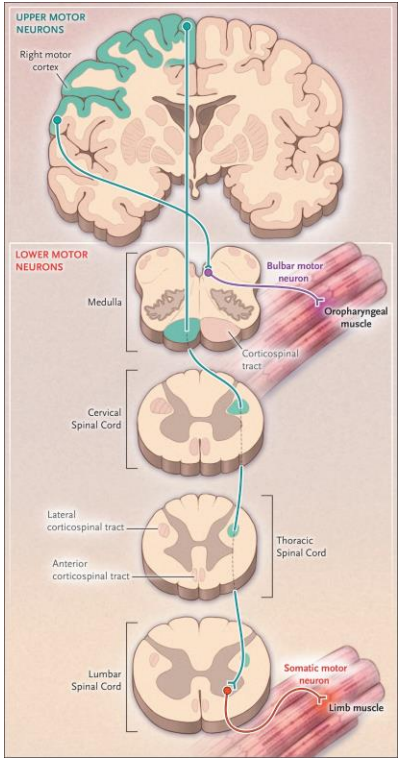
Transforming actigraphy in MND

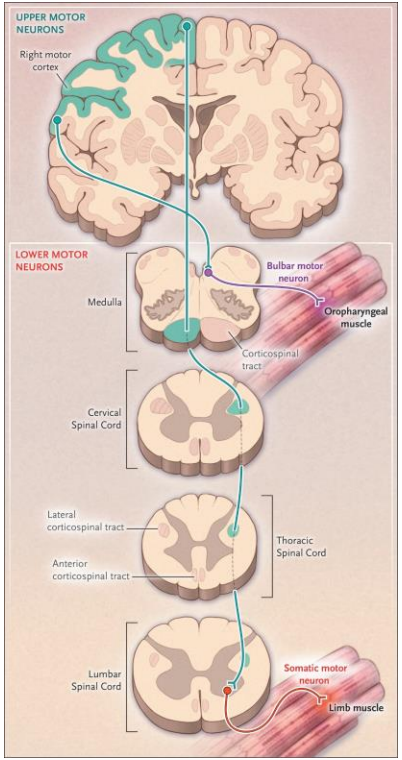
Cory Holdom

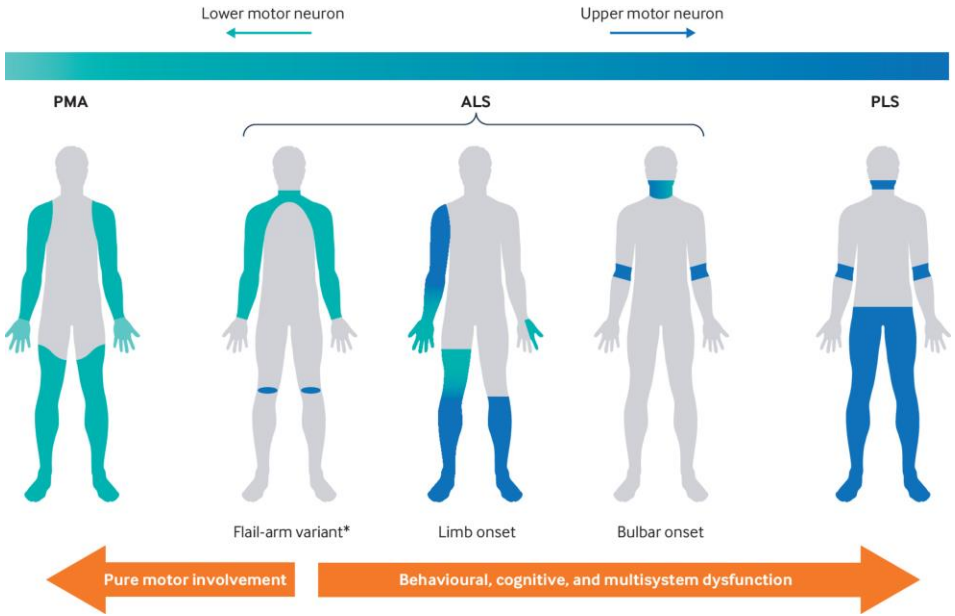
Australian Institute for Bioengineering and Nanotechnology
University of Queensland

