

MS Journal Appendix for MRI methodology

Hardware	
Field strength	3.0 T
Manufacturer	Siemens
Model	Skyra
Coil type (e.g. head, surface)	Head and neck (cervical cord), spine (thoracic cord)
Number of coil channels	Head and neck: 20; spine: 32

Acquisition sequence	
Type (e.g. FLAIR, DIR, DTI, fMRI)	PD-weighted, T2-weighted, T1-weighted MP-RAGE
Acquisition time	Brain axial DE TSE: 2'58" Brain sagittal T1-weighted MP-RAGE: 5'12" Cervical cord sagittal PD-weighted: 3'32" Cervical cord axial T2-weighted multi-echo: 4'50' Cervical cord sagittal T1-weighted MP-RAGE: Thoracic cord sagittal PD-weighted: 3'32" Thoracic cord axial T2-weighted 1 st set: 4'16" Thoracic cord axial T2-weighted 2 nd set: 4'16"
Orientation	Sagittal: brain and cervical cord T1-weighted MP-RAGE, cervical and thoracic cord PD-weighted Axial: brain DE TSE, cervical cord T2-weighted multi-echo, thoracic cord T2-weighted
Alignment (e.g. anterior commissure/posterior commissure line)	
Voxel size	Brain axial DE TSE: 0.98x0.98x3.3 mm Brain sagittal T1-weighted MP-RAGE: 0.93x0.93x0.9 mm Cervical cord sagittal PD-weighted: 0.42x0.42x3.3 mm Cervical cord axial T2-weighted multi-echo: 0.4x0.4x3.3 mm Cervical cord sagittal T1-weighted MP-RAGE: 0.98x0.98x1 mm Thoracic cord sagittal PD-weighted: 0.42x0.42x3.3 mm Thoracic cord axial T2-weighted: 0.31x0.31x3.3 mm

Acquisition sequence	
TR	Brain axial DE TSE: 2670 ms Brain sagittal T1-weighted MP-RAGE: 2300 ms Cervical cord sagittal PD-weighted: 2000 ms Cervical cord axial T2-weighted multi-echo: 510 ms Cervical cord sagittal T1-weighted MP-RAGE: 2300 ms Thoracic cord sagittal PD-weighted: 2000 ms Thoracic cord axial T2-weighted: 3500 ms
TE	Brain axial DE TSE: 24-120 ms Brain sagittal T1-weighted MP-RAGE: 2.81 ms Cervical cord sagittal PD-weighted: 9 ms Cervical cord axial T2-weighted multi-echo: 14 ms Cervical cord sagittal T1-weighted MP-RAGE: 5 ms Thoracic cord sagittal PD-weighted: 9 ms Thoracic cord axial T2-weighted: 103 ms
TI	Brain sagittal T1-weighted MP-RAGE: 900 ms Cervical cord sagittal T1-weighted MP-RAGE: 1140 ms
Flip angle	Brain axial DE TSE: 145° Brain sagittal T1-weighted MP-RAGE: 9° Cervical cord sagittal PD-weighted: 145° Cervical cord axial T2-weighted multi-echo: 30° Cervical cord sagittal T1-weighted MP-RAGE: 8° Thoracic cord sagittal PD-weighted: 145° Thoracic cord axial T2-weighted: 145°
NEX	NEX=1 for all sequences, apart from cervical and thoracic cord sagittal PD-weighted: NEX=2
Field of view	Brain axial DE TSE: 250x188 Brain sagittal T1-weighted MP-RAGE: 240x240 Cervical cord sagittal PD-weighted: 161x112 Cervical cord axial T2-weighted multi-echo: 200x200 Cervical cord sagittal T1-weighted MP-RAGE: 250x250 Thoracic cord sagittal PD-weighted: 161x112 Thoracic cord axial T2-weighted: 239x239

Acquisition sequence		
Matrix size	Brain axial DE TSE: 256x192 Brain sagittal T1-weighted MP-RAGE: 256x256 Cervical cord sagittal PD-weighted: 384x269 Cervical cord axial T2-weighted multi-echo: 256x256 Cervical cord sagittal T1-weighted MP-RAGE: 256x256 Thoracic cord sagittal PD-weighted: 384x269 Thoracic cord axial T2-weighted: 448x336	
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		
Other parameters:		

Image analysis methods and outputs	
Lesions	
Type (e.g. Gd-enhancing, T2-hyperintense, T1-hypointense)	T2 hyperintense
Analysis method	Local thresholding segmentation technique
Analysis software	Jim 7, Xinapse Systems Ltd., Colchester, UK (www.xinapse.com)
Output measure (e.g. count or volume [ml])	T2 lesion count, T2 lesion volume
Tissue volumes	
Type (e.g. whole brain, grey matter, white matter, spinal cord)	1) Whole brain volume 2) Cervical and thoracic spinal cord atrophy
Analysis method	Segmentation
Analysis software	1) SIENAx (version 2.6) 2) Jim7, Xinapse
Output measure (e.g. absolute tissue volume in ml, tissue volume as a fraction of intracranial volume, percentage change in tissue volumes)	1) Normalized brain volume 2) Normalized cervical and thoracic cross-sectional area
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: