

Supplementary Material

A Retrospective Comparison of Multiple Approaches to Anatomically Informed Contact Selection in Subthalamic Deep Brain Stimulation for Parkinson's Disease

Supplementary Table 1. Clinical characteristics of the study cohort

n	28
age [years]	64.5 ± 7.2
sex [male]	16 (57.1 %)
Hoehn and Yahr scale at surgery [stage]	3.1 ± 1.0
disease duration at surgery [years]	10.4 ± 4.8
baseline LEDD [mg]	1090 ± 415
baseline UPDRS III MED OFF [score]	39.2 ± 11.0
baseline UPDRS III MED ON [score]	20.5 ± 8.1
Levodopa UPDRS III reduction* [score]	18.7 ± 7.6
Levodopa response** [%]	0.48 ± 0.13
days between surgery and follow up	390.6 ± 53.9
follow-up LEDD [mg]	584 ± 353
follow-up UPDRS III MED OFF/STIM ON [score]	21.9 ± 10.5
follow-up UPDRS III MED ON/STIM ON [score]	16.6 ± 10.1
DBS UPDRS III reduction*** [score]	17.3 ± 13.1
DBS response****	0.42 ± 0.26
response ratio*****	0.9 ± 0.6
chronic DBS amplitude [mA]	2.3 ± 0.9
chronic DBS frequency [Hz]	130 ± 25.5
chronic DBS pulse width [μs]	60 ± 7.4

* baseline UPDRS III MED OFF – baseline UPDRS III MED ON

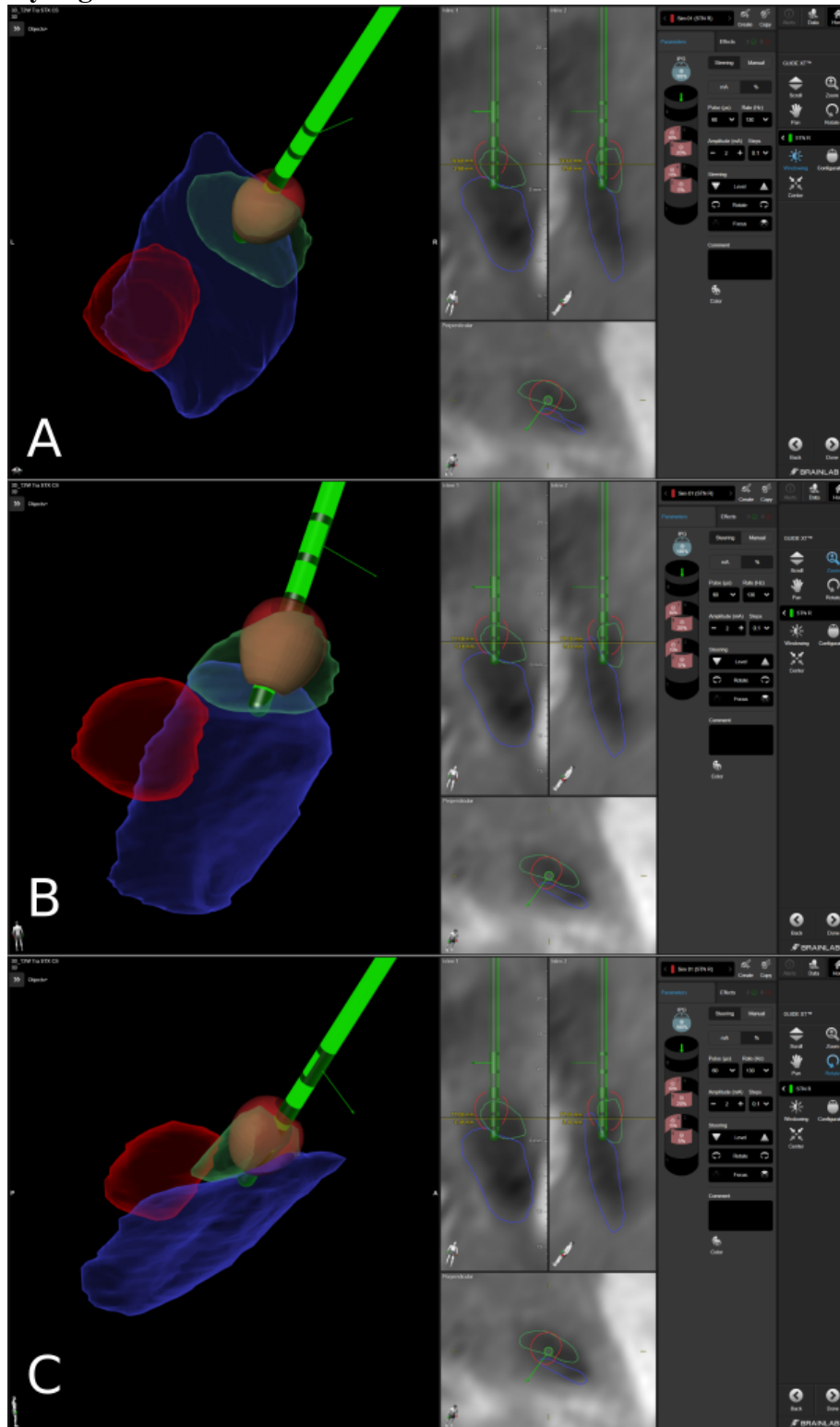
** (baseline UPDRS III MED OFF – baseline UPDRS III MED ON)/baseline UPDRS III MED OFF

*** baseline UPDRS III MED OFF – follow up UPDRS III MED OFF/STIM ON

**** (baseline UPDRS III MED OFF – follow up UPDRS III MED OFF/STIM ON)/baseline UPDRS III MED OFF

***** DBS response/Levodopa response

Supplementary Figure 1. The user interface of Brainlab Elements™ GUIDE XT



Screenshots of the user interface of the software used for visual assessment of individual anatomy in this study. Settings are set at 2 mA, 60 μ s, 130 Hz. All three images depict the right hemisphere of the same representative subject. The 3D visualization is demonstrated in transverse (A), coronal (B), and sagittal (C) view.

Supplementary Table 2. Lateralized motor outcomes

baseline UPDRS III hemiscore MED OFF [score]	12.7 ± 4.6
baseline UPDRS III hemiscore MED ON [score]	6.7 ± 3.7
follow up UPDRS III hemiscore MED OFF/STIM ON [score]	6.7 ± 4.0
Levodopa UPDRS III hemiscore reduction* [score]	6.0 ± 3.0
DBS UPDRS III hemiscore reduction** [score]	5.9 ± 4.9
hemispheric Levodopa response***	0.48 ± 0.19
hemispheric DBS response****	0.43 ± 0.31
hemispheric response ratio*****	1.1 ± 0.84

