Figure SI1. Overview over original research (OR) and review articles (RA) which address the issues of pediatric imaging and / or provide techniques to work with children within the imaging environment; in chronological order.

Authors	Type [OR\RA]	Approach	Subjects	Sex [M/F]	Age [years]	Results
Slifer et al., 1993	OR	Operant behavioral technique	4 children	[2/2]	5 to 6	Significant decrease in movement
Slifer et al., 1994	OR	Behavioral training with motion control (radiation treatment in children without sedation)	10 children		3 to 7	8 of 10 children benefit (no sedation)
Tyc et al., 1995	OR	Cognitive-behavioral intervention in oncology patients	55 children		6 to 18	Reduction in distress
Slifer, 1996	OR	Behavioral training with motion control (radiation treatment in children without sedation)	11			For 9 of 11 children sedation could be avoided
Rosenberg et al., 1997	OR	Simulation using a mock MRI unit	32 children 16 obsessive compulsive disorders (OCD), 16 controls	[16/16]	6 to 17 (mean: 12.2)	Significant decrease in heart rate and self-reported distress level in all subjects All subjects completed the MRI session
Pressdee et al., 1997	OR	Play Therapy	169 children		4 to 8	One of the 169 children later needed GA
Armstrong & Aitken, 2000	OR /RA	This paper reviews the role of play preparation in pediatric anesthesia				
Bookheimer, 2000	RA	A variety of technological, experimental, and practical aspects are reviewed when imaging children (fMRI basics, comparing groups and choosing dependent variables, regional activation patterns as dependent variables, anatomical constraints, statistical considerations, practical considerations, anesthesia and pediatric imaging). Suggestions for their management are provided.				
Slifer et al., 2002	OR	Operant behavioral technique	4 children (2 ADHD)	[2/2]	7 to 10	Accuracy increased whereas head motion decreased
Byars et al., 2002	OR	Systematic desensitization, orientation training	209 children	[106/103]	5 to 18 (mean: 10)	Overall success rate: 80% 86% of all girls 74% of all boys
Poldrack et al., 2002	RA	Review of methodological issues and solution which arise when performing pediatric fMRI, including compliance (minimizing anxiety, minimizing motion), data processing (motion correction, modeling motion, spatial normalization), statistical analysis and the hemodynamic response, as well as progress in pediatric fMRI (Imaging basic cognitive processes, clinical fMRI, imaging neuropsychological disorders).				

Wilke et al., 2003	RA	An overview over current and future applications of fMRI is given, and typical problems, pitfall, and benefits of doing fMRI in pediatric age group are discussed. This is done on the background of fMRI basics, current research applications brain plasticity and current clinical applications.				
Davidson et al., 2003	RA	Important issues relevant to developmental and clinical neuroimaging research are discussed, including anatomical, physical and psychological differences between children and adults, as well as general issues. Additionally, the development of age appropriate and scanner appropriate tasks for children are discussed, also in the context of an empirical study of development and learning in healthy children and adults.				
Overy et al., 2005	RA	Behavioral preparation techniques	33 children		5 to 7	Mean performance similar during practice and MRI session (no adverse effect due to MRI environment after training)
Sury et al., 2005	RA	Review - problems of painless imaging (Ultrasound & echocardiography, computer tomography, nuclear medicine imaging, positron emission tomography, magnetic resonance imaging) and patient management techniques (behavioral techniques, natural sleep, sedation, anaesthesia)				
DeAmorim e Silva et al., 2006	OR	Practice magnetic resonance unit	134 children (retrospective evaluation)	[63/71]	4.1 to 16.1 (mean 7.7)	Overall success rate: 90% of all children passed the practice session 98% of those had a clinical non-GA MRI 94% of those with success
Kotsoni et al., 2006	RA	Review of methodological and theoretical issues (developmental differences in anatomy & physiology and developmental and clinical differences in ability) and provides possible approaches (acclimation to, and modification of, the imaging environment for pediatric population)				
Epstein et al., 2007	OR	Mock scanner training Operant feedback using a video system	45 participants (23 youth, 22 parents / ADHD and non-ADHD)	[24/21]	adults: 47 youth: 17	10% data loss (excessive movement > 2mm) No in between group differences
Hallowell et al., 2008	OR	(1) behavioral technique (2) use of a practice MRI unit	291 children	[142/ 149]	3.6 to 17 (mean 7.9)	74.9% pass at practice 12 % borderline pass 96% diagnostic useful images of children entering MRI machine
O'Shaughnessy et al., 2008	RA	Review considering principles of fMRI, issues relevant to imaging children (anatomy, development, response variability, task selection, cooperation and movement), research using fMRI to examine cognitive processing in pediatric population (executive functions, visual spatial processing, facial expression and special focus on language studies) and applications to patient care				Reliable data in 95% of typically developing children > 8 years 80% of children aged 4 to 5
Hunt & Thomas, 2008	RA	Review aiming to provide a foundation for investigators aiming to use (f)MRI in research. Special consideration is given towards basic concepts of MRI physics, typical MRI components, scan types, experimental design factors, work with pediatric and special population.				

