

Supplementary Table 2. MRS in OSA patients and control subjects

	Groups		t-test	
	Patient	Control	t	p-value
Frontal WM (NAA peak, mM/I)				
RT	10.113 ± 1.192 (8–12)	13.910 ± 1.700 (11–16.7)	-9.293	< 0.001*
LT	10.579 ± 1.113 (8.5–12.2)	13.770 ± 1.170 (12–15.8)	-9.730	< 0.001*
Frontal WM (choline peak, mM/I)				
RT	5.844 ± 0.772 (4.5–7)	3.993 ± 0.308 (3.5–4.55)	10.173	< 0.001*
LT	4.990 ± 0.876 (3.6–6.8)	3.865 ± 0.245 (3.55–4.4)	5.579	< 0.001*
Frontal WM (creatine peak, mM/I)				
RT	9.077 ± 0.881 (7.5–10.5)	12.781 ± 0.736 (11–13.9)	-15.521	< 0.001*
LT	8.918 ± 0.811 (7.8–10.9)	12.208 ± 0.756 (11–13.36)	-14.431	< 0.001*
Frontal WM (lipid peak, mM/I)				
RT	3.591 ± 0.801 (2–4.9)	1.970 ± 0.274 (1.5–2.5)	8.695	< 0.001*
LT	3.530 ± 0.706 (2–4.6)	1.999 ± 0.227 (1.58–2.5)	9.357	< 0.001*
Frontal WM (lactate peak, mM/I)				
RT	3.562 ± 0.746 (2–4.7)	1.970 ± 0.266 (1.58–2.5)	9.144	< 0.001*
LT	3.702 ± 0.659 (2.5–4.7)	1.954 ± 0.210 (1.55–2.4)	11.442	< 0.001*
Hippocampus (NAA peak, mM/I)				
RT	10.858 ± 1.172 (8.8–12.5)	14.291 ± 0.794 (12.9–15.5)	-11.443	< 0.001*
LT	10.941 ± 0.969 (8.9–12.4)	13.925 ± 0.687 (12.9–15.2)	-11.907	< 0.001*
Hippocampus (choline peak, mM/I)				
RT	4.803 ± 0.832 (3.4–6.2)	4.211 ± 0.569 (3.6–5)	2.774	0.008*
LT	4.850 ± 0.790 (3.5–6)	4.255 ± 0.528 (3.68–5)	2.951	0.005*
Hippocampus (creatine peak, mM/I)				
RT	9.315 ± 0.883 (8–10.8)	12.520 ± 0.630 (11.5–13.5)	-14.007	< 0.001*
LT	9.561 ± 0.863 (8.2–11)	12.575 ± 0.590 (11.6–13.42)	-13.619	< 0.001*
Hippocampus (lipid peak, mM/I)				
RT	3.577 ± 0.669 (2.4–4.5)	1.942 ± 0.226 (1.6–2.4)	10.501	< 0.001*
LT	3.684 ± 0.664 (2.4–4.49)	1.945 ± 0.214 (1.67–2.4)	11.291	< 0.001*
Hippocampus (lactate peak, mM/I)				
RT	3.519 ± 0.688 (2.3–4.48)	1.962 ± 0.205 (1.65–2.4)	9.802	< 0.001*
LT	3.675 ± 0.633 (2.5–4.48)	1.918 ± 0.173 (1.68–2.3)	12.087	< 0.001*
Parieto-occipital cortex (NAA peak, mM/I)				
RT	10.947 ± 1.042 (8.8–12.5)	14.309 ± 0.628 (13.3–15.3)	-12.917	< 0.001*
LT	11.086 ± 1.026 (8.7–12.4)	14.281 ± 0.630 (13.2–15.3)	-12.432	< 0.001*
Parieto-occipital cortex (choline peak, mM/I)				
RT	4.863 ± 0.791 (3.6–6.2)	4.255 ± 0.504 (3.62–5)	3.045	0.004*
LT	4.741 ± 0.878 (3.4–6.2)	4.027 ± 0.546 (3.63–5.01)	3.239	0.002*
Parieto-occipital cortex (creatine peak, mM/I)				
RT	9.453 ± 0.867 (8.1–10.9)	12.500 ± 0.621 (11.5–13.4)	-13.547	< 0.001*
LT	9.400 ± 0.914 (8–11)	12.520 ± 0.630 (11.5–13.5)	-13.284	< 0.001*
Parieto-occipital cortex (lipid peak, mM/I)				