* baseline UPDRS III hemiscore MED OFF – baseline UPDRS III hemiscore MED ON

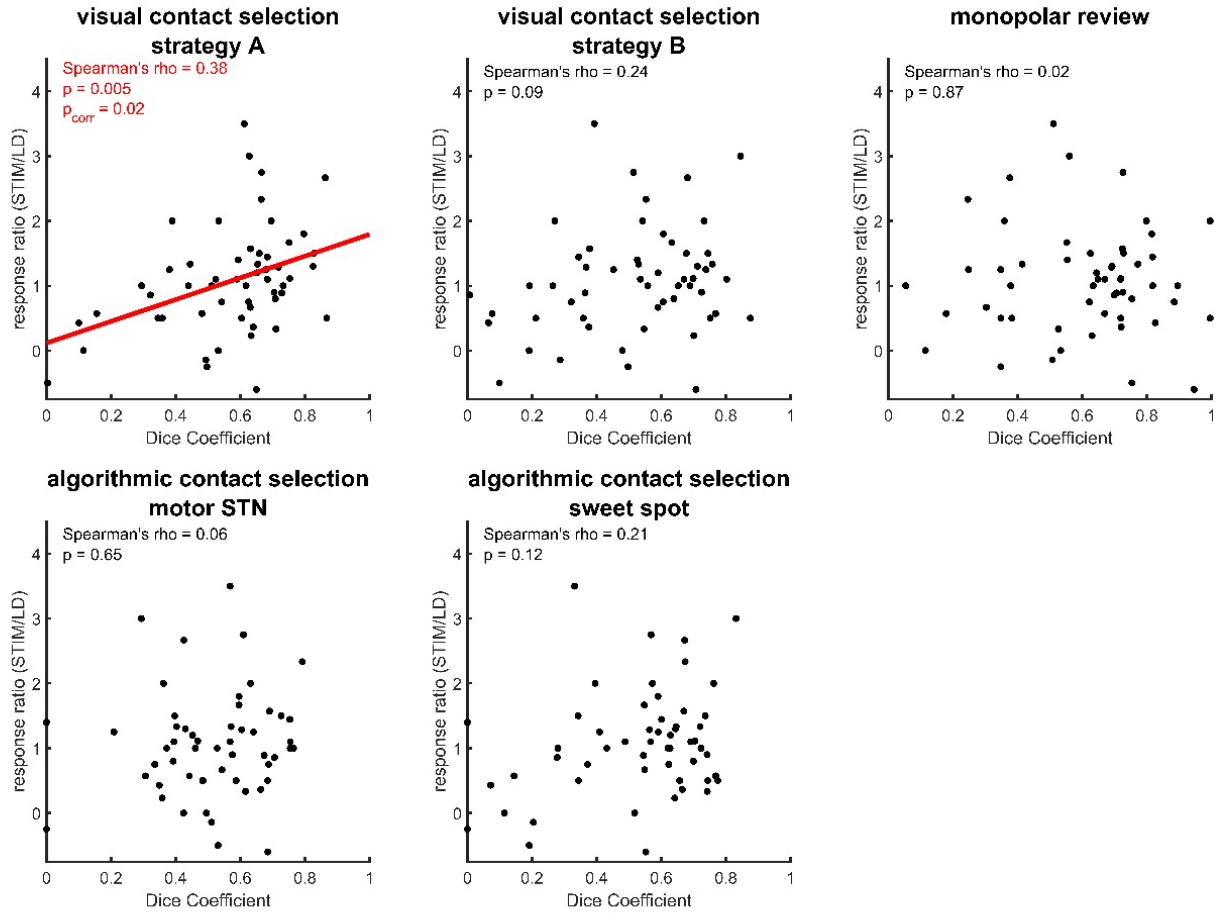
** baseline UPDRS III hemiscore MED OFF – follow up UPDRS III hemiscore MED OFF/STIM ON

*** (baseline UPDRS III hemiscore MED OFF – baseline UPDRS III hemiscore MED ON)/baseline UPDRS III MED OFF

**** (baseline UPDRS III hemiscore MED OFF – follow up UPDRS III hemiscore MED OFF/STIM ON)/baseline UPDRS III MED OFF

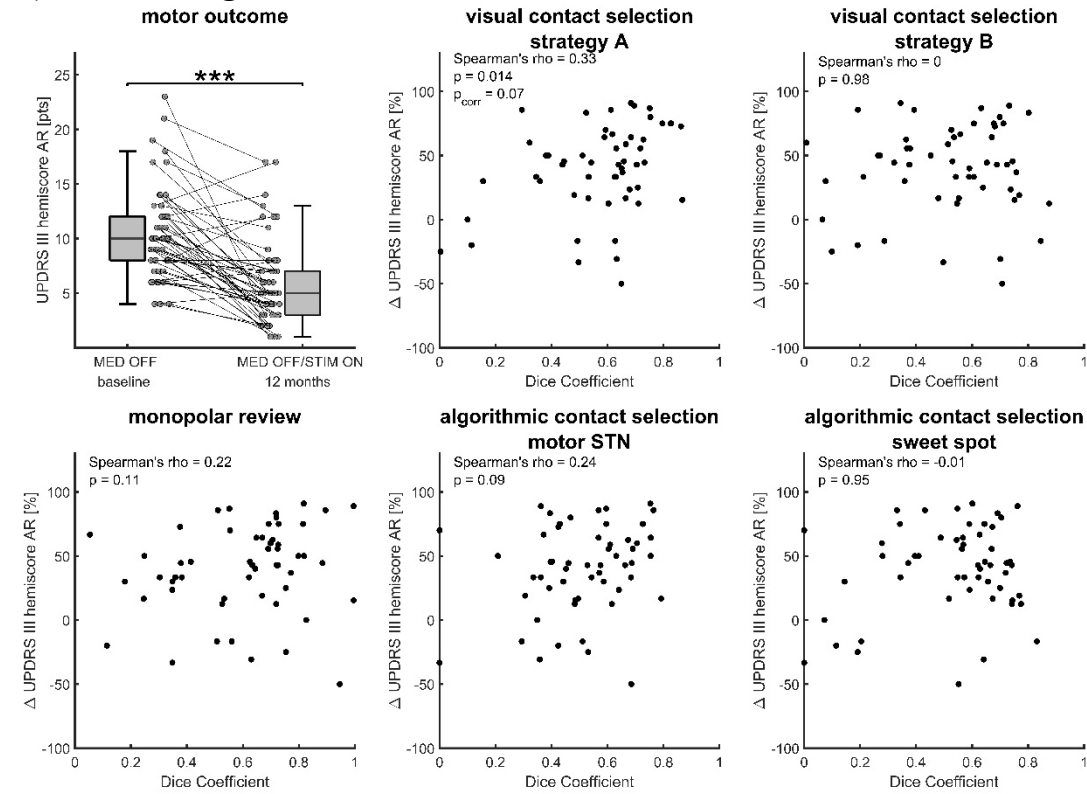
***** DBS response/Levodopa response

Supplementary Figure 2. Correlations of response ratios to contact selection strategies

