

Exercise programs in Parkinson's disease

Colleen Canning

Motor impairments

bradykinesia,
hypokinesia,
akinesia (freezing)

rigidity

tremor

dyskinesia

dystonia

postural instability

↓ muscle strength

Non-motor impairments

- Cognitive impairment and dementia
- Anxiety, depression
- Sleep disorders
- Hallucinations
- Autonomic disorders, eg, orthostatic hypertension
- Sensory impairment, eg, pain, sensory integration deficits
- Fatigue

Pickering et al (2007)

- Previous falls
- ? Increased disease severity

} fixed

Latt et al 2009

- Previous falls } fixed
- Leg extensor muscle weakness } remediable
- Reduced balance
- Freezing of Gait

Exercise to reduce falls and fall
risk in PD?

The Effects of an Exercise Program on Fall Risk Factors in People with Parkinson's Disease: A Randomized Controlled Trial

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Questions

Does a 6 month exercise program which targets leg muscle strength, balance and freezing:

1. Improve performance in measures of fall risk?
2. Improve physical abilities, fear of falling and quality of life?

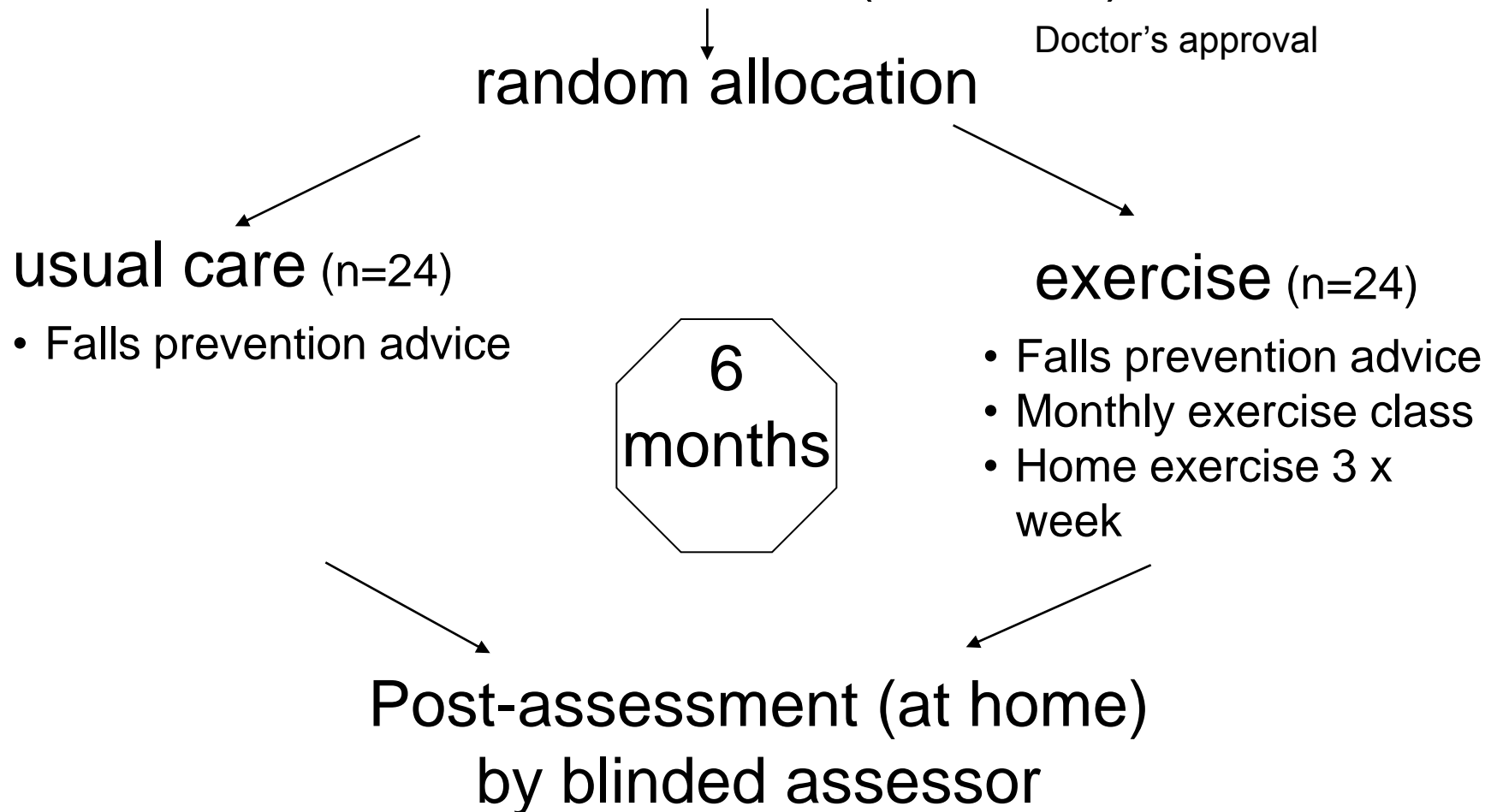
Inclusion criteria

1. Idiopathic PD
2. Walk independently (with or without an aid)
3. 30 – 80 yrs
4. One or more falls in prior 12 mths or at risk of falls

Exclusion criteria

- Significant cognitive impairment (MMSE<24)
- Other neurological, musculoskeletal, cardiopulmonary or metabolic condition that would interfere with the safe conduct of the training protocol

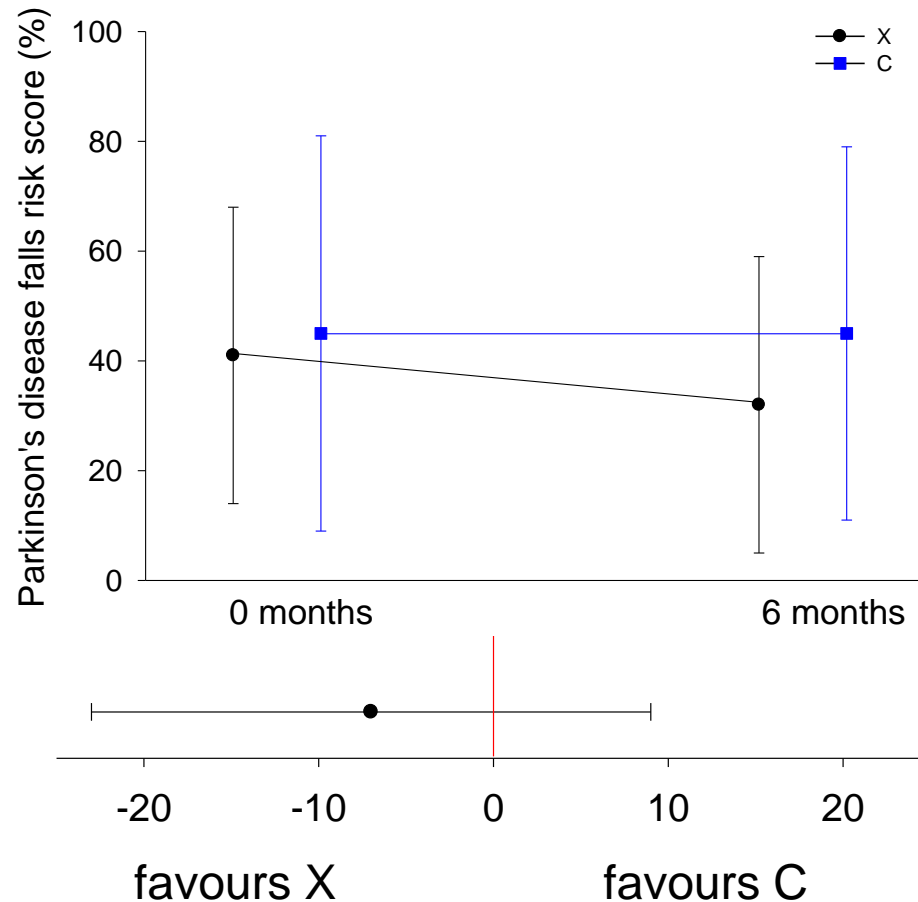
Initial assessment (at home)



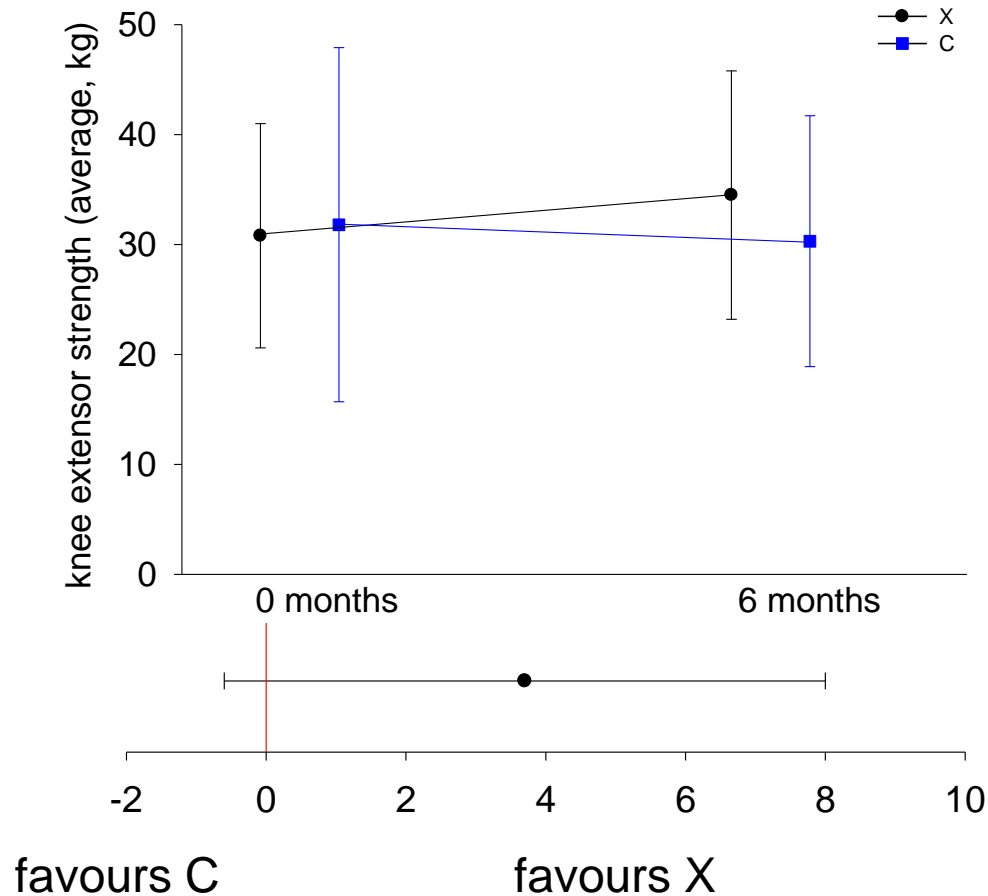
Retention

- 3 drop outs from exercise group
 - did not wish to continue (n=1)
 - health problems unrelated to intervention (n=2)

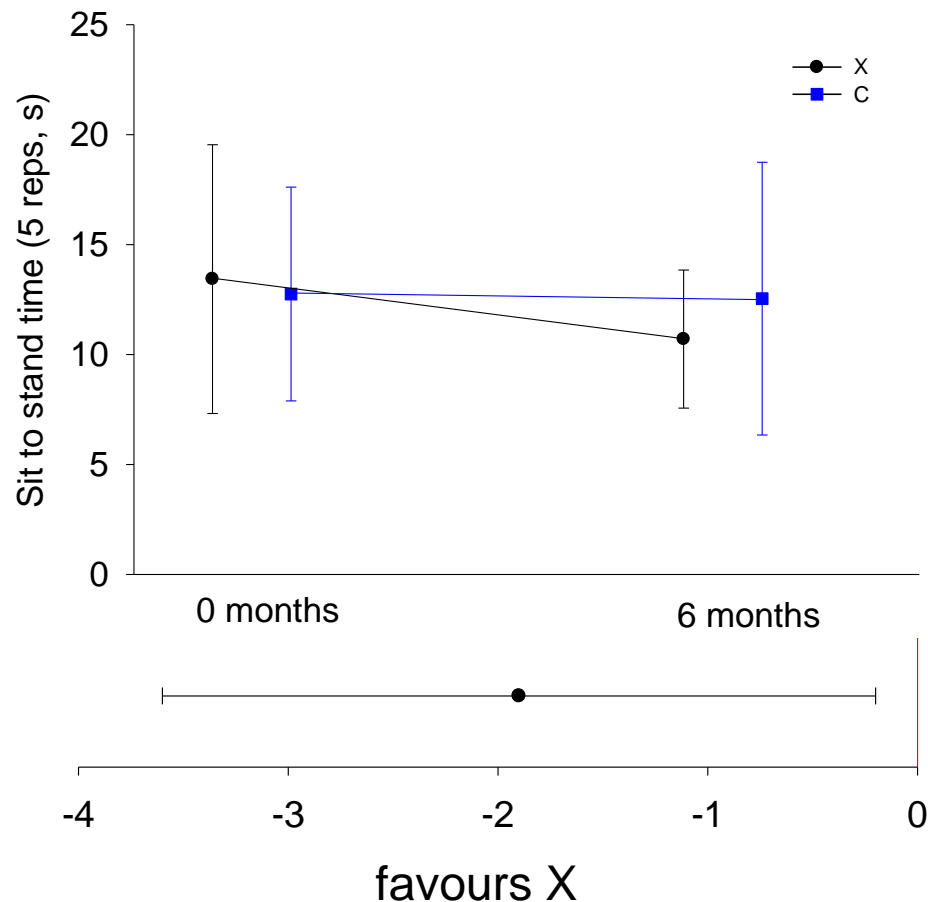
7% improvement in Parkinson's disease falls risk score



4kg improvement in knee extensor strength



2 second improvement in sit ↔ stand speed (5 reps)



Trend towards improvement in

- walking speed
- fear of falling

No improvement in

- balance (apart from sit to stand and walking speed)

Exercise delivery

- 5 x Parkinson's NSW support groups
 - St George/Sutherland
 - Liverpool
 - Parramatta
 - Blue Mountains
 - Macarthur
- 3-6 participants/group
- 1-2 physiotherapists/group

Exercise prescription

PD-WEBB

Weight Bearing Exercise for Better Balance

- Balance exs
- Strength exs
- Cueing strategies to reduce freezing of gait

40-60 mins, 3 x wk, 6 months

1 class per month + home-based exercise

2-4 home visits

WEBB balance exercises



WEBB strength exercises



PD-WEBB

cueing strategies

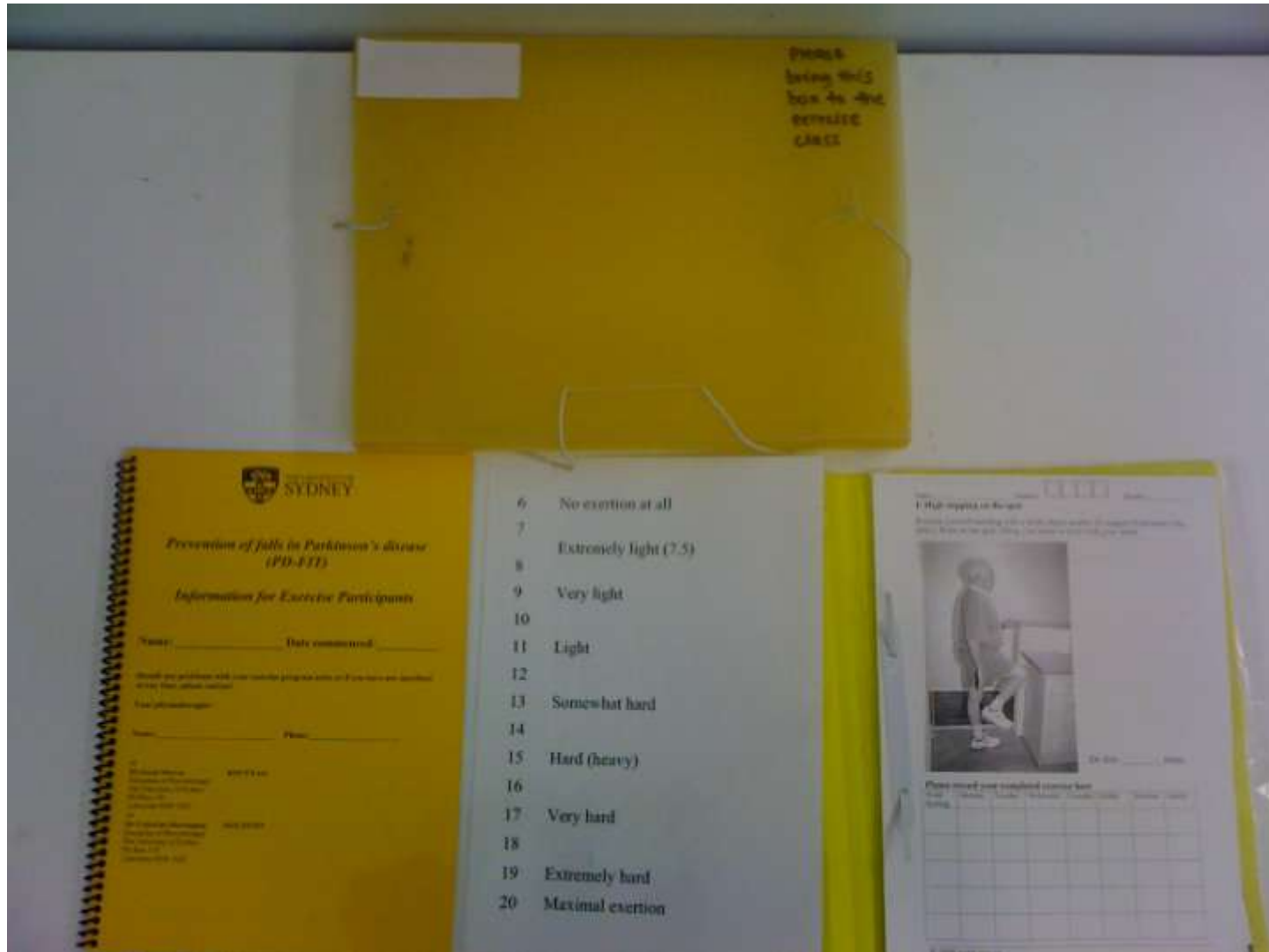
based on the RESCUE trial
(Nieuwboer et al 2007)



Equipment for one participant



Information for participants and exercise recording



USING THE WEIGHTED VEST OR BELT

Placing the weights into the pockets

Always place the required weights into the weight pockets and ensure the pockets are closed before putting the vest or belt on. Only use the weight prescribed by your physiotherapist. If you feel you may require more or less weight, please contact your therapist and follow advice given.



USING THE WEIGHTED VEST

1. Sitting down to apply and remove

The vest will be heavy with the weights added – have someone help you if you need to. Place the vest on a lounge or bed. Sit down in front of, or next to the vest. Put the vest on. If you have a sore arm or restricted movement in one arm, then place that arm through the sleeve hole first. Zip the vest up, and do up the catch at the front. To remove the vest, repeat these steps in reverse.



Participants' exercise record

Example

Name: _____ Number: Month: _____

4(d) Stepping over obstacles - sideways

Position yourself standing with a stable object in front (eg. table) and a small obstacle on the floor beside you. Practice stepping over the obstacle sideways and back without touching it. Try not to hold on.



Repeat _____ times each leg

Please record your completed exercise here

Week Starting	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday



Road trip!



Prevention of falls in Parkinson's disease (PD-FIT)

Class Training Log

Exercise Name and Number: Standing Number 2

Date: 29/4/10

Exercise Class Number: 1

Name	Version of exercise completed (eg, a,b,c)	Details of exercise (eg, weight, block height)	Amount of exercise (number of repetitions, or time spent exercising)	Comments
	C	Chair and table for safety	3 mins	Left foot forward more difficult, occas. loss of balance
	C	Chair and table for safety	3 mins	Occas. loss of balance
	C- progressed to D	Chair and table for safety	3 mins	Occas. use of hands, managed approx 10 sec SLS
	A- progressed to B	Chair and table for safety	3 mins	
	C- Progressed to D	Chair and table for safety	3 mins	Managed approx 10 secs SLS

Prevention of falls in Parkinson's disease (PD-FIT) Home Visit Training log

Participant's Name _____ Ph. No. _____

Exercise No.	Date	Supervised Session No.	Exercise details (eg. weight, no. reps)	Comments
1 5a 5d	4/3/10	1	2 mins 2 mins 1 min	Warm up. 5 mins.
2d	4/3/10	1	As long as possible on each leg then change for up to 3 mins.	3 mins.
3f	4/3/10	1	Up to 3 mins	3 mins.
4d 4c	4/3/10	1	Stepping with each foot until standing leg fatigues then change to other leg. Each exercise for 1.5 mins.	3 mins total.
6c	4/3/10	1	Vest - 2kg 2 sets x 15 reps each	Borg 14
7a	4/3/10	1	Vest - 2kg 2 sets x 15 reps each	Borg 13
8b.	4/3/10	1	Vest - 2kg 2 sets x 15 reps each 10cm blocks	Borg 13

Adherence

- 3.6 (SD 2.1) exercise classes attended
- 2.2 (SD 0.9) home visits completed
- 70% (SD 32%) of 78 exercise sessions completed
- No adverse events (1310 exercise sessions)

- Medical screening for participation in moderate intensity exercise program
- Assessment
 - motor and non-motor impairments, activity limitations
 - variable effects of Parkinson's medications
 - exercise history, beliefs about exercise, expectations about ability to exercise, perception of benefits

- Establish any need for full supervision use of transfer belt
- Prepare exercises for each participant in advance of class
- Allow time to set up before and clear up after class
- Home exercise only commenced after home visit to deliver equipment and set up exercise (usually 2 visits)
- Safety / challenge of balance exercises

Class organisation

- Instructor led, pairs, circuit

Vests

- Putting vests on and off, especially when heavy

Progression

- Maintaining variety and interest (not always progression)
- For those with some cognitive impairment, consider using less variety and only progress when necessary

- Participant's experience of the exercise program
(Qualitative study in progress O'Brien C, Canning CG, Clemson L)
- Appreciated PT understanding the challenges of PD
 - When asked if anything to do with PD made exercising difficult, the participant replied *“balance is one because it's not like weight bearing or the physical side...it's in your brain as well as your coordination and you can get disappointed if you can't do it”*
 - *“Parkinson's invites negative thoughts”*

Participant's experience of the exercise program

(Qualitative study in progress O'Brien C, Canning CG, Clemson L)

- Commenting on a participant who stopped attending the group exercise class

“It was a pity because she might have felt she wasn't able to compete and rather than do her best in every circumstance she might have felt a bit out of it”

- Reported variations in ability to exercise
- *“I was trying to work out whether they were better in the morning or the evening”*
- Negative impact of co-morbidities and complications, on recommencing exercise

Class

- Difficult to set up multipurpose venues prior to commencement of class
- Storage of equipment when not used

Home

- Storage of equipment when not being used
- Cluttered environment may impact of safety

Transport

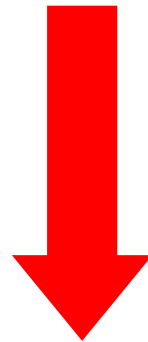
- Participants
- Equipment – one set at home, separate sets available for classes

Non-significant improvement in falls risk



Lack of statistical power

7% reduction in falls risk ?= less falls



PD Falls Intervention Trial (PD_FIT)

(Protocol - Canning et al 2009, BMC Neurology 9:4)

230 participants - 21 groups

Collaborators:

- Natalie Allen
- Cathie Sherrington
- Stephen Lord
- Victor Fung
- Jacqui Close
- Mark Latt
- Serene Paul
- Susan Murray
- Sandra O'Rourke
- Christine O'Brien
- Joeeun Song

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- Parkinson's NSW
- NHMRC

Allen NE, Canning CG, Sherrington CS, Lord SR, Latt MD, Close JCT, O'Rourke SD, Murray SM, Fung VSC. The effects of an exercise program on fall risk factors in people with parkinson's disease: A randomized controlled trial. Mov Disord 2010;25:1217-1225.

Ashburn A, Fazakarley L, Ballinger C, Pickering R, McLellan LD, Fitton C. A randomised controlled trial of a home-based exercise programme to reduce the risk of falling among people with Parkinson's disease. J Neurol Neurosurg Psychiatry 2007; 78:678-684.

Canning CG, Sherrington CS, Lord SR, Fung VSC, Close JCT, Latt MD, Allen NE, O'Rourke SD, Murray SM. Exercise therapy for prevention of falls in people with Parkinson's disease: A protocol for a randomised controlled trial and economic evaluation. BMC Neurology 2009; 9:4.

Latt MD, Lord SR, Morris JG, Fung VS. Clinical and physiological assessments for elucidating falls risk in Parkinson's disease. Mov Disord 2009;24(9):1280-1289.

Nieuwboer A, Kwakkel G, Rochester L, et al. Cueing training in the home improves gait-related mobility in Parkinson's disease: the RESCUE trial. J Neurol Neurosurg Psychiatry 2007;78:134-140.

Pickering RM et al. A meta-analysis of six prospective studies of falling in Parkinson's disease. Movement Disorders 2007;22:1892-1900.

- **Weight-Bearing Exercises for Better Balance Program**

Draft freely available from: <http://webb.org.au>

- **RESCUE CD-Rom** – Rescue Consortium (2005) Using cueing to improve mobility in Parkinson's disease. A CD-Rom for therapists.

Can purchase from: <http://hces.unn.ac.uk/rescue/pubs/cd-rom.htm>

- **KNGF Guidelines** for physical therapy in patients with Parkinson's disease

Freely available from:

<https://www.kngfrichtlijnen.nl/654/KNGF-Guidelines-in-English.htm>