RT	3.601 ± 0.713 (2.3–4.48)	1.944 ± 0.186 (1.66–2.3)	10.133	< 0.001*
LT	3.501 ± 0.737 (2.2–4.48)	1.884 ± 0.159 (1.66–2.2)	9.634	< 0.001*
Parieto-occipital cortex (lactate peak, mM/I)				
RT	3.518 ± 0.651 (2.4–4.47)	1.943 ± 0.172 (1.65–2.2)	10.552	< 0.001*
LT	3.566 ± 0.707 (2.3–4.49)	1.896 ± 0.188 (1.64–2.3)	10.288	< 0.001*
Putamen (NAA peak, mM/I)				
RT	11.804 ± 0.594 (11–12.9)	11.812 ± 0.671 (10.9–12.9)	-0.042	0.967
LT	12.273 ± 0.501 (11.1–12.9)	12.372 ± 0.549 (11.5–13.1)	-0.653	0.517
Putamen (choline peak, mM/I)				
RT	4.253 ± 0.512 (3.5–5)	4.477 ± 0.513 (3.6–5.2)	-1.517	0.136
LT	4.034 ± 0.247 (3.6–4.5)	4.106 ± 0.259 (3.62–4.44)	-0.986	0.329
Putamen (creatine peak, mM/I)				
RT	10.139 ± 0.483 (9.55–11.09)	10.260 ± 0.405 (9.5–10.71)	-0.918	0.363
LT	10.525 ± 0.373 (9.75–11.02)	10.592 ± 0.607 (9.8–11.69)	-0.487	0.629
Putamen (lipid peak, mM/I)				
RT	2.701 ± 0.330 (2.2–3.4)	2.674 ± 0.120 (2.55–2.96)	0.361	0.720
LT	3.051 ± 0.346 (2.2–3.39)	2.999 ± 0.136 (2.81–3.2)	0.641	0.525
Putamen (lactate peak, mM/I)				
RT	2.748 ± 0.312 (2.3–3.39)	2.712 ± 0.096 (2.6–2.9)	0.511	0.612
LT	2.884 ± 0.383 (2.3–3.38)	2.811 ± 0.090 (2.7–3)	0.830	0.411
Cerebellum (NAA peak, mM/I)				
RT	11.774 ± 0.629 (11–13)	11.887 ± 0.476 (11.1–12.51)	-0.681	0.499
LT	12.071 ± 0.483 (11.2–12.8)	12.121 ± 0.444 (11.6–12.9)	-0.369	0.714
Cerebellum (choline peak, mM/I)				
RT	4.071 ± 0.223 (3.7–4.4)	4.036 ± 0.292 (3.5–4.39)	0.480	0.633
LT	4.073 ± 0.229 (3.7–4.41)	3.997 ± 0.233 (3.7–4.49)	1.153	0.255
Cerebellum (creatine peak, mM/I)				
RT	10.247 ± 0.331 (9.74–10.9)	10.270 ± 0.530 (9.3–11)	-0.189	0.851
LT	10.341 ± 0.339 (9.75–10.8)	10.263 ± 0.405 (9.79–10.99)	0.737	0.465
Cerebellum (lipid lactate, mM/I)				
RT	2.933 ± 0.336 (2.3–3.36)	2.836 ± 0.092 (2.72–3)	1.261	0.213
LT	2.745 ± 0.282 (2.3–3.3)	2.674 ± 0.114 (2.54–2.9)	1.066	0.292
Cerebellum (lactate peak, mM/I)				
RT	2.909 ± 0.330 (2.2–3.34)	2.887 ± 0.083 (2.78–3.04)	0.296	0.769
LT	2.640 ± 0.293 (2.2–3.3)	2.562 ± 0.094 (2.43–2.7)	1.144	0.258
Frontal WM (choline/creatine ratio)				
RT	2.001 ± 0.447 (1.2–2.9)	1.229 ± 0.039 (1.17–1.3)	7.684	< 0.001*
LT	2.328 ± 0.545 (1.2–3)	1.165 ± 0.150 (0.9–1.5)	9.279	< 0.001*
Frontal WM (NAA/creatine ratio)				
RT	2.594 ± 0.282 (2–3)	2.030 ± 0.163 (1.7–2.3)	8.069	< 0.001*
LT	2.629 ± 0.274 (2–3.15)	2.102 ± 0.152 (1.96–2.4)	7.816	< 0.001*
Frontal WM (NAA/choline ratio)				
