

Mapping Motor Pathways in Parkinson's Disease Patients with Subthalamic Deep Brain

Stimulator: A Diffusion MRI Tractography Study

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Table S1. Postoperative MRI protocol.

Parameters	T1	DTI	DTI_B0
	MPRAGE		
Orientation	sagittal	transverse	transverse
TR (ms)	3400	6500	6500
TE (ms)	3	126	126
TI (ms)	900	/	/
FA (degree)	8	90	90
Matrix	216×224	110×110	110×110
FOV (mm ²)	216×224	220×220	220×220
Number of slices	192	72	72
Voxel size (mm ³)	1×1×1	2×2×2	2×2×2
Acquisition averages	1	b=0 s/mm ² , 16 b=1000 s/mm ² ,64	16
BW (Hz/Px)	260	1,336	1,336
Phase encoding direction	R->L	A->P	P->A
Acquisition time (min: sec)	06:02	09:13	02:17
SAR (w/kg)	0.03±0.01	0.34±0.02	0.32±0.02

Abbreviations: DTI, diffusion tensor imaging; TR, repetition time; TE, echo time; TI, inversion time; FA, flip angle; FOV, field of view; BW, bandwidth; R, right; L, left; A, anterior; P, posterior; SAR, specific absorption rate.

Table S2. The mean values and standard deviations of the volume and the FA value of the ROIs.

ROIs	Side	Volume (mm ³)			FA		
		DBS-on	DBS-off	<i>p</i>	DBS-on	DBS-off	<i>p</i>
DN	L	395±53	392±50	0.331	0.25±0.04	0.26±0.04	0.523
	R	402±52	401±51	0.721	0.27±0.04	0.26±0.04	0.413
THA	L	675±86	694±88	0.068	0.21±0.04	0.20±0.03	0.170
	R	669±89	673±124	0.803	0.21±0.04	0.20±0.04	0.276
PG	L	3179±536	3295±488	0.320	0.17±0.03	0.17±0.02	0.709
	R	2934±676	3017±462	0.497	0.18±0.05	0.17±0.03	0.360
STN	L	22.3±3.8	22.8±3.5	0.447	0.37±0.12	0.33±0.08	0.056
	R	24.4±4.0	23.9±4.0	0.334	0.35±0.11	0.32±0.09	0.299
SN	L	143±16	142±19	0.327	0.31±0.06	0.32±0.05	0.616
	R	132±16	134±16	0.018	0.34±0.06	0.35±0.06	0.594
STR	L	2666±421	2665±409	0.931	0.25±0.02	0.24±0.03	0.233
	R	2668±402	2666±402	0.889	0.25±0.02	0.25±0.02	0.559

There is no significant difference in the volume or FA value of the defined seed and target ROIs between the DBS-on and the DBS-off conditions. Values are reported as mean ± standard deviation.

Abbreviations: FA, fractional anisotropy; ROI, regions-of-interest; n, number of patients; DN, dentate nucleus; THA, thalamus; PG, precentral gyrus; STN, subthalamic nucleus; SN, substantia nigra; STR, striatum; L, left side; R, right side.

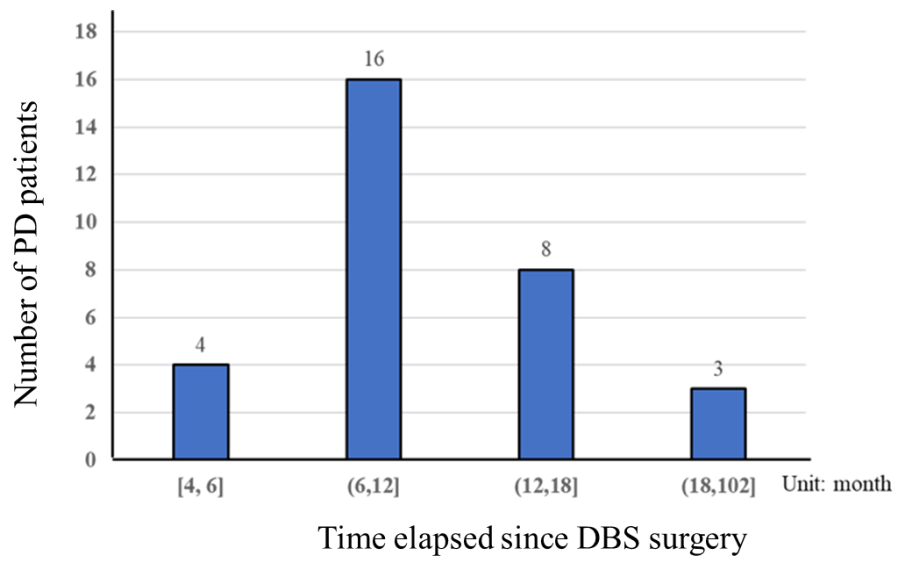


Figure S1. Follow-up for MRIs obtained after DBS surgery. The duration from the DBS implantation surgery to the post MRI session ranged from 4 to 102 months in the patients. Abbreviations: DBS, deep brain stimulation.