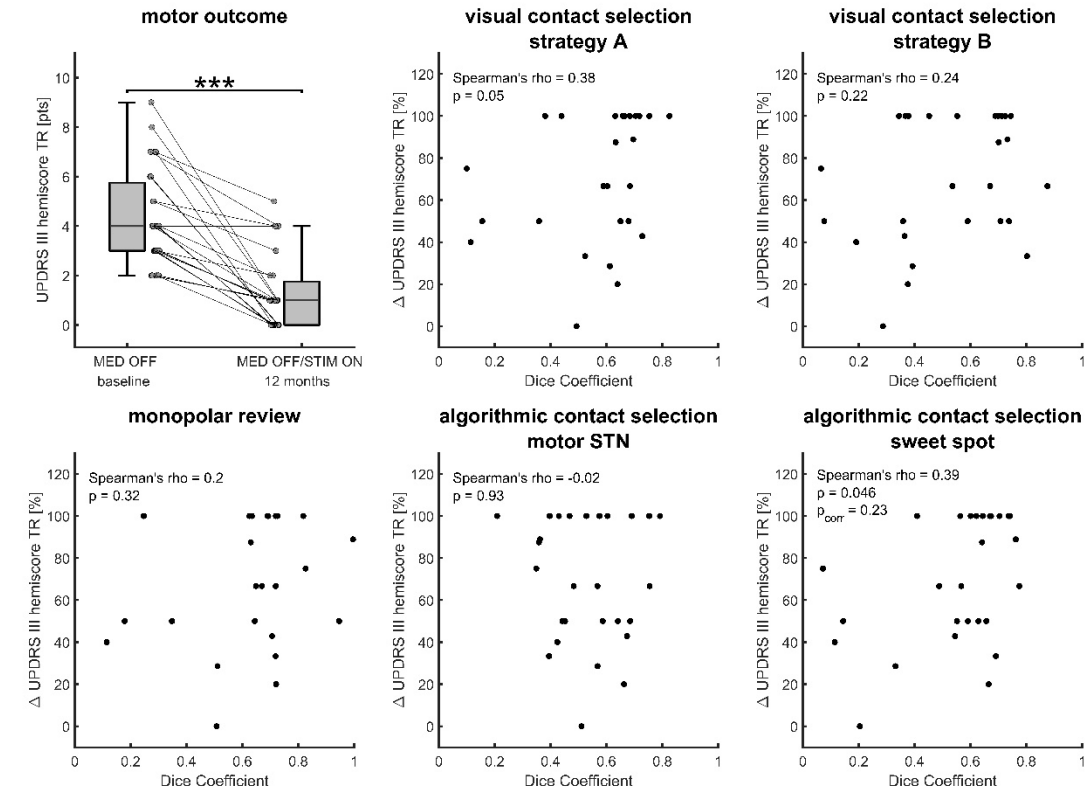


Supplementary Figure 3. Symptom-specific subanalysis

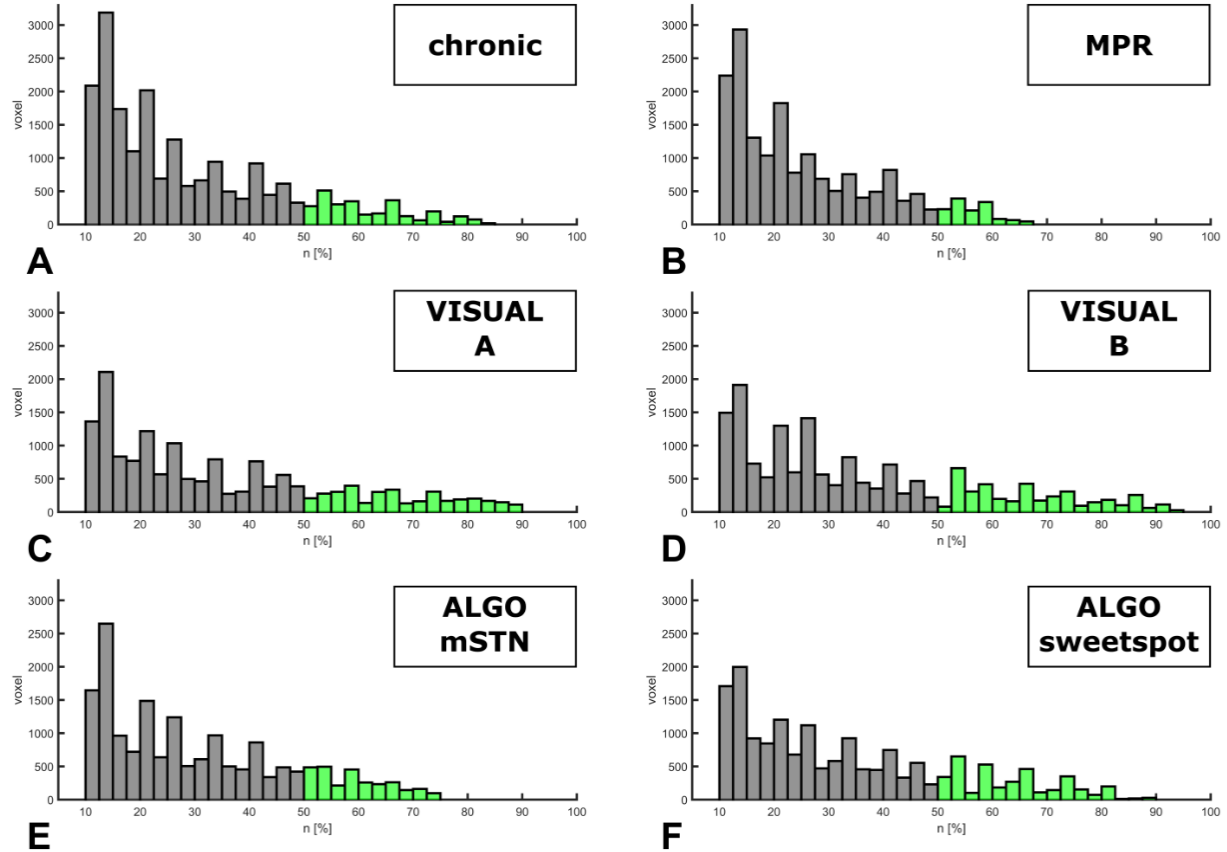
A) Akinetic-rigid



B) Tremor



Supplementary Figure 4. Quantitative analysis of voxel-based n-maps



Histograms of the n-maps for chronic stimulation (A) and the different contact selection strategies (B-F) are depicted in Figure 4. Grey bars indicate n-values of 10%-50%, while green bars indicate n-values $\geq 50\%$.

	$n \geq 1$	$n \geq 50\%$	$n \geq 50\%$ motor STN		$n \geq 50\%$ associative STN		$n \geq 50\%$ limbic STN		$n \geq 50\%$ extranuclear	
	mm ³	mm ³	mm ³	%	mm ³	%	mm ³	%	mm ³	%
chronic	649.8	22.1	12.1	55	5.9	27	0.3	1	3.85	17
MPR	398.6	10.9	7.4	68	2.6	24	0.0	0	0.94	9
VISUAL-A	287.5	28.3	14.8	52	4.7	17	0.1	0	8.82	31
VISUAL-B	273.9	31.6	9.1	29	4.3	14	0.0	0	18.30	58
ALGO-mSTN	299.3	22.5	18.1	81	2.2	10	0.8	4	1.33	6
ALGO-sweetspot	306.3	29.0	9.5	33	4.4	15	0.0	0	15.07	52