RT	0.938 ± 0.275 (0.55–1.6)	1.597 ± 0.019 (1.57–1.63)	-10.671	< 0.001*
LT	1.058 ± 0.335 (0.5–1.6)	1.607 ± 0.030 (1.55–1.65)	-7.279	< 0.001*
Hippocampus (choline/creatine ratio)				
RT	2.164 ± 0.507 (1.2–2.9)	1.202 ± 0.013 (1.18–1.22)	8.454	< 0.001*
LT	2.179 ± 0.493 (1.2–2.89)	1.206 ± 0.017 (1.18–1.23)	8.802	< 0.001*
Hippocampus (NAA/creatine ratio)				
RT	2.596 ± 0.249 (2–2.97)	2.015 ± 0.135 (1.8–2.2)	9.509	< 0.001*
LT	2.613 ± 0.250 (2–2.94)	2.035 ± 0.083 (1.97–2.2)	9.959	< 0.001*
Hippocampus (NAA/choline ratio)				
RT	1.057 ± 0.320 (0.58–1.6)	1.605 ± 0.018 (1.58–1.64)	-7.631	< 0.001*
LT	1.013 ± 0.305 (0.6–1.6)	1.611 ± 0.020 (1.57–1.64)	-8.716	< 0.001*
Parieto-occipital cortex (choline/creatine ratio)				
RT	2.205 ± 0.496 (1.2–2.8)	1.207 ± 0.015 (1.18–1.23)	8.965	< 0.001*
LT	2.066 ± 0.489 (1.2–2.79)	1.203 ± 0.019 (1.17–1.23)	7.876	< 0.001*
Parieto-occipital cortex (NAA/creatine ratio)				
RT	2.471 ± 0.208 (2–2.79)	2.029 ± 0.049 (1.98–2.1)	9.320	< 0.001*
LT	2.483 ± 0.194 (2–2.73)	2.018 ± 0.039 (1.97–2.1)	10.517	< 0.001*
Parieto-occipital cortex (NAA/choline ratio)				
RT	1.129 ± 0.278 (0.71–1.6)	1.600 ± 0.015 (1.58–1.62)	-7.547	< 0.001*
LT	1.133 ± 0.258 (0.77–1.6)	1.602 ± 0.016 (1.57–1.63)	-8.105	< 0.001*
Putamen (choline/creatine ratio)				
RT	1.284 ± 0.042 (1.2–1.35)	1.272 ± 0.016 (1.24–1.3)	1.235	0.223
LT	1.287 ± 0.038 (1.2–1.34)	1.279 ± 0.016 (1.25–1.31)	0.895	0.375
Putamen (NAA/creatine ratio)				
RT	2.104 ± 0.046 (2–2.18)	2.091 ± 0.047 (2.04–2.16)	1.008	0.319
LT	2.089 ± 0.037 (2–2.13)	2.079 ± 0.042 (2.03–2.15)	0.852	0.398
Putamen (NAA/choline ratio)				
RT	1.517 ± 0.043 (1.44–1.6)	1.523 ± 0.018 (1.49–1.55)	-0.553	0.583
LT	1.519 ± 0.037 (1.47–1.6)	1.530 ± 0.026 (1.44–1.56)	-1.123	0.267
Cerebellum (choline/creatine ratio)				
RT	1.281 ± 0.033 (1.2–1.32)	1.274 ± 0.018 (1.24–1.3)	0.970	0.337
LT	1.261 ± 0.027 (1.2–1.29)	1.255 ± 0.018 (1.22–1.28)	0.990	0.327
Cerebellum (NAA/creatine ratio)				
RT	2.093 ± 0.030 (2–2.12)	2.083 ± 0.047 (2.01–2.13)	0.936	0.354
LT	2.068 ± 0.039 (2–2.11)	2.062 ± 0.029 (2.01–2.1)	0.594	0.555
Cerebellum (NAA/choline ratio)				
RT	1.533 ± 0.034 (1.5–1.6)	1.543 ± 0.016 (1.51–1.57)	-1.180	0.244
LT	1.541 ± 0.025 (1.51–1.6)	1.543 ± 0.018 (1.51–1.58)	-0.307	0.760

Data are presented as mean ± standard deviation (range).

*Significant at $p < 0.05$.

MRS, proton magnetic resonance spectroscopy; NAA, N-acetyl aspartate; OSA, obstructive sleep apnea; WM, white matter; RT, right; LT, left.