

# Practical Predictors of DBS Outcome: Leveraging Accessible Clinical and Imaging Markers

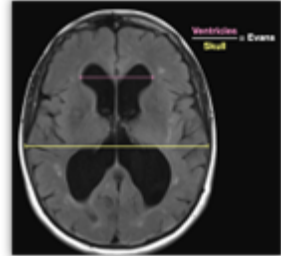


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**Background:** Deep brain stimulation (DBS) is an established therapy for advanced Parkinson's disease (PD), yet individual responses remain highly variable. Previous studies investigating cerebral and subcortical atrophy in PD suggest that reduced volumes may be linked to less favourable outcomes(1). While most analyses relied on advanced volumetric methods, only a few focused on simple 2D indices—including the Evans Index and third ventricular width (2)—highlighting the potential utility of accessible neuroimaging markers to improve outcome prediction and patient selection.

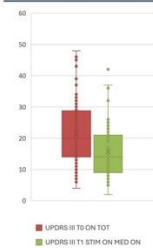
**Methods**  
retrospective study, 1 y follow-up  
76 patients (46M, 30F, mean age  $60.1 \pm 7.8$  years)  
Motor outcome: UPDRS II, UPDRS III, UPDRS IV  
Motor subscores: akinesia, rigidity, tremor, axial (3)  
Cognition, QoL and functional status: MMSE, PDQ39, Sf36, Sm36, S&E;  
Therapy: LEDD; Imaging: Evans Index (median 0.2368) + explorative (vs HC) cortical thickness



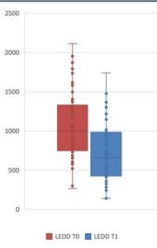
## Results

Daily ON after 12 months

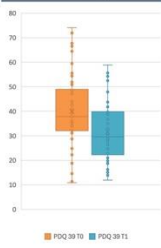
UPDRS III comparison during follow-up



LEDD comparison during follow-up



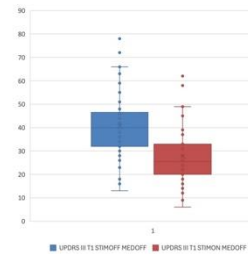
PDQ 39 comparison during follow-up



Improved with DBS

- UPDRS III
- Tremor
- Akinesia
- Rigidity
- Axial
- Item 18 (arising from chair)
- Item 27 (postural stability)
- Item 28 (posture)
- Item 29 (gait)
- Item 30 (body bradykinesia)

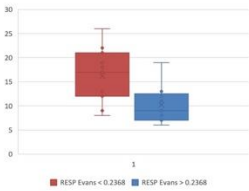
Response to DBS (without pharmacological therapy)



## Evans' Index

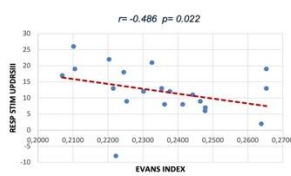
Significant differences

Stimulation response



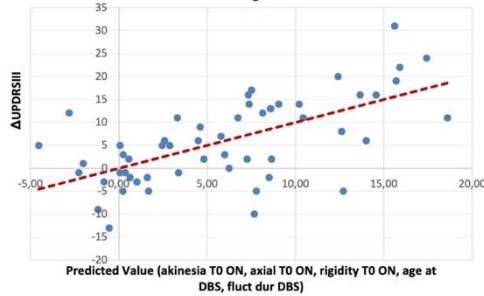
Significant correlations

Stimulation response



## Multi-variate linear regression analysis

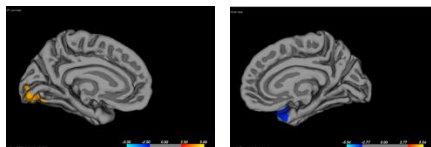
$R^2=0.400$  Sig. <0.001



## Cortical Thickness (PD VS HC)

Left Hemisphere  
Lateral occipital  
Superior parietal

Right Hemisphere  
Superior temporal



## Conclusions

DBS is effective in patients with baseline axial symptoms. Baseline clinical variables (age at surgery, motor fluctuation duration) predict motor outcome. Evans Index may serve as a simple preoperative stratification marker. Further studies needed to validate advanced MRI metrics in routine practice.

1 Barbosa et al., 2024; 2 Hamed et al., 2020; 3 Xu et al., 2018;



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