Motor neuron diseases

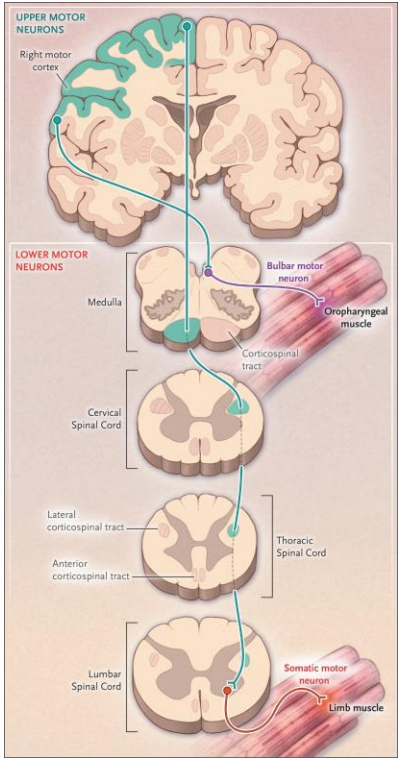


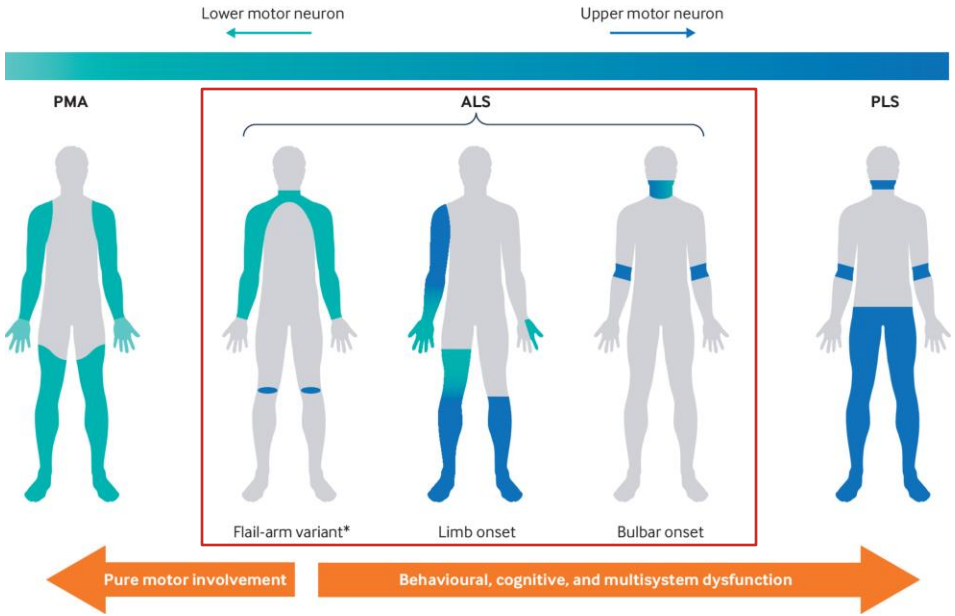
Motor neuron diseases





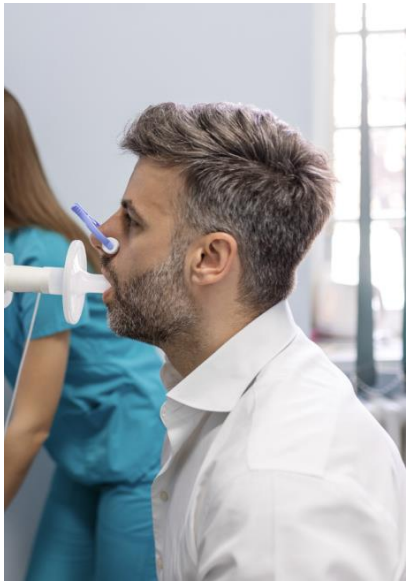
Motor neuron diseases





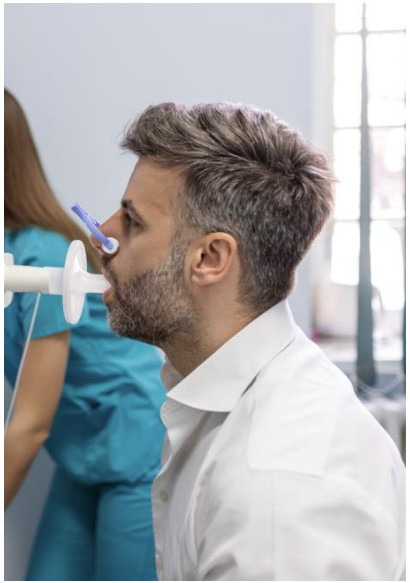
Capturing disease progression

Spirometry



Capturing disease progression

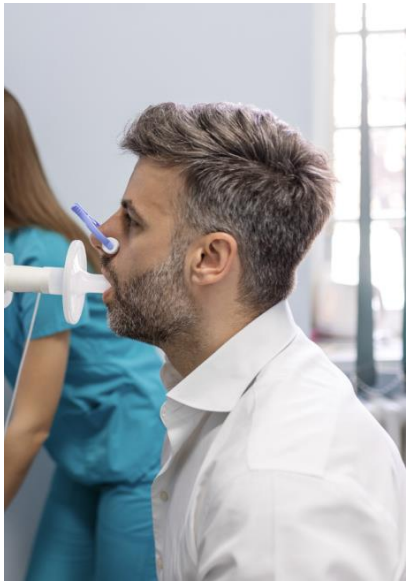
