Maximizing mobility in Parkinson’s disease: Effects of an individualized training program on fall risk

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What is Parkinson’s disease?

• A progressive neurological condition that causes a reduction in the amount of dopamine produced by the brain
What is Parkinson’s disease?

• Dysfunction at the Basal Ganglia
  • Substantia nigra – where dopamine is produced
What causes PD?

• Unknown etiology
• Genetics
  • Believed to cause 10-15% of PD cases
  • PD GENERation
• Environmental Factors
  • Head injury
  • Exposure to pesticides
Statistics

• PD affects approximately 1.5 million Americans

• Approximately 60,000 new cases annually
  • # of cases expected to double between 2005-2030

• Men are 1.5x more likely to have PD than women

Dorsey ER, *Neurology*, 2007
Motor Symptoms

• Cardinal signs
  • Bradykinesia
  • Tremor
  • Rigidity
  • Postural Instability
The Problem of Falls
Incidence of Falls in PD

• 45-68% of people with PD fall annually

• Approximately 66% of those who fall do so recurrently

• Falls expected to become “major health problem” with anticipated increase in number of individuals with PD

Latt MD, Mov Disord, 2009
Paul SS, Mov Disord, 2013
Wood BH, J Neurol Neurosurg Psychiatry, 2002
Purpose

• The purpose of this investigation was to determine if a community-based boxing training program could improve functional mobility and reduce falls in persons with mild-to-moderate PD.
Research Study

- 12-week exercise program for individuals with Parkinson’s Disease
  - Rock Steady Boxing
    - Each session involves a 45-60 minute circuit
    - Function, balance and non-contact boxing activities
    - 3-minute training bouts + 1-minute rest breaks
  - Balance program
    - Tailored to each individual’s areas of balance dysfunction (sensory, visual, vestibular)
    - Working with personal trainer
Methods

Day 1: Balance tests + 30 day Hx of falls

Day 12: YMCA boxing classes

Day 24: Balance tests + Hx of falls

6 wks

6 wks

30 days
Statistical Methods

• Paired $t$ tests on *pre* and *post* effects
• *A priori* level of significance set at 0.05
• Effect sizes calculated with Cohen’s *d*
Outcome Measures

• BERG Balance Scale
• Modified Clinical Test of Sensory Integration in Balance (MCTSIB)
• Timed Up and Go test (TUG)
• Five-times Sit-to-Stand (5-STS)
• Activities-Specific Balance Confidence scale (ABC)
• History of Falls
Participants

• 20 enrolled
• 19 completed all outcomes
  • 1 lost to follow-up (moved)
• 13 M, 6 F
  • Age: 71.11 ± 6.43
  • BMI: 27.86 ± 4.75
  • Hoehn & Yahr: 2.0
  • UPDRS motor score: 16.79 ± 4.96
Clinical Balance Outcomes

Timed Up and Go (TUG) Test

- Pre: 11.08 seconds
- Post: 9.59 seconds
Clinical Balance Outcomes

BERG Balance Test

Pre: 41.9
Post: 42.3
Clinical Balance Outcomes

![Bar Chart: MCTSIB Test](image)

- **Pre**: 80.33
- **Post**: 82.15
Clinical Balance Outcomes

ABC Scale

Pre: 81.12
Post: 86.05

* indicates a significant difference.
Clinical Balance Outcomes

5x Sit-to-Stand

- Pre: 12.98
- Post: 11.49
Clinical Balance Outcomes

![Bar chart showing falls before and after treatment]

- Pre: 16 falls
- Post: 7 falls
Discussion / Conclusion

• Our data suggest that participation in a community-based non-contact boxing program may decrease the risk of falling for participants with mild to moderate PD.

• Participants move with greater power and fluidity, which may decrease their overall fall risk.
Woo-Ha! Gooo Rock Steady!
Questions