

MS Journal Appendix for MRI methodology

Hardware	
Field strength	3 Tesla
Manufacturer	Siemens
Model	TimTrio
Coil type (e.g. head, surface)	Head
Number of coil channels	32

Acquisition sequence	
Type (e.g. FLAIR, DIR, DTI, fMRI)	MPRAGE, FLAIR
Acquisition time	MPRAGE: 4:24 min; FLAIR: 7:38 min
Orientation	HFS
Alignment (e.g. anterior commissure/posterior commissure line)	anterior to posterior commissure line
Voxel size	MPRAGE & FLAIR: 1mm isotropic
TR	MPRAGE: 1900 ms; FLAIR: 6000 ms
TE	MPRAGE: 3.03 ms; FLAIR: 388 ms
TI	MPRAGE: 900 ms; FLAIR: 2100 ms
Flip angle	MPRAGE: 9°; FLAIR: 120°
NEX	MPRAGE & FLAIR: 1
Field of view	MPRAGE & FLAIR: 256x256x176
Matrix size	MPRAGE & FLAIR: 256x256
Parallel imaging	Yes <input type="checkbox"/> <input checked="" type="checkbox"/> No
If used, parallel imaging method: (e.g. SENSE, GRAPPA)	
Cardiac gating	Yes <input type="checkbox"/> <input checked="" type="checkbox"/> No
If used, cardiac gating method: (e.g. PPU or ECG)	
Contrast enhancement	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Acquisition sequence

If used, provide name of contrast agent, dose and timing of scan post-contrast administration

Gadovist, 0.1mL (1mmol/mL) per kg body weight, second MPAGE 10min. post-contrast administration

Other parameters:

Image analysis methods and outputs	
Lesions	
Type (e.g. Gd-enhancing, T2-hyperintense, T1-hypointense)	T2-hyperintense, Gd-enhancing (when available)
Analysis method	Lesion count and volume
Analysis software	ITK-SNAP, FSL cluster
Output measure (e.g. count or volume [ml])	Count and volume (mL)
Tissue volumes	
Type (e.g. whole brain, grey matter, white matter, spinal cord)	Whole brain, grey and white matter and CSF
Analysis method	Whole brain, grey and white matter and CSF volume
Analysis software	FSL SIENA-X (without BET)
Output measure (e.g. absolute tissue volume in ml, tissue volume as a fraction of intracranial volume, percentage change in tissue volumes)	Absolute tissue volume in mL and VScaling factor (as a representative for head-size)
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)	
Analysis method	
Analysis software	
Output measure	

Other analysis details:

FLAIR MRIs were centred on the choroid plexus in the lateral ventricles and cropped using an in-house Python script, mean intensities calculated and flattened into a 1D array with numpy and matplotlib libraries.