



# *Neurogym Technologies*

St. Patrick's Home – Ottawa Ontario

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# *Participants*

- 11 residents of a LTC facility – selected by restorative care staff based on the following criteria:
  - Able to transfer with supervision or assistance from 1 person
  - Able to understand and follow instructions
- At the start of the training program each of the residents required some assistance to perform 5 consecutive sit to stand movements
- Most common co-morbidities included Parkinson's disease, multiple sclerosis, osteoarthritis, dementia



# *Methodology*

- 12 week case study
- Training sessions 3x / week for 25-30 minutes
- Assisted standing with the NeuroGym sit to stand trainer
  - Up to 50 repetitions in a session
  - Progressive reductions in weight assistance
- Games-based biofeedback training
  - Began at week 5
  - Progressive increase in game speed



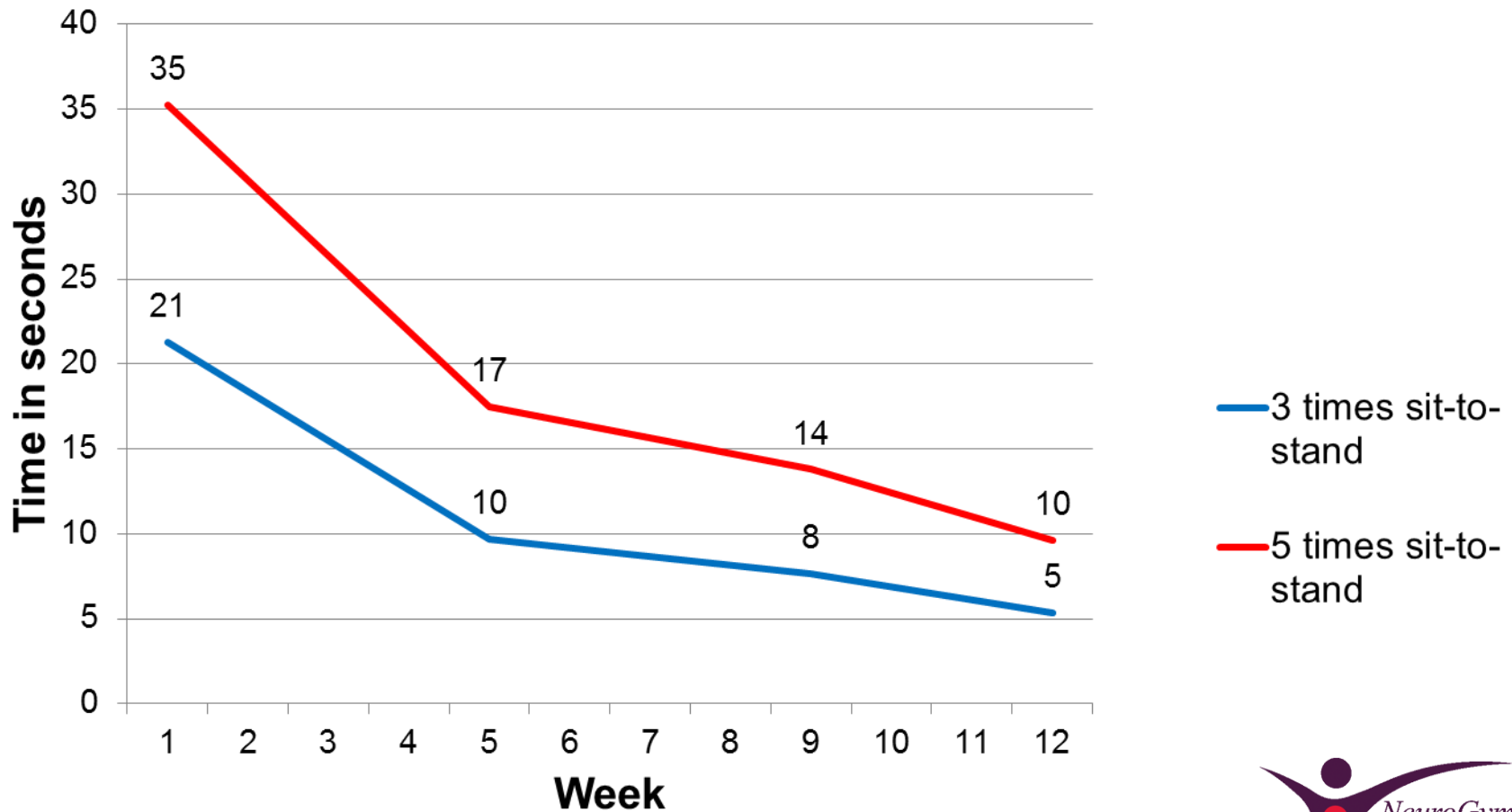
# *Sit To Stand Trainer*



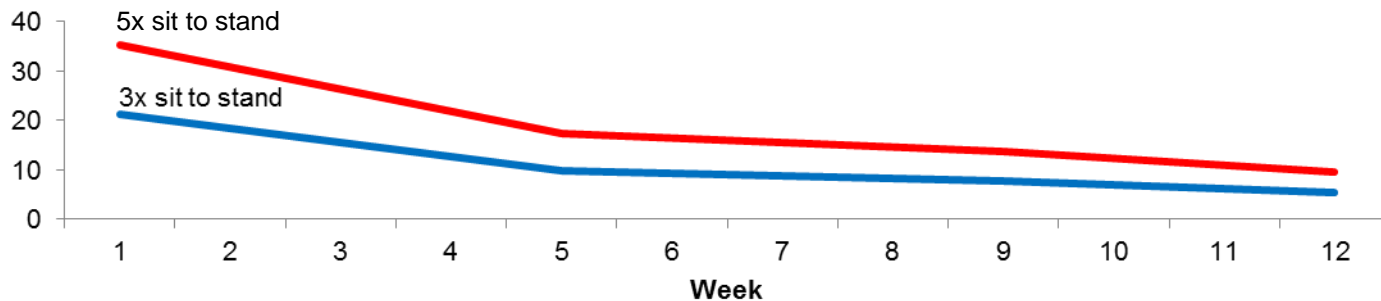
**NOT A LIFT!**



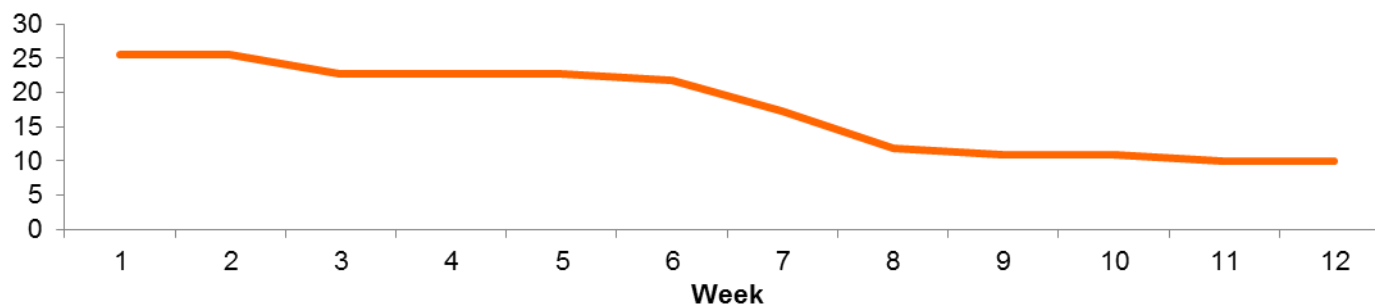
# Average Time to Complete Repeated sit to stands



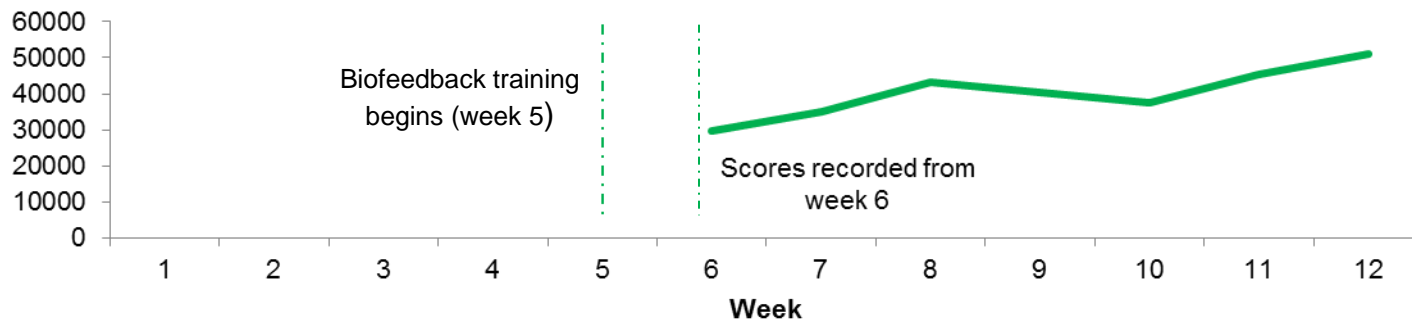
# Weekly Trends During Training



Average Time to Complete Repeated sit to stands (seconds)



Average weight Assistance (lbs)