Spirometry



Self-report

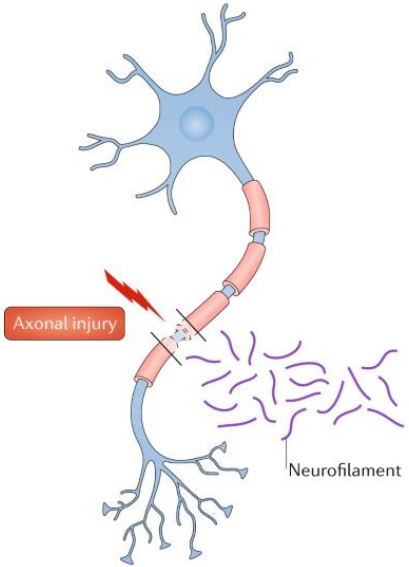
Capturing disease progression

Spirometry



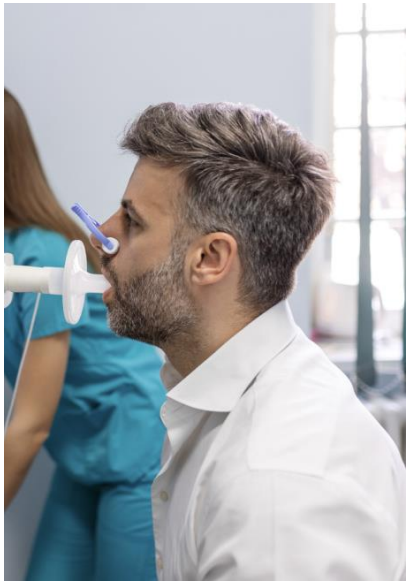
Self-report

Neurofilaments



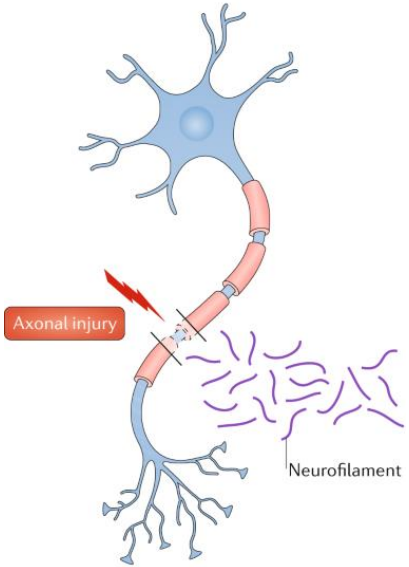
Capturing disease progression

Spirometry



Self-report

Neurofilaments



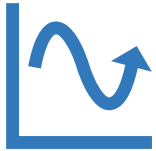
Physical activity

?

