

Neuroplasticity & balance training in Parkinson's disease: planned analysis of a RCT^[1]

Franziska Albrecht¹, Joana B. Pereira¹, Eric Westman¹, Hanna Johansson^{1,2}, Malin Freidle¹, Urban Ekman^{1,2,3}, Alexander Lebedev¹, Staffan Holmin^{1,2}, Per Svenningsson^{1,2}, Erika Franzén^{1,2,3}

¹Karolinska Institutet, ²Karolinska University Hospital and ³Stockholms Sjukhem

Importance

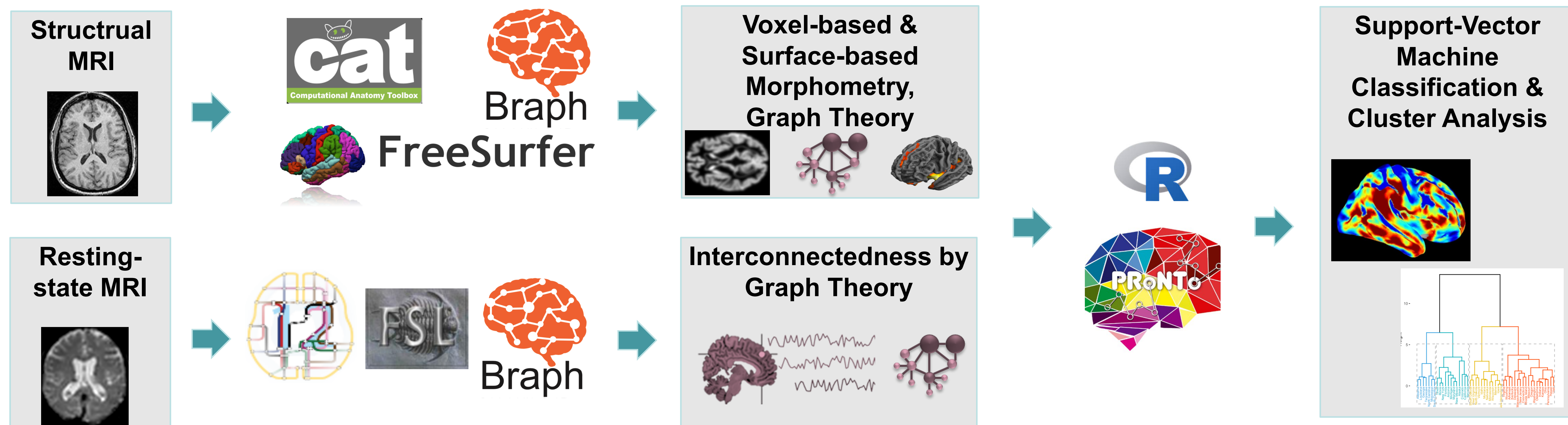
There is no cure for Parkinson's disease (PD) yet; alternative treatments ensuring quality of life are needed. Findings of neuroplasticity - a possible inhibition of degenerative processes - in response to physical exercise would revolutionize treatment of PD.

Aim

Determine effects of highly challenging balance training on brain structure/ functional connectivity & motor-cognitive functions:

- Difference in baseline brain structure & connectivity?
- Plastic changes after the intervention?
- Brain changes correlated with motor/cognitive improvement?

MRI Analyses



Background

Findings suggest that intensive, challenging & cognitively demanding physical exercise can induce neuroplasticity in PD^[2]. We have shown by a highly challenging balance training – **HiBalance program** – positive effects on gait & balance^[3]. Thus, we aim now to link behavioral changes to neuroplastic brain alterations^[1].

Material & Methods

Participants:

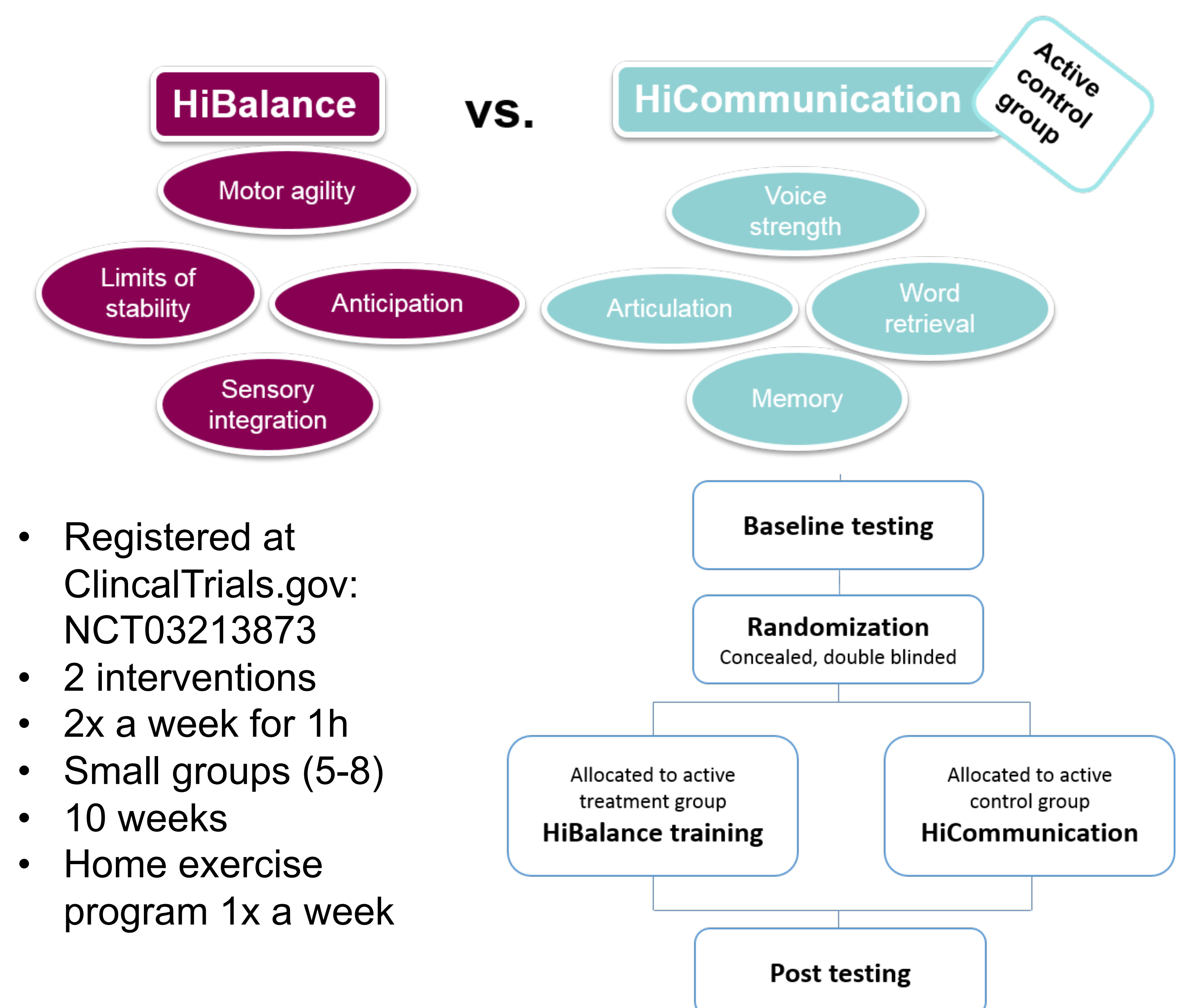
- 39 healthy controls
- 83 idiopathic PD
 - Hoehn & Yahr 2-3, ≥ 60 years, ≥ 21 MoCA

Measures:

- MRI, 3T Phillips Ingenia
 - Structural & resting-state
- Balance (Mini-BESTest, ABC)
- Temporal & spatial gait parameters (Gaitrite)
 - Single & dual task (auditory stroop)
- Perceived walking ability (Walk-12G)
- Physical activity level/intensity (accelerometers)
- Disease specific (MDS-UPDRS)
- Cognitive function (TMT, MoCa, RAVLT, WAIS-IV)
- Blood serum (BDNF)



Intervention



- Registered at ClinicalTrials.gov: NCT03213873
- 2 interventions
- 2x a week for 1h
- Small groups (5-8)
- 10 weeks
- Home exercise program 1x a week

Acknowledgements



References
 [1] Franzén et al., BMC Neurology, 2019.
 [2] Petzinger et al., Lancet neurology, 2013.
 [3] Conradsson, Löfgren, Nero, Hagströmer, Ståhle, Lökk, Franzén. NNR, 2015.

Contact

Karolinska Institutet
 Franziska Albrecht, PostDoc
 Division of Physiotherapy
 franziska.albrecht@ki.se
 @FranziAlb



Karolinska Institutet