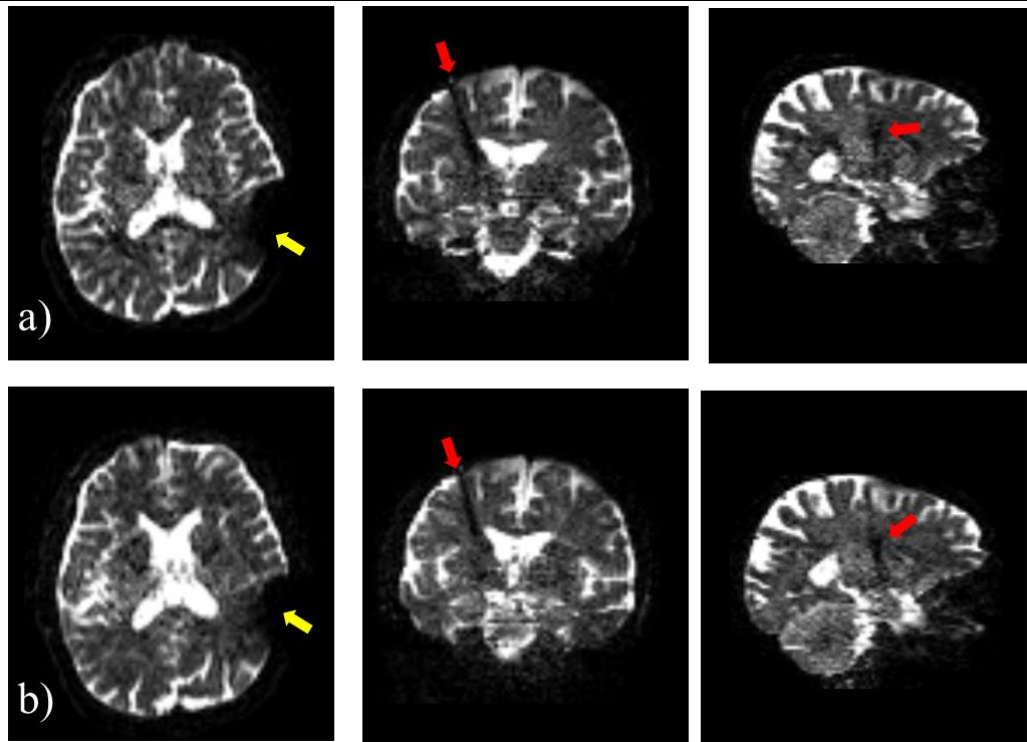


Figure S2. The B_0 images of one representative patient in the a) DBS-on and b) DBS-off states. A trained MRI analyst conducted a visual image quality assessment of all 80 volumes for each DTI scan. The yellow arrows indicate artifacts generated by the extension cables which were placed on the skull, resulting in signal loss observed over the parietal and temporal regions of the left hemisphere. The red arrows indicate the artifacts generated by the DBS electrodes.

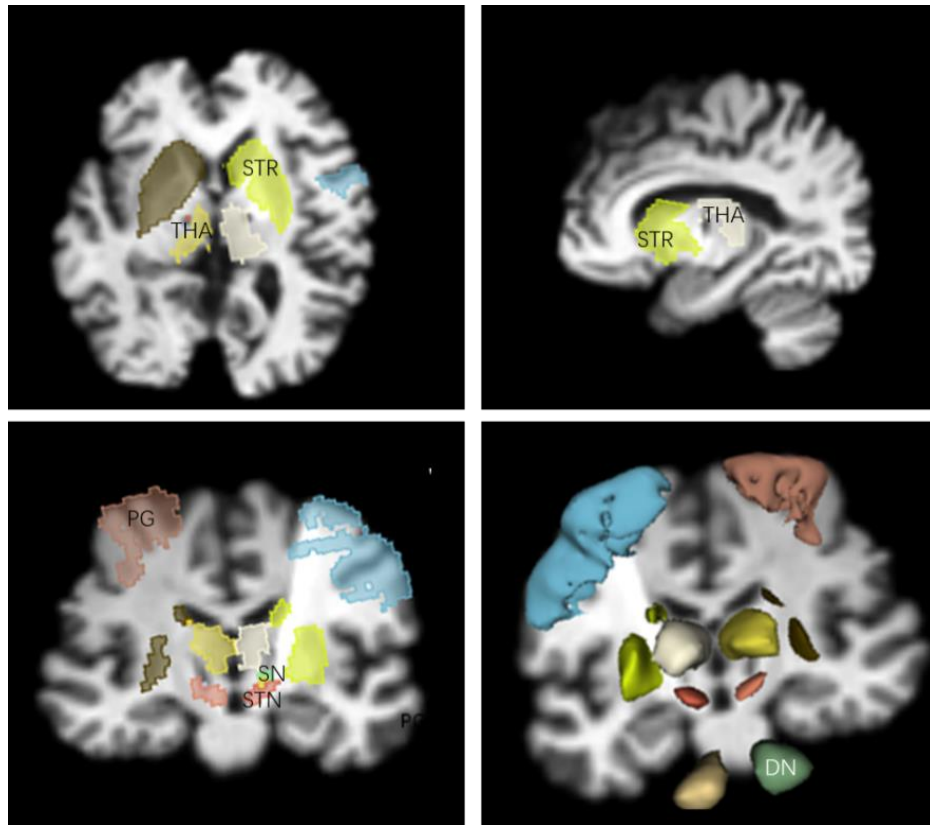


Figure S3. The segmentation outlines of the twelve ROIs in a representative patient. Abbreviations: STR, striatum; THA, thalamus; PG, precentral gyrus; SN, substantia nigra; STN, subthalamic nucleus; DN, dentate nucleus.