Wearable devices are ideal for passive, continuous biomarkers

Mobility and fall risk

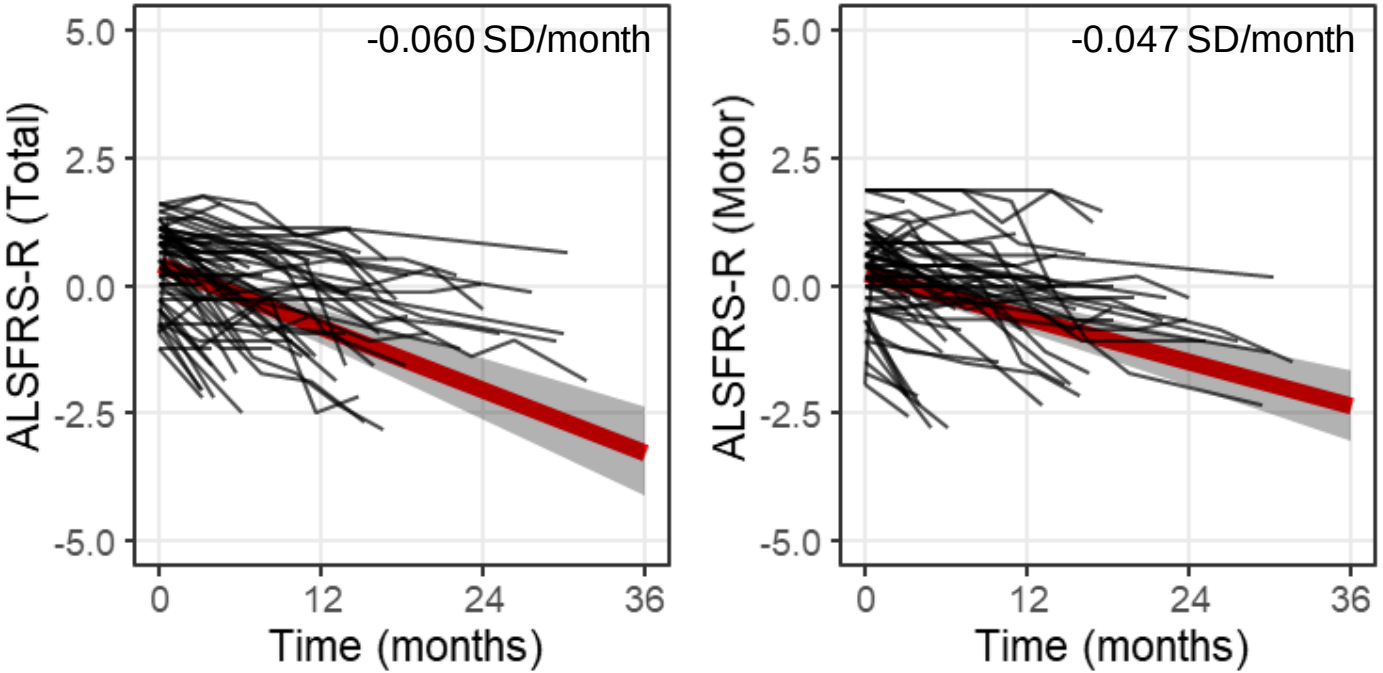
Daily activity



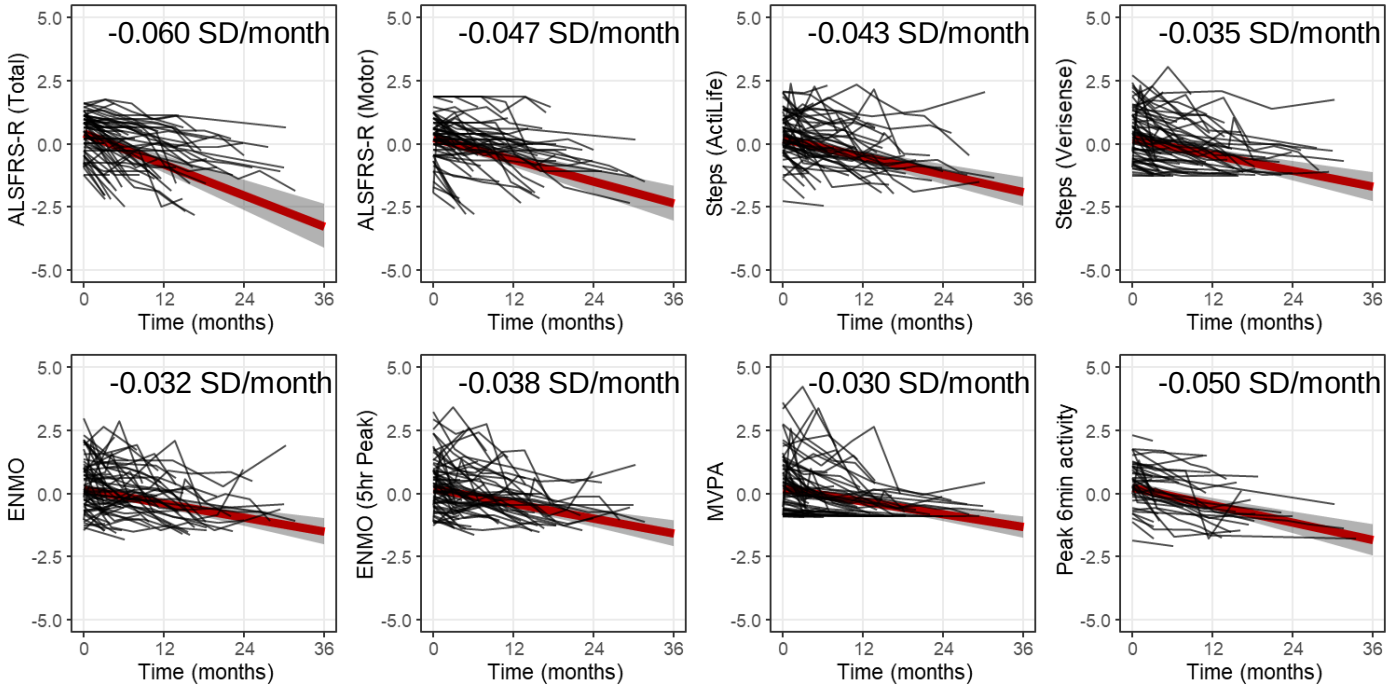
Patient heterogeneity

Sleep tracking

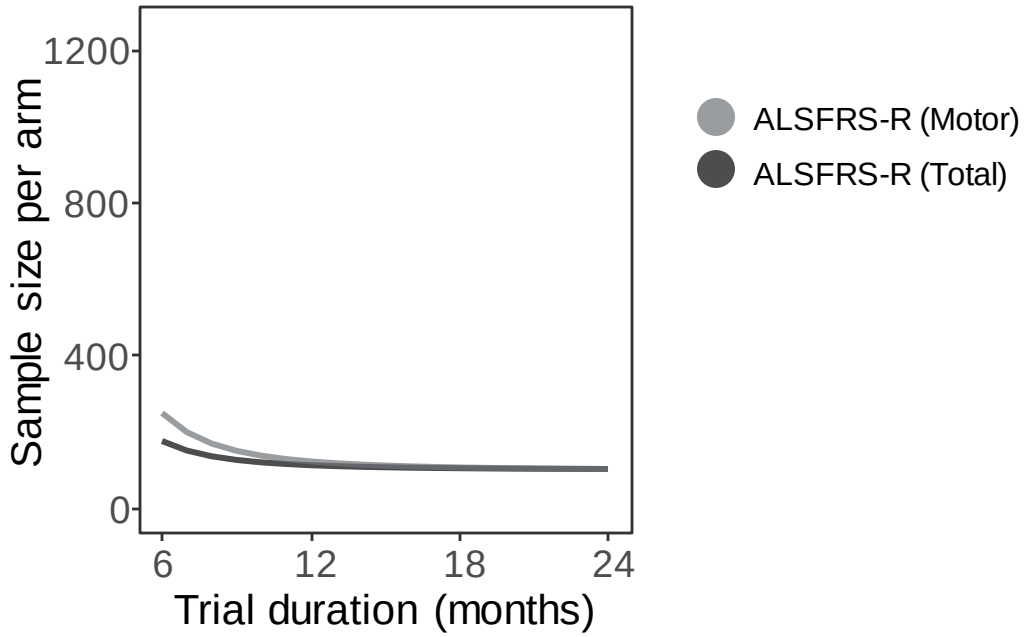