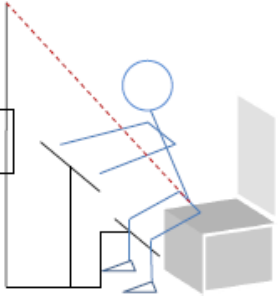


Average Game Score



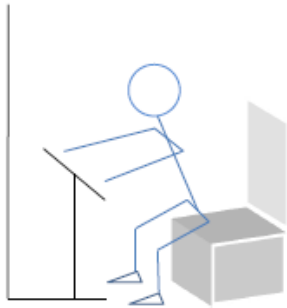
# Progression of Support / Assistance

## Weight assistance, hand support and knee pad support



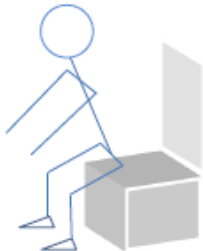
- Counterweight provides assistance for moving the body off the seat
- Hand support stabilizes the body and pulling against the bar helps move the body off the seat
- Knee pad stabilizes the lower body and provides a fulcrum for moving the body forward and off the seat

## Hand support only



- Body weight is lifted off the seat entirely by muscle force
- Hand support stabilizes the body and pulling against the bar helps move the body off the seat
- Legs are independently stabilized

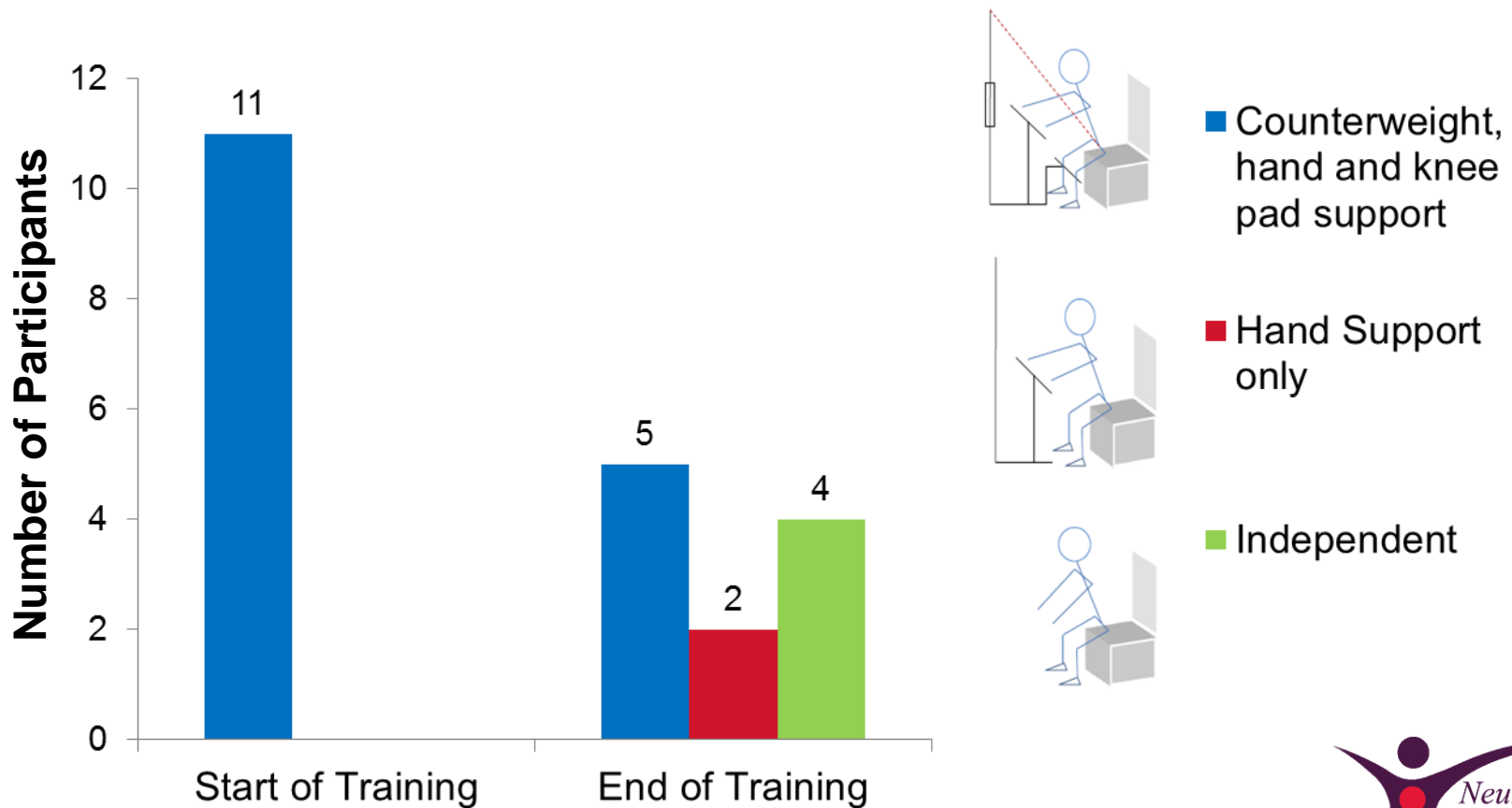
## Independent



- Lifting the body off the seat requires muscular force and speed – to develop enough angular momentum for lifting the body off the seat
- The body is stabilized independently

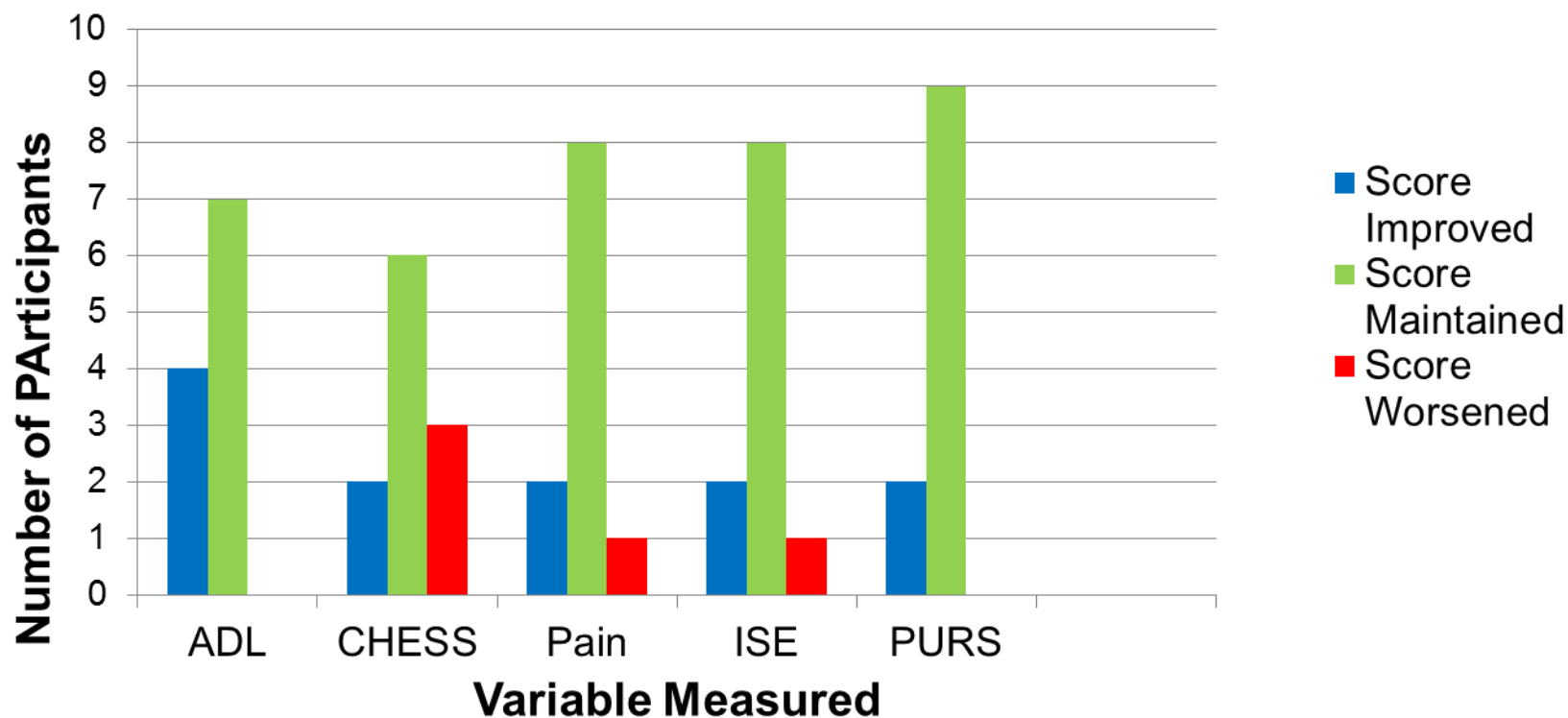


# Support / Assistance Required for 5x sit to stand





# Changes in RAI MDS 2.0 Scores After Training



**ADL** – activities of daily living scale  
**CHES** – changes in health, end stage disease, signs and symptoms

**Pain** – Pain scale  
**ISE** – index of social engagement  
**PURS** – pressure ulcer risk scale



# Conclusions

- Enabled movement training with progressively reduced body weight support and biofeedback training, with progressively increased speed, improved the ability to perform repeated sit to stand movements measured by time to complete 3 and 5 consecutive sit to stands
- 4 of 11 participants were able to perform 5 consecutive sit to stands without assistance at the end of the training program
- 4 of 11 participants (not the same 4 as above) improved their ADL scores (measured by RAI MDS 2.0) after the training program
- Training with body weight support and speed sensitive biofeedback improved the ability to stand from a chair, these improvements appear to be associated with positive outcomes on the RAI MDS 2.0

