

Reducing falls risk in people with Parkinson's disease

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The Parkinson's Disease and Movement Disorders Center at D-H offers:

- Free literature/lending library
- Physician/health care locator
- Support group listings
- Referrals to community services
- Educational events & newsletters
- Phone and email helplines
- Caregiver resources and more

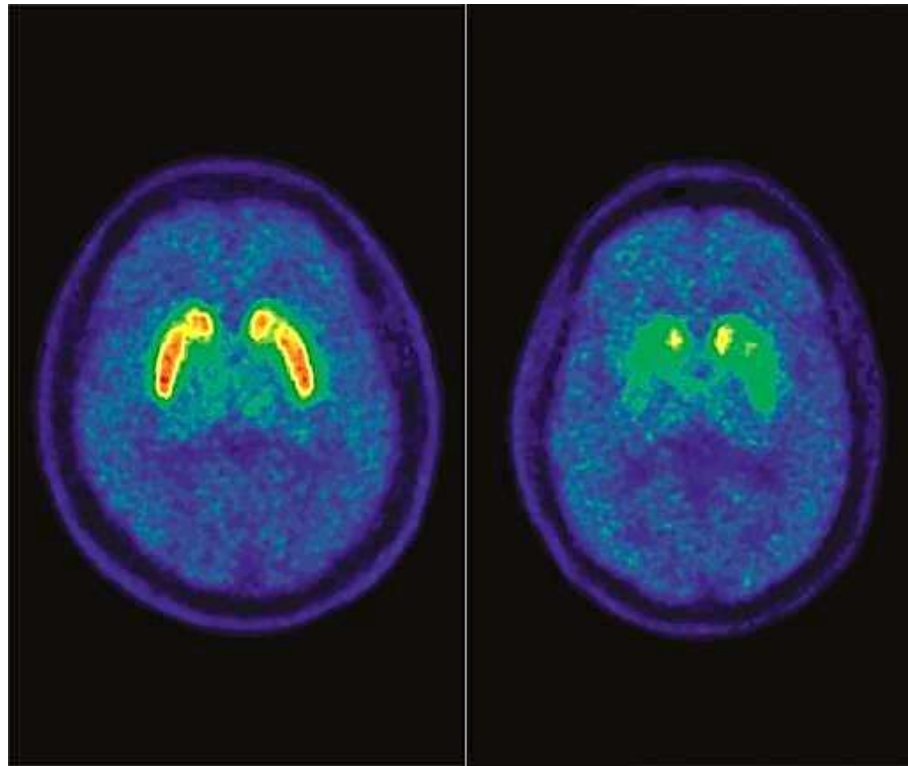
Today's talk:

- What is Parkinson's disease (PD)?
- Symptoms that contribute to increased falls risk in those with PD
- Assessing falls risk in PD patients
- Useful interventions to reduce PD-related falls
- Programs in NH for the Parkinson's community

What is Parkinson's disease?

- PD is a neurodegenerative disorder resulting in dopamine deficiency.

Healthy
dopamine
levels



In PD

DaT (Dopamine Transporter) scan

www.interactions.org/beacons/sites/default/files/ICFA_BeaconsOfDiscovery.pdf

Prevalence of PD (estimates)

- Over 1 million people in US have PD
 - NH: 4,500 people with PD
- Age is the major risk factor
 - 1.6% > 65
 - 3% > 85
- Average age of onset: 60
- More men than women (2:1 ratio)

Falls risk in PD: It's not just a matter of balance.

- Motor symptoms
- Other physical symptoms
- Effects on mood, thought and behavior
- Fluctuations of symptoms
- Medications

“The complexity of falls risk in PD requires a multidisciplinary approach.”

Motor symptoms of PD contribute to falls risk.

- Tremor
- Bradykinesia/slowness of movement
- Reduced reflexes and responses
- Muscle rigidity
- Axial rigidity
- Stooped posture
- Gait impairment
- Asymmetry/irregularity of movements

Other physical symptoms that can lead to falls

- Double vision
- Reduced proprioception
- Dizziness and lightheadedness
- Chronic constipation
- Urinary incontinence
- PAIN: Numbness, aching, burning, cramping

PD's effects on mood, behavior, and thought contribute to falls

- Cognitive changes
 - Memory/Planning
 - Concentration/distractibility
 - Impulsive or unaware behaviors
 - Psychosis
 - Later-stage dementia
- Depression, apathy, anxiety and mood shifts
- Sleep disturbances and fatigue

Fluctuations in PD symptoms

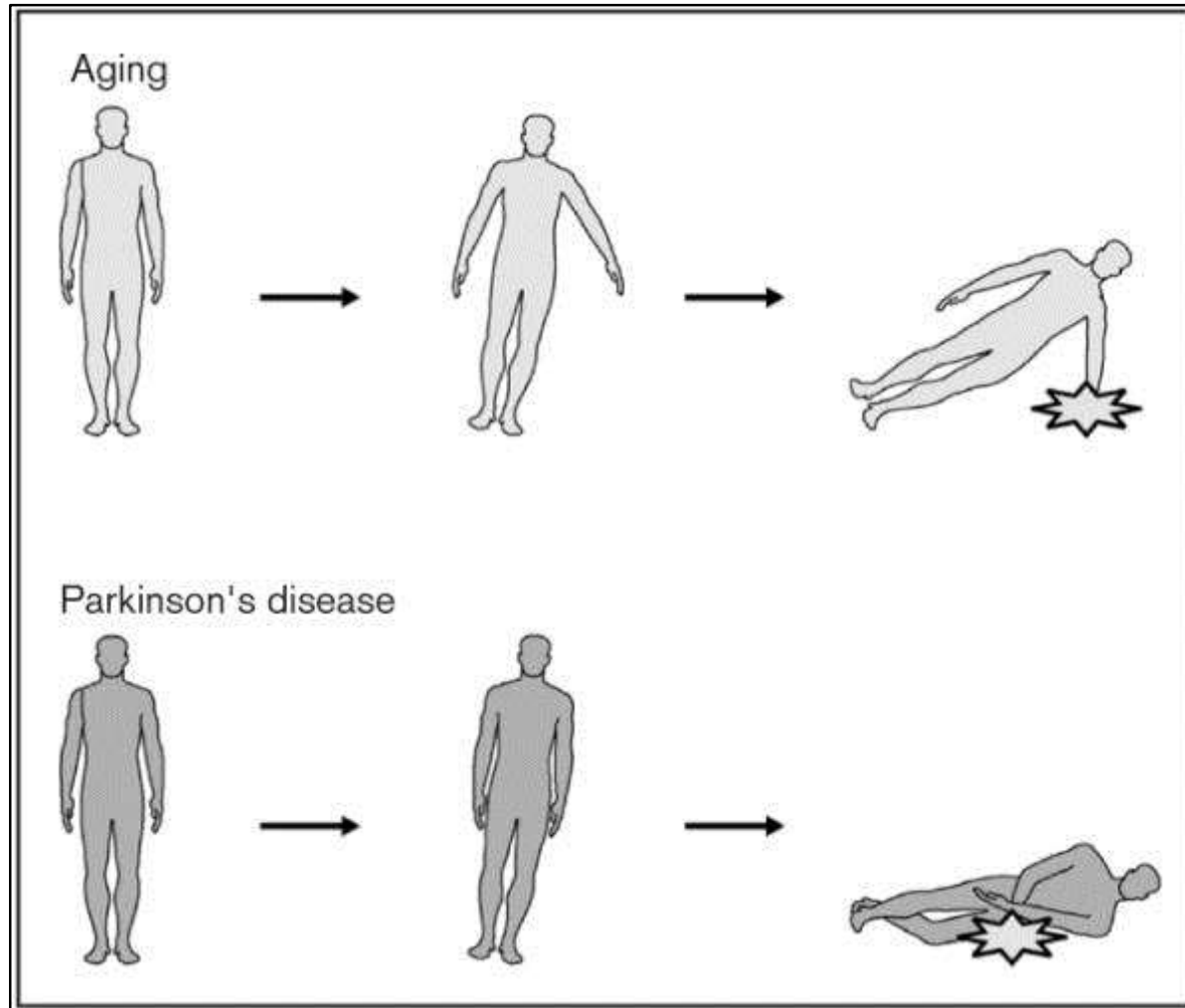
- Fluctuations in motor and non-motor symptoms
- “On-Off” cycling of medication
- Symptoms may worsen (temporarily) due to stress or anxiety.

Falls risk: Why is PD different?

- Risk is increased if one has history of falls:
 - 3-fold in older adults
 - 6-fold in people with PD
- “Dual task gait”
- (Un)awareness: Reckless gait
- Freezing of gait
- Stooped posture
- Swaying when standing
- Poor reaction time

From Alfonso Fasano, MD, PhD (Toronto), WPC 2016

Injuries in PD falls: hips, legs, head



Only 10% of falls are witnessed.

So residents with PD were video-monitored at an assisted living facility.

The following led to falls:

- Distractibility
- Dual-tasking deficits
- Inability to recover from perturbation

Ideally, we would assess level of falls risk for ALL individuals with Parkinson's.

Assessing falls risk in people with PD

Questions	Score
Have you fallen in the past year?	Y = 6 N = 0
Have you experienced freezing of gait in the past month?	Y = 3 N = 0
Do you walk slower than people about the same age as you who do not have PD?	Y = 2 N = 0

<i>Risk of falling in the next 6 months:</i>	
<i>Total score = 0</i>	<i>Low risk (17%)</i>
<i>Total score = 2-6</i>	<i>Moderate risk (50%)</i>
<i>Total score = 7-11</i>	<i>High risk (85%)</i>

From Jeff Hausdorff, PhD (Tel Aviv), WPC 2016

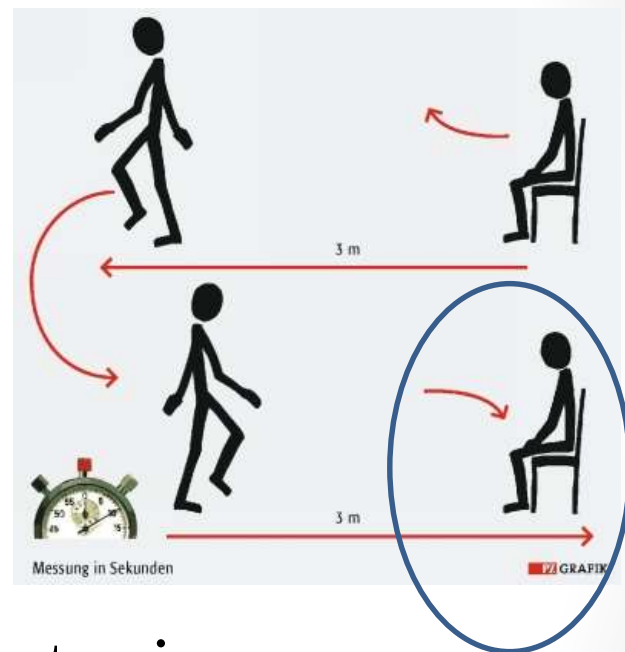
Paul et al, 2013, Mov Disord 28:655; Duncan et al, 2015, Park Rel Disord 21:960

Timed Up & Go (TUG) and Instrumented TUG (iTUG)

TUG score ≥ 14 sec: High fall risk

iTUG study

- N= 1,055 (not diagnosed with PD)
- Age: 80 ± 8 years
- 77% female



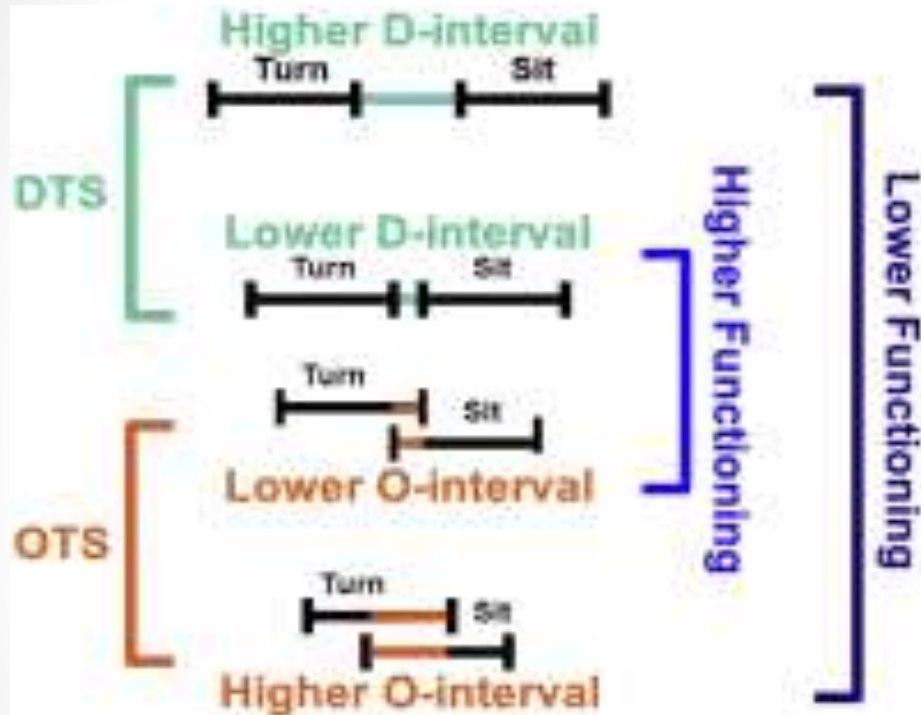
Identify two turn/sit transition strategies:

- DTS = Distinct transition strategy (77%)
- OTS = Overlapping transition strategy (23%)

From Jeff Hausdorff, PhD (Tel Aviv), WPC 2016

Weiss et al, 2016, JAmMedDirAssoc 17:864

iTUG: Targets for falls intervention.



Lower functionality:

- Higher TUG score
- Poorer motor function
- Lower cognitive function
- Higher mobility disability

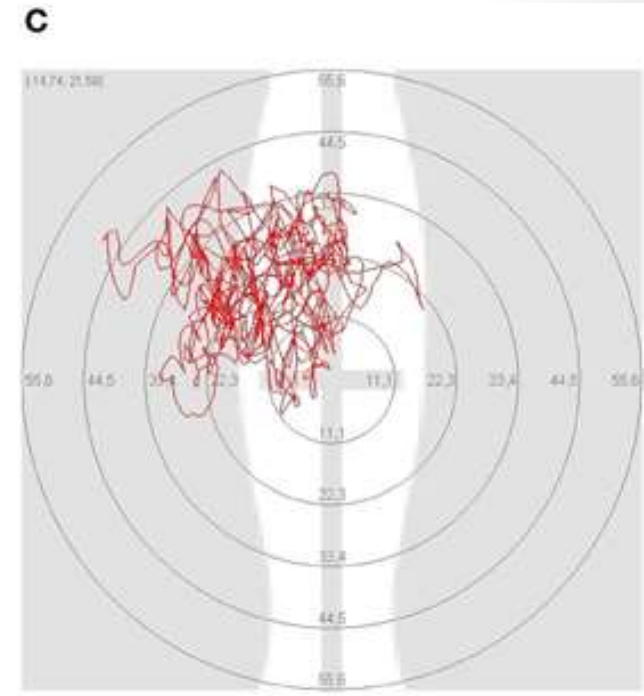
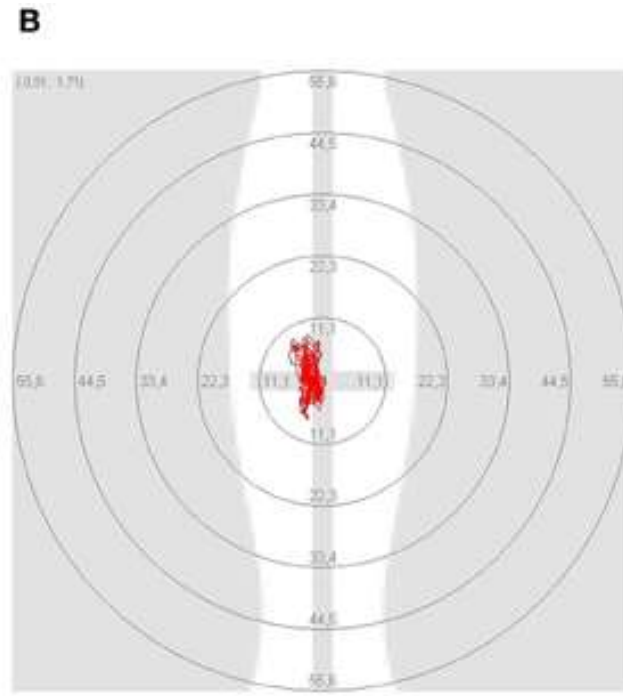
High Distinct interval:

- Lower gait speed
- More bradykinesia

High Overlap interval:

- More rigidity

Quantitative Posturography



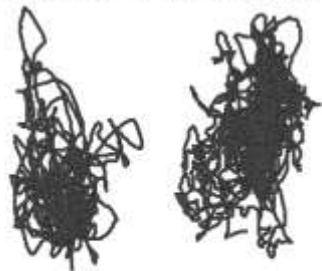
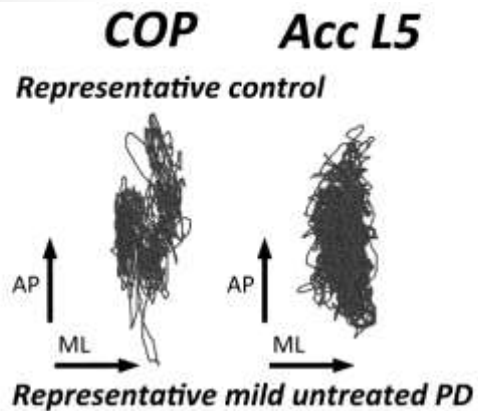
Foot position
on platform