Activity measures decline over time



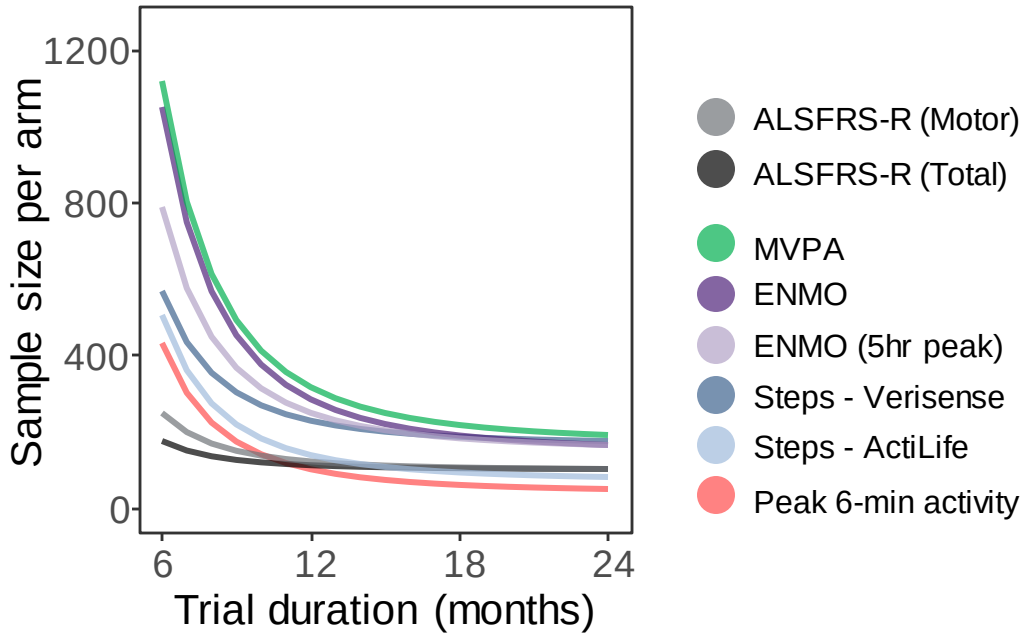
Activity measures decline over time



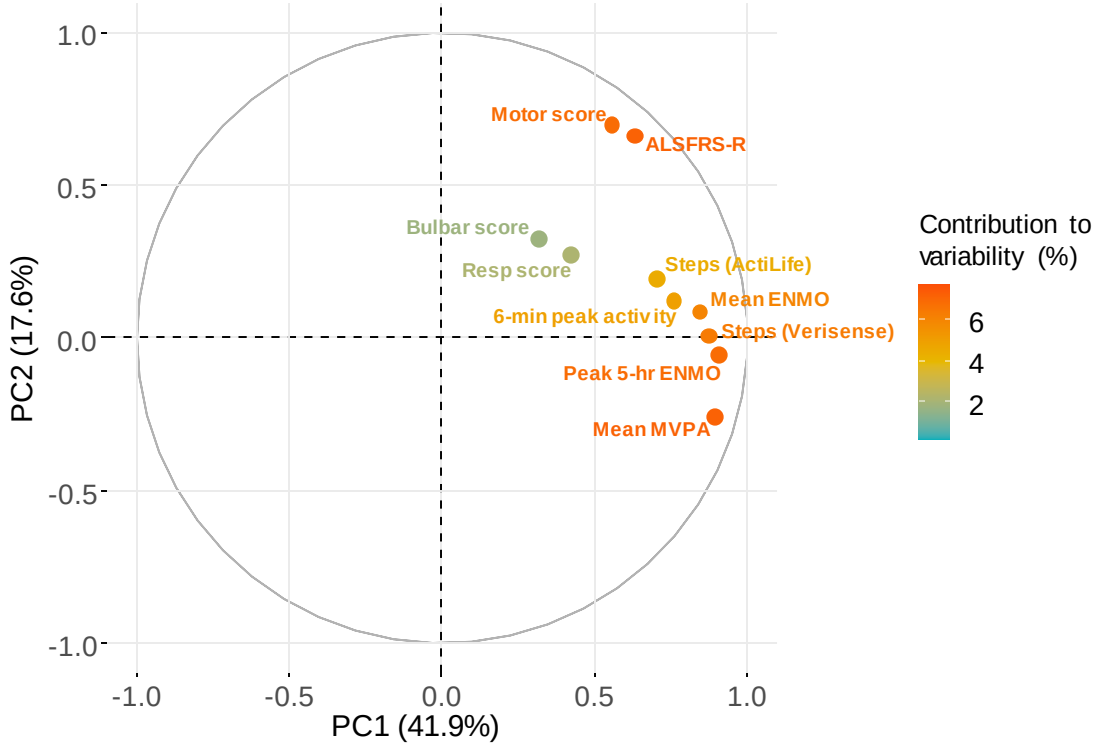
Activity measures can be used to power trials



Activity measures can be used to power trials



Accelerometery captures a different aspect of MND to ALSFRS-R

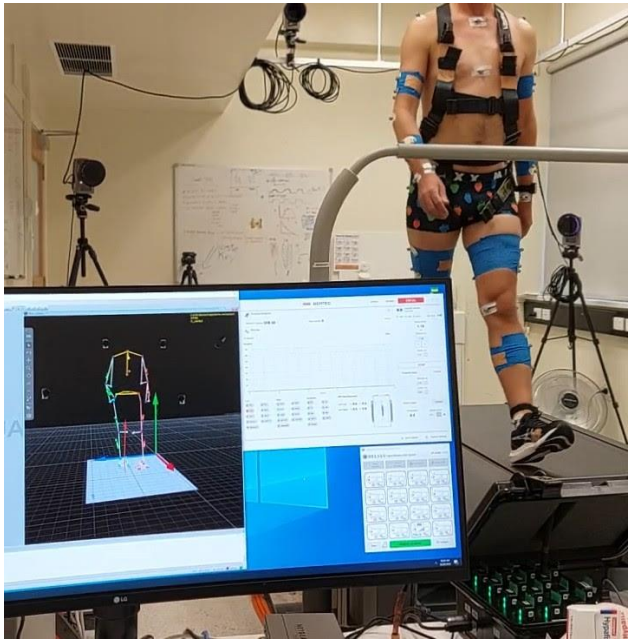


We can measure disease progression through standard accelerometery

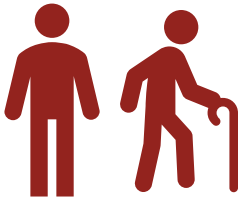
But can we make it better?

