Monash Institute of Medical Research and is an Honorary Research Fellow at the Murdoch and Children's Research Institute (Melbourne, Australia). He has worked as a pediatric radiologist for 20 years and has subspecialty pediatric interests in MRI, cardiothoracic, neonatal and urinary imaging and has a strong commitment to teaching and research.

Dear MAGNETOM Flash reader,

Children are intrinsically difficult to image. Their organs are small creating a high demand on spatial resolution. They have rapid heart and respiratory rates making thoracic and abdominal imaging even more challenging than in adults. In addition, they often have a very limited capacity to cooperate and the environment of the MRI unit adds to the difficulty of obtaining diagnostic images. Nevertheless, MRI provides excellent contrast resolution and does not use ionizing radiation making it a very valuable imaging tool in children*.

MRI has undergone a major revolution over recent years with higher field strength, sequences that overcome SAR issues, parallel imaging, sequences that suppress motion artifact, 3 dimensional imaging and improved coil technology combining to overcome many of these hurdles. This has enabled faster and higher resolution imaging and enabled many of the new and novel MRI applications showcased in this edition of MAGNETOM Flash.

These technological advances have developed in parallel with a better appreciation of the needs of children and how to improve their capacity to cooperate to avoid the need for general anesthesia. The recognition of the need for specialist staff to familiarize children with the procedure, the importance of information appropriate to the development of the child (picture books, MRI toys, videos and Mock MRI units) and the use of distraction with MRI compatible videos and music have expanded the availability of MRI in pediatrics. These techniques when compared to general anesthesia or deep sedation are safe and relatively inexpensive. In many centers general anesthesia or deep sedation was routinely used for most children. Embracing these techniques has expanded the use of MRI to children as young as 3 years without anesthesia.

The combination of these techniques and technological advancement has expanded the role of MRI in pediatrics from being predominantly a brain

imaging technology to being a comprehensive multi-organ modality. In pediatrics it is now routinely used in thoracic, cardiac, abdominal, musculoskeletal and total body imaging. Techniques such as DWI and tractography and neurography are improving our understanding of pediatric disease processes both in and outside the brain. Safe high resolution and fast MRI techniques are creating the reality of fetal cardiac MRI. In the last 10 years there has been a revolution in the application of MRI in pediatrics, there is no reason why the next 10 years should be any different.

This issue of MAGNETOM Flash showcases many of these exciting new techniques from renowned experts and demonstrates how they have been applied both to clinical pediatric imaging and in research.

Michael Ditchfield

*Siemens disclaimer: MR scanning has not been established as safe for imaging fetuses and infants less than two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures. This disclaimer does not represent the view of the the guest editor of this issue. It is solely for regulatory reasons.

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