Healthy control

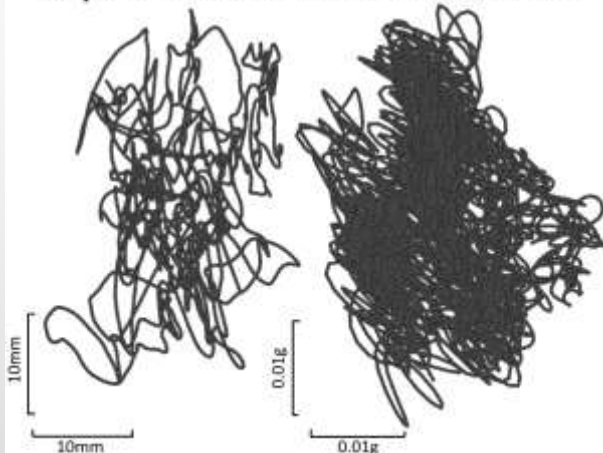
Person with PD

Center of Pressure (COP)

Quantitative Posturography: iSway



Representative moderate untreated PD



- Center of P vs Accelerometer
 - Cost
 - Portability
- iSway: Several parameters distinguish PD vs control
- Uses of iSway:
 - Evaluate treatment efficacy
 - Monitor disease progression
 - Predict falls risk

From Jeff Hausdorff, PhD (Tel Aviv), WPC 2016

Mancini et al, 2012, JNeuroengRehabil 9:59

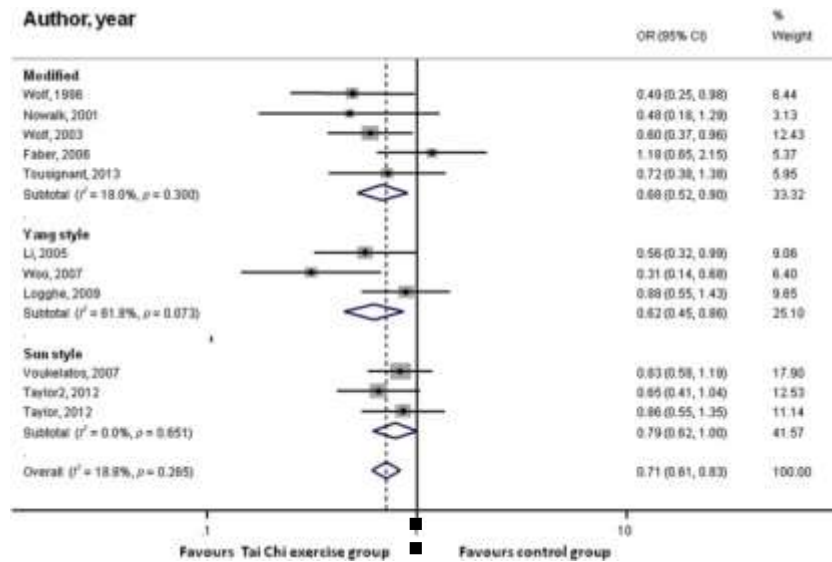
Pirtola & Era, 2006, Gerontol 52:1

Nardone & Schiapatti, 2006, MovDisord 21:1515

Reduction in PD falls risk via exercise

- *“We would not be talking about this five years ago!”*
- 5 randomized controlled trials (2011-present)
- >100 PD participants (N = 896)
- Falls as primary or secondary outcome

Meta-analyses: Effects of exercise on falls in PD



Favors exercise group ← → *Favors control group*

✓ Postural stability
(balance/mobility)

✓ Rate of falls

✓ Prevention of falls

From Colleen Canning, PhD (Sydney), WPC 2016

Hu et al., 2016, IntJGerontol 10:131

Exercise to reduce falls in PD: What works?

- Exercises that challenge balance
 - Change center of mass and base of support
 - Reduce hand support
 - Add cognitive/motor dual tasks
- Progressive strength/resistance exercises
- Movement strategy training
 - Break complex movement into smaller parts
 - Cue the moves
 - Progress to dual tasking

Falls risk interventions in PD

- ✓ Check medications
- ✓ Physical therapy
- ✓ Occupational therapy
- ✓ Speech language pathology
- ✓ Community-based programs



AMERICAN
SPEECH-LANGUAGE-
HEARING
ASSOCIATION



LSVT BIG™

- Research-based exercise program
- Trained PT/OT focuses on bigger movements
- Treatment
 - Individual 1 hr sessions, 4 days/week for 4 weeks
 - Daily homework & carryover exercises
- Results:
 - Faster walking, larger steps
 - Improved balance
 - Increased trunk rotation
- www.LSVTGlobal.com
 - NH: 58 LSVT BIG clinicians

