

MS Journal Appendix for MRI methodology

Field strength	1.5 T
Manufacturer	Philips
Model	Achieva
Coil type (e.g. head, surface)	SENSE Neurovascular Coil
Number of coil channels	8 channels for head, 4 channels for neck

Type (e.g. FLAIR, DIR, DTI, fMRI)	RS fMRI, DE TSE, 3D T1 TFE, post-contrast T1 SE	
Acquisition time	45 min	
Orientation	Axial	
Alignment (e.g. anterior commissure/posterior commissure line)	AC-PC	
Voxel size	RS fMRI: 1.89x1.89x4 mm ² DE TSE: 0.94x0.94x3.0 mm ² 3D T1 TFE: 1.0x1.0x1.0 mm ² post-contrast T1 SE: 0.94x0.94x3.0 mm ²	
TR	RS fMRI: TR=3000ms DE TSE: TR=3124 ms 3D T1 TFE: TR=7.2 ms post-contrast T1 SE: TR=500 ms	
TE	RS fMRI: TE=35 ms DE TSE: TE=20/100 ms 3D T1 TFE: TE=3.27 ms post-contrast T1 SE: TE=10 ms	
TI	3D T1 TFE: TI=1000 ms	
Flip angle	RS fMRI: FA=90° DE TSE: FA=90° 3D T1 TFE: FA=8° post-contrast T1 SE: FA=90°	
NEX	RS fMRI: NEX=1 DE TSE: NEX=1 3D T1 TFE: NEX=1 post-contrast T1 SE: NEX=2	
Field of view	RS fMRI: FOV=240x240 mm ² DE TSE: FOV=240x240 mm ² 3D T1 TFE: FOV=256x256 mm ² post-contrast T1 SE: 240x240 mm ²	
Matrix size	RS fMRI: Matrix=96x96, reconstructed to 128x128 DE TSE: Matrix=256x256 3D T1 FFE: Matrix=256x256 post-contrast T1 SE: 256x256	
Parallel imaging	Yes	No
If used, parallel imaging method: (e.g. SENSE, GRAPPA)	SENSE	
Cardiac gating	Yes	No

If used, cardiac gating method: (e.g. PPU or ECG)		
Contrast enhancement	Yes	No
If used, provide name of contrast agent, dose and timing of scan post-contrast administration	gadopentetate dimeglumine, acquisition delay 5 min	
Other parameters:	STIR spinal cord: - Voxel size=0.81x0.81x3.0 mm² - TR= 2500 ms - TE=60 ms - TI=110 ms - FA=90° - FOV=260x180 (recFOV 69%) - Acquisition matrix= 312x295 post contrast T1-weighted TSE spinal cord: - Voxel size=0.81x0.81x3.0 mm² - TR=500 ms - TE=7.8 ms - FA=90° - FOV=260x180 (recFOV 69%) - Acquisition matrix=312x313	

Lesions	
Type (e.g. Gd-enhancing, T2-hyperintense, T1-hypointense)	T2-hyperintense, T1-hypointense
Analysis method	Local thresholding segmentation technique
Analysis software	Jim software package (Version 7, Xinapse Systems, Colchester, UK)
Output measure (e.g. count or volume [ml])	lesion volume [ml]
Tissue volumes	
Type (e.g. whole brain, grey matter, white matter, spinal cord)	Whole brain, gray matter and white matter normalized volumes percentage of brain volume changes at follow-up
Analysis method	brain segmentation and skull based normalization
Analysis software	SIENAX SIENA
Output measure (e.g. absolute tissue volume in ml, tissue volume as a fraction of intracranial volume, percentage change in tissue volumes)	Normalized brain volume (NBV), normalized grey matter volume, normalized white matter volume. Percentage brain of volume change (PBVC)
Tissue measures (e.g. MTR, DTI, T1-RT, T2-RT, T2*, T2', 1H-MRS, perfusion, Na)	
Type (e.g. whole brain, grey matter, white matter, spinal cord, normal-appearing grey matter or white matter)	
Analysis method	
Analysis software	
Output measure	
Other MRI measures (e.g. functional MRI)	
Type (e.g. whole brain, grey matter, white matter, spinal cord, normal-appearing grey matter or white matter)	RS fMRI static and dynamic functional connectivity
Analysis method	RS fMRI pre-processing Group independent component analysis (selection of relevant components of interest) Calculation of static and dynamic functional network connectivity (FNC) correlation matrices Calculation of dynamic FNC properties (hard-clustering and fuzzy meta-states analyses)
Analysis software	SPM12, AFNI, GIFT software, GIFT MANCOVAN and dFNC toolboxes
Output measure	Dynamic FNC properties (recurring dynamic FNC states, dwell times, probability of transitioning, global dynamism measures)

Other analysis details: