

Figure legends

Figure 1 A flow chart of the recruited subjects in this study. MS, multiple sclerosis; AQP4+ NMOSD, aquaporin 4 seropositive neuromyelitis optica spectrum disorders; AQP4- NMOSD, aquaporin 4 seronegative neuromyelitis optica spectrum disorders; MOGAD, myelin oligodendrocyte glycoprotein antibody associated disease; HC, healthy control.

Figure 2 WMH frequency maps of MS, AQP4+ NMOSD, AQP4- NMOSD, MOGAD and HC. WMH frequency maps were smoothed with a Gaussian Kernel of 4mm×4mm×4mm for a better visualization. WMH, white matter hyperintensity; MS, multiple sclerosis; AQP4+ NMOSD, aquaporin 4 seropositive neuromyelitis optica spectrum disorders; AQP4- NMOSD, aquaporin 4 seronegative neuromyelitis optica spectrum disorders; MOGAD, myelin oligodendrocyte glycoprotein antibody associated disease; HC, healthy control.

Figure 3 The periventricular normalized NODDI metrics of NAWM and WMH within rings radiating from ventricle to cortex in MS, AQP4+ NMOSD, AQP4- NMOSD and MOGAD displayed by boxplot with median, 25th and 75th percentiles, whiskers and outliers presented. MS, multiple sclerosis; AQP4+ NMOSD, aquaporin 4 seropositive neuromyelitis optica spectrum disorders; AQP4- NMOSD, aquaporin 4 seronegative neuromyelitis optica spectrum disorders; MOGAD, myelin oligodendrocyte glycoprotein antibody associated disease; HC, healthy control; NDI, neurite density index; ODI, orientation dispersion index; ISOVF, isotropic volume fraction; NAWM, normal-appearing white matter; WMH, white matter hyperintensity.

Figure 4 Associations of individual NAWM periventricular abnormality gradients of normalized NODDI metrics with brain tissue volumes (including WMH volume,

WMV and GMV) in MS, AQP4+ NMOSD, AQP4- NMOSD and MOGAD. NDI, neurite density index; ODI, orientation dispersion index; ISOVF, isotropic volume fraction; MS, multiple sclerosis; AQP4+ NMOSD, aquaporin 4 seropositive neuromyelitis optica spectrum disorders; AQP4- NMOSD, aquaporin 4 seronegative neuromyelitis optica spectrum disorders; MOGAD, myelin oligodendrocyte glycoprotein antibody associated disease; WMV, white matter volume; GMV, grey matter volume; NAWM, normal-appearing white matter; WMH, white matter hyperintensity. * indicates $p < 0.05$; ** indicates $p < 0.01$; *** indicates $p < 0.001$.

Figure 5 Association of individual periventricular abnormality gradient of NAWM NODDI metrics with clinical variables in MS, AQP4+ NMOSD and MOGAD. NDI, neurite density index; ODI, orientation dispersion index; ISOVF, isotropic volume fraction; MS, multiple sclerosis; AQP4+ NMOSD, aquaporin 4 seropositive neuromyelitis optica spectrum disorders; MOGAD, myelin oligodendrocyte glycoprotein antibody associated disease; NAWM, normal-appearing white matter; PASAT, Paced Auditory Serial Addition Test; MMSE, Mini-Mental State Examination; SDMT, Symbol Digit Modalities Test; CVLT, California Verbal Learning Test; EDSS, expanded disability status scale. * indicates $p < 0.05$; ** indicates $p < 0.01$.

