

Supplementary Material

Oculomotor Dysfunction in Idiopathic and *LRRK2*-Parkinson's Disease and At-Risk Individuals

Supplementary Table 1. Comparison of oculomotor performance between L2NMC with normal and abnormal DaT-SPECT

	Normal DaT-SPECT (N=8)	Abnormal DaT-SPECT (N=13)	<i>p</i>
Age, y	60.38 (10.06)	61.92 (8.08)	-
Microsaccade number	6.00 (3.79)	7.91 (6.98)	0.43
Microsaccade amplitude, °	0.39 (0.16)	0.50 (0.21)	0.26
Microsaccade peak velocity, %/s	27.66 (7.18)	28.91 (10.12)	0.69
SWJ, number	0.29 (0.49)	2.00 (2.65)	0.068
BCEA, ° ²	0.92 (0.96)	1.85 (1.79)	0.15
Horizontal prosaccade latency, ms	256.94 (19.38)	282.38 (46.47)	0.19
Vertical prosaccade latency, ms	279.86 (46.74)	300.18 (54.80)	0.42
Horizontal prosaccade peak velocity, %/s	367.42 (99.39)	293.21 (44.37)	0.04
Vertical prosaccade peak velocity, %/s	242.45 (46.01)	239.76 (50.17)	0.90
Horizontal prosaccade positive error, °	0.45 (0.15)	0.69 (0.40)	0.12
Horizontal prosaccade negative error, °	-0.27 (0.1)	-0.53 (0.64)	0.35
Vertical prosaccade positive error, °	0.43 (0.13)	0.72 (0.78)	0.37
Vertical prosaccade negative error, °	-0.52 (0.55)	-0.49 (0.31)	0.81
% Corrective antisaccades	87.17 (28.93)	96.25 (7.69)	0.28
% Successful antisaccades	86.88 (20.17)	85.77 (19.46)	0.97
Horizontal corrective antisaccade latency, ms	551.94 (126.66)	644.64 (153.60)	0.10
Vertical corrective antisaccade latency, ms	577.57 (86.58)	679.90 (211.14)	0.26
% Correct memory saccades	95.71 (6.08)	90.39 (14.79)	0.34
Horizontal memory saccade latency, ms	470.80 (215.93)	432.15 (286.08)	0.78
Vertical memory saccade latency, ms	486.70 (133.99)	720.95 (708.19)	0.41

Mean values of oculomotor parameters in each L2NMC group, with standard deviations in brackets. Level of significance was calculated with general linear models, age and sex adjusted.

°, degrees; BCEA, Bivariate Contour Ellipse Area; L2NMC, Non Manifesting Carrier of the *LRRK2* G2019S mutation.

Supplementary Table 2. Correlation between oculomotor parameters and UPDRS-III and MoCA scores

	UPDRS-III		MoCA	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age, y	0.32	0.0053	-0.57	0.00000017
Fixation test				
Microsaccade number	-0.14	0.28	0.037	0.97
Microsaccade amplitude, °	0.02	0.86	-0.10	0.27
Microsaccade peak velocity, °/s	-0.01	0.84	0.002	0.51
SWJ, number	-0.02	0.91	-0.03	0.54
BCEA, ° ²	-0.04	0.17	-0.28	0.23
Prosaccade test				
Horizontal latency, ms	0.38	0.024	-0.26	0.86
Vertical latency, ms	0.11	0.55	-0.03	0.56
Horizontal peak velocity, °/s	-0.13	0.63	0.11	0.66
Vertical peak velocity, °/s	-0.19	0.28	0.24	0.35
Horizontal positive error, °	0.33	0.026	-0.13	0.94
Horizontal negative error, °	-0.32	0.018	0.11	0.59
Vertical positive error, °	0.15	0.45	-0.08	0.79
Vertical negative error, °	-0.28	0.034	0.09	0.69
Antisaccade test				
% Corrective antisaccades	-0.38	0.011	0.45	0.016
% Successful antisaccades	-0.52	0.00022	0.61	0.00032
Horizontal corrective antisaccade latency, ms	0.46	0.00051	-0.55	0.00012
Vertical corrective antisaccade latency, ms	0.23	0.057	-0.46	0.0077
Memory saccade test				
% Correct memory saccades	-0.28	0.059	0.57	0.00030
Horizontal memory saccade latency, ms	0.32	0.021	-0.61	0.000011
Vertical memory saccade latency, ms	0.21	0.24	-0.36	0.036

Correlation between UPDRS-III or MoCA scores and oculomotor parameters represented by Pearson's *r*, with level of significance calculated with linear regression analysis, age and sex adjusted.

°, degrees; BCEA, Bivariate Contour Ellipse Area; SWJ, square wave jerk.

Supplementary Table 3. Classification accuracy of oculomotor parameters in L2NMC

	AUC	<i>p</i>	CI 95%
Microsaccade amplitude, °	0.712	0.0057	(0.57, 0.86)
Microsaccade peak velocity, °/s	0.671	0.026	(0.53, 0.81)
SWJ, number	0.586	0.25	(0.43, 0.74)
BCEA, °²	0.739	0.0014	(0.61, 0.87)
Horizontal prosaccade latency, ms	0.717	0.0023	(0.61, 0.83)
Vertical prosaccade latency, ms	0.704	0.0043	(0.58, 0.82)
Vertical prosaccade negative error, °	0.693	0.014	(0.55, 0.84)
Horizontal corrective antisaccade latency, ms	0.612	0.11	(0.46, 0.76)
Vertical corrective antisaccade latency, ms	0.681	0.013	(0.54, 0.82)
Horizontal memory saccade latency, ms	0.608	0.13	(0.47, 0.75)
Vertical memory saccade latency, ms	0.713	0.0038	(0.59, 0.84)

°, degrees; BCEA, Bivariate Contour Ellipse Area; SWJ, square wave jerk.