ADDS 2024

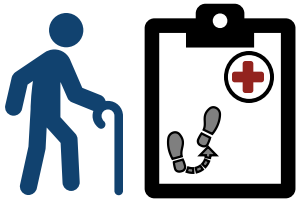
Transforming actigraphy in MND (Trac-MND)



Aim 1: Develop new patient-specific models for improved gait-analysis

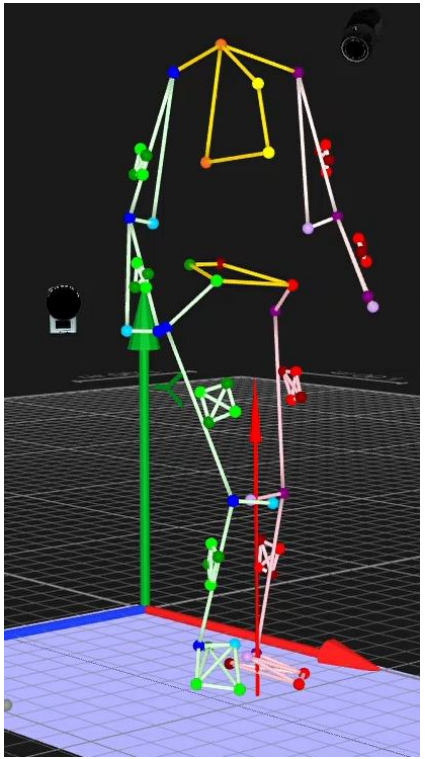


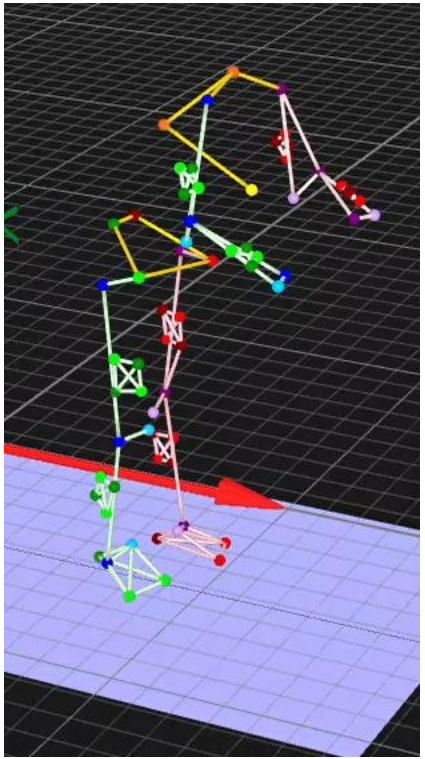
Aim 2: Use redefined models to improve understanding of the variability in gait in patients with neurodegenerative disease.

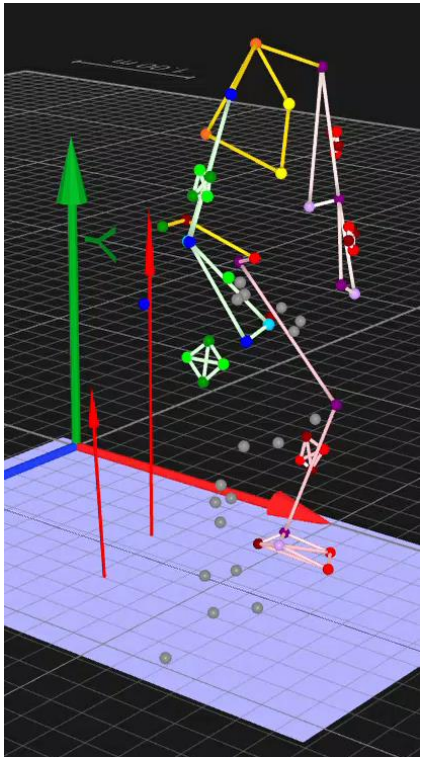


Aim 3: Evaluate capacity of refined gait measures for use as remote measures of functional decline.

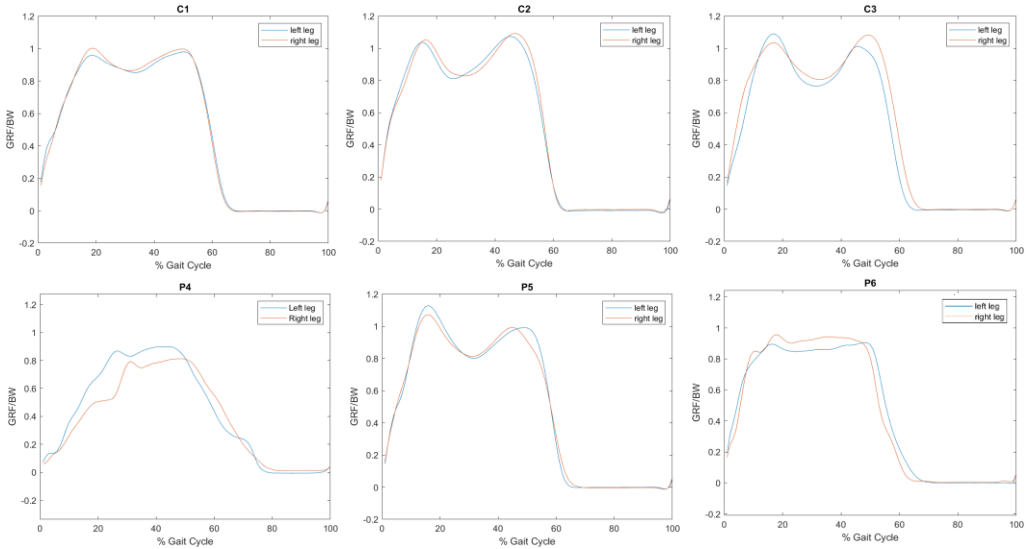
Patient movements on the treadmill



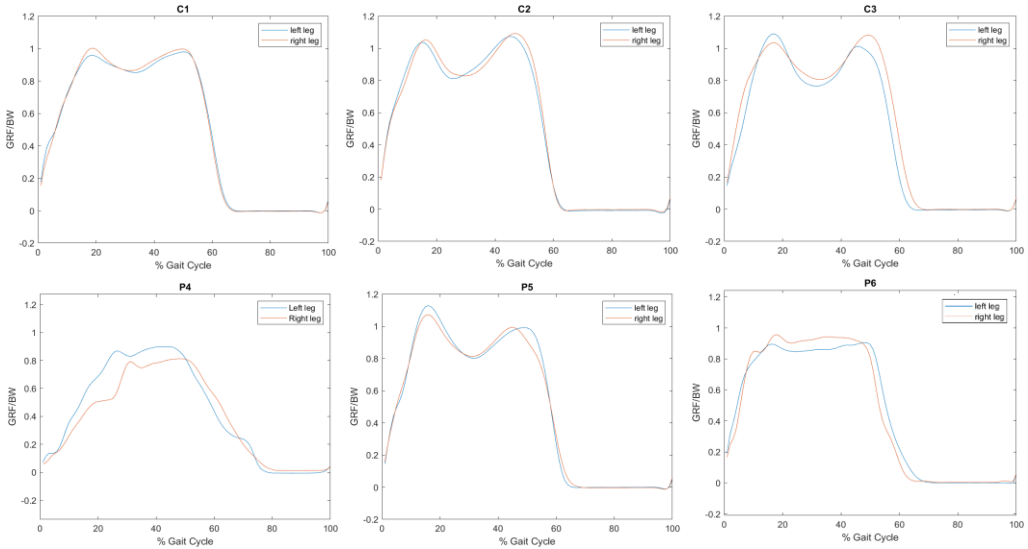


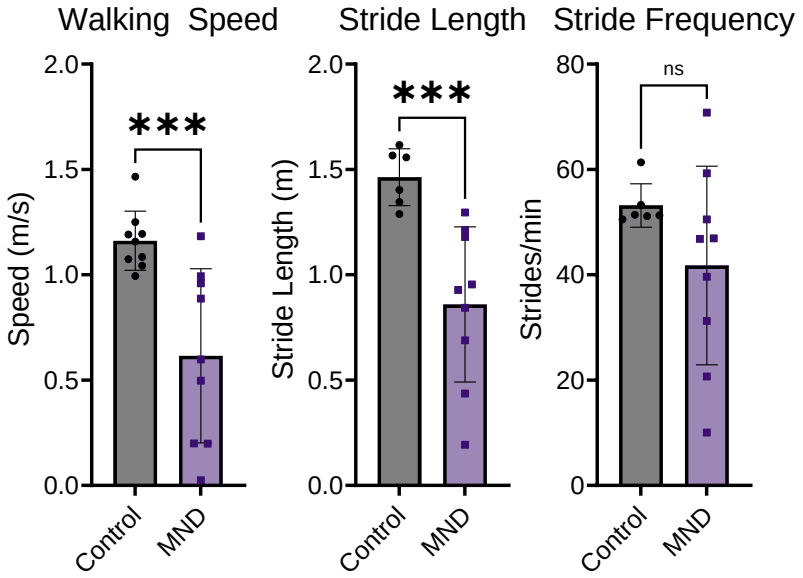


Examples of outputs from treadmill



Examples of outputs from treadmill





Next steps

- Validate treadmill-based step estimations
  - Lumbar, wrist, ankle
  - Case, control
- Identify specific, meaningful features of gait disruption for MND
  - Early, subclinical pathology
  - Fall risk assessments

Acknowledgements

Ngo & Steyn Groups

Dick Group


Dr Taylor Dick


Dr James Williamson


Dr Alexis Brierty

ActiGraph


Dr Christine Guo


Dr Rakesh Pilkar

WESLEY MEDICAL RESEARCH

The Honda Foundation

THE UNIVERSITY OF QUEENSLAND AUSTRALIA | Faculty of Medicine

ActiGraph

We acknowledge and thank all study participants, their families and friends for contributions to this research.

Questions?

Thank You for Your Time.

c.holdom@uq.edu.au

@HoldomCory