



Neuropsychological Functioning of Parkinson's Disease Patients Two Years Post Subthalamic Nucleus Deep Brain Stimulation Surgery

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OBJECTIVE

- To assess neuropsychological functioning 2 years following subthalamic nucleus (STN) deep brain stimulation surgery (DBS) for the treatment of Parkinson's disease (PD).

BACKGROUND

- Long-term cognitive outcome of STN DBS for the treatment of PD has shown declines in verbal fluency, verbal memory and visuospatial reasoning.
- However, results have been inconsistent across studies and a long-term comparison of DBS patients and medically treated PD patients has not been presented.

PARTICIPANTS

- A comprehensive neuropsychological battery was used to examine the neurocognitive functioning of 10 bilateral STN DBS patients and 10 matched medically treated PD patients at baseline and at 2 years post-surgery.

Table 1 - Demographics

	<u>PD</u>	<u>DBS</u>
Age	57.5 (5.66)	61.2 (11.0)
Age of Onset	51.5 (6.91)	49.0 (8.43)
Education	15.5 (1.43)	14.0 (2.10)
H & Y	1.90 (0.46)	2.27 (0.62)

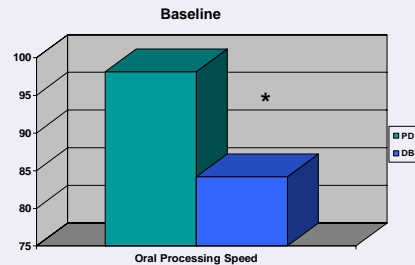
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TESTS ADMINISTERED

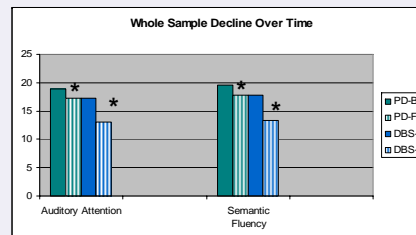
Basic orientation and mental status (Mini Mental Status Exam and Dementia Rating Scale), auditory attention (WAIS-III Digit Span), verbal memory (Rey Auditory Verbal Learning Test), nonverbal memory (Brief Visual Memory Test-Revised), confrontational naming (Boston Naming Test), sustained attention and executive functioning (STROOP Color Word Test), oral information processing speed (Symbol Digit Modalities Test), motor abilities (Hoehn and Yahr while on medication).

RESULTS

- Age, PD onset age, education and PD staging were not significantly different between the groups (Table 1).
- Neuropsychological functioning at baseline indicated that the DBS patients were significantly slower on a timed, oral measure of sustained attention/concentration as compared to the medically managed PD patients (STROOP word subtest, $p=.009$). No other significant baseline differences were found.

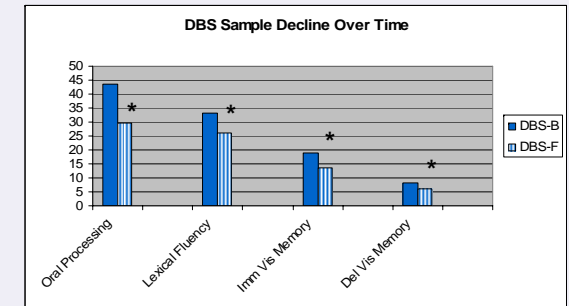


- At the two year follow-up evaluation, the entire sample (DBS and medically managed PD) evidenced declines in auditory attention (Digit Span, $p=.005$) and semantic fluency (Animals, $p=.001$).



RESULTS CONT'D.

- In addition to these declines, patients who underwent DBS significantly declined in comparison to their medically treated counterparts on measures of oral information processing speed (Symbol Digit, $p=.003$) and lexical fluency (FAS, $p=.001$).
- An unexpected decline in both immediate and delayed visual memory for simple items was found (BVMT-R, $p=.002$; $p=.007$, respectively). Differences for visual recognition memory were not found.



- In addition, verbal memory changes over time and between the groups were not significant.

SUMMARY & CONCLUSIONS

- These results are supported by previous research which indicates that DBS patients experience declines in frontostriatal functioning, specifically oral processing speed and verbal fluency.
- However, our DBS group also experienced a significant decline in visual memory abilities over the two-year period as compared to a matched PD control group.
- Further research regarding the effects of DBS on the visual memory system is warranted.
- DBS candidates should be counseled about the potential long-term risk of visual memory and frontostriatal cognitive declines following DBS surgery.