Raschle et al., 2009	P	Video Protocol for Pediatric Neuroimaging (incorporates the use of a mock scanner as well as behavioral management techniques)		4.9 to 6.3 years (mean 5.5)	Overall success rate: 95%. Overall movement decrased whereas chance of obtaining high quality images increased.
Thomason, 2009	RA	Review of pediatric neuroimaging procedures, addresses issues, such as child movement and anxiety and reviews reports of pediatric neuroimaging participants.			
Church et al., 2010	RA	Discussion and overview of various issues related to pediatric neuroimaging, including assessing task performance, dealing with group performance differences, controlling for movement, statistical power, atlas registration and data analysis strategies.			
De Bie, HMA et al., 2010	RA	Confirms success rate of mock scanner use in pediatric neuroimaging studies	90 children	3 to 14 years	For children under 7 years of age, 33 out of 36 were able to continue to the fMRI session after training, and out of the 33, 23 of them had less than 3mm movement during image acquisition.
Schlund et al., 2011	P	Describes the development and application of an individualized multiple reward approach for increasing the number of fMRI tasks children complete during pediatric neuroimaging sessions.	28 children	9 to 13	Higher compliance and task completion rate in children assessed using an individualized multiple reward approach (Compliance in standard reward group: 68.4%; compliance in the multiple reward group: 93.6%)

Notes: Original Research (OR), review articles (RA), male (M), female (F)

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Figure SI2. Overview over original research (OR) and review articles (RA) which address the issues of pediatric imaging and / or provide techniques to work with infants within the imaging environment; in chronological order.

Authors	Type [OR\RA]	Approach	Subjects	Sex [M/F]	Age [months]	Result
Anderson et al., 2001	OR	Natural Sleep Technique (Infants were swaddled, outfitted with earphones, infants' heads were lightly packed using foam padding and towels)	20	[11/9]	1 week	Images acquired successfully in 14 of 20 infants, 6 woke up during scan sessions with no adverse events experienced.
Dehaene-Lambertz et al., 2002	OR	Infants were awake or naturally sleeping with the following materials: special noise protection foam, noise protection helmet, infant's body/head swaddled with bandages to ensure comfort/discourage movements	20	[6/14]	2-3 months	
Gilmore et al., 2004	OR	Feed & Wrap Technique (Neonates were fed, swaddled, fitted with ear protection and heads secured in a vacuum-fixation device in a 3T head-only scanner. A parent stayed in the MR room throughout image acquisition)	20	[10/10]	newborns	Obtained quality images without significant motion in 13 of 20 neonates. Most of these failures were due to failure getting the infant to sleep before image acquisition.
Paterson et al., 2004	Conference Abstract	Protocol outlining the approach to the Natural Sleep Technique in infants from 3 to 12 months of age, outlining the preparation involved, procedure for putting the infant to sleep, and the comfort and sound attenuation equipment necessary for MRI with naturally sleeping infants.				Scanning success at 3-4 months: 60% (6 out of 10), 6-7 months: 72% (39 of 54), 12-13 months: 62.5% (20 of 32), with a subset needing multiple session attempts
Sury et al., 2005	RA	Review summarizes approaches to implementing behavioral techniques when working with infants, protocol for using sedation/anesthesia, and the Natural Sleep Technique, along with a discussion on the pros and cons of selecting each approach. The research team reports a 50-75% success rate with the Natural Sleep Technique.				
Almli et al., 2007	OR	Feed & Wrap Technique (Newborn Infants are fed and swaddled to sleep during daytime or nighttime. Parental education about the scan and testing process in the mock scanner environment)	106		newborns-4 yrs	Of 106 infants and children, 75 were successful (see page 321, outlines reasons for failure

Gilmore et al., 2007	OR	Feed & Wrap Technique (Neonates were fed, swaddled, fitted with ear protection and heads secured in a vacuum-fixation device in a 3T head-only scanner. A parent stayed in the MR room throughout image acquisition)	74	[40/34]	Newborns	
Redcay et al., 2007		Natural Sleep Technique (child fell asleep naturally in waiting room or scanner room. After 5–10 min of sleep on the scanner bed, earplugs and headphones were placed on the child)	21	[14/7]	30-60 months	
Knickmeyer et al., 2008	OR	Feed & Wrap Technique (neonates fell asleep after being fed and & swaddled easily, having skipped their nap for the day. Neonates fitted with ear protection and secured in vacuum-fixation device in a 3T head-only scanner)	98	[49/49]	newborn-2 yrs	
Hansen, 2009	OR	Feed & Wrap Technique (infants fasted for 4 hours, fed just prior to the scan to induce sleep and positioned in an immobilisation device, VacFix Vacuum Cushion)	36		newborns	89% success rate
Ortiz-Mantilla et al., 2010	OR	Natural Sleep Technique (followed the protocol of Paterson et al, 2004)	27	[15/12] ([13/11])	6 and 12 months	Success rate at 6 months 72%; Success rate at 12 months 63% (45% of all participants were longitudinal scans, thus acquisition at both 6 and 12 months)
Glasel et al., 2011	OR	Natural Sleep Technique (Asleep during MR imaging; minimized noise exposure by covering magnet bore with noise protection foam)	14	[9/5]	1 month - 4 months	
Windram et al., 2011	OR	Feed & Wrap Technique (infants fasted for 4 hours prior to the scan and fed immediately before the MRI, swaddeled with infant sheets and were placed in a immobilizer, MedVac Bag)	20		newborn-6 months	Success in all 20 with sufficient image quality

Notes: Original Research (OR), review articles (RA), male (M), female (F)

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	# of children recruited	# of imaging sessions	Total # of attempted MRIs	# of successful attempts	# of unsuccessful attempts	Overall Success Rate (%)
3-4 months	10	9x1 1x2	11	6	5	55%
6-7 months	59	51x1 8x2	67	43	28	64%
8-11 months	8	6x1 2x2	10	5	5	50%
12-15 months	32	28x1 9x2	36	22	18	61%
4-6 years	45	45x1	45	44	1	97%