Data analysis

RMT was defined as the minimum stimulus intensity that elicited MEPs of ≥50 μV in 5 out of 10 consecutive trials in the relaxed target muscles. For measurement of MEP amplitude, TMS was adjusted to produce MEPs of 1mV in the relaxed contralateral APB muscle. Twenty trials were tested. The stimuli intensity was kept constant at the different times of assessment (baseline, T0, T30, T60).

The CSP duration was assessed from 10 trials during isometric contraction (approximately 15% of maximum voluntary contraction kept constant with visual feedback through an oscilloscope) with TMS intensity set at 130% of RMT. The APB and ADM muscles were assessed separately.

The background EMG area was measured for 100 ms preceding the TMS pulse for each of 20 trials used for the measurement of MEP amplitude to look for differences in baseline activities between controls and patients. Background EMG area was also evaluated in the 200 ms preceding TMS to ensure a similar degrees of contraction during the CSP recording. A trial was excluded if the pre-stimulus EMG area exceeded mean +2 SD of the pre-stimulus EMG area measured at baseline. The experimental block was excluded from the analysis if >50% of trials were rejected.

Statistical analysis

A mixed-model analyses of variance (ANOVA) was used to compare MEP amplitude ratio to baseline, CSP duration ratio to baseline, RMT and background EMG area in the four sessions of patients with those in healthy controls. If the effects of group (Med-OFF/Stim-OFF, Med-OFF/Stim-ON, Med-ON/Stim-OFF, Med-ON/Stim-ON session and healthy controls) or group x time (baseline, T0, T30, T60) interactions were significant, the effect of time in each group was

explored with a mixed-model ANOVA. Least significant difference (LSD) tests for multiple comparisons were used for *post-hoc testing.*

For the patients only, we also analyzed the changes in MEP amplitude ratio to baseline and CSP duration ratio to baseline using a mixed-model ANOVA with medication (medication ON versus medication OFF), stimulation (stimulation ON versus stimulation OFF) and time (baseline, T0, T30, T60) as the main factors. The APB and ADM muscles were analyzed separately.

We compared the UPDRS motor scores and the background EMG area in the four sessions (Med-OFF/Stim-OFF, Med-OFF/Stim-ON, Med-ON/Stim-OFF, and Med-ON/Stim-ON) using repeated measure ANOVA and paired *t*-tests. Paired *t*-test or Wilcoxon signed rank test was used to compare the dosages of dopaminergic medications and UPDRS dyskinesia ratings before and after STN-DBS surgery. The statistical significance was set at $p < 0.05$. Unless otherwise stated, data are given as mean ± standard error of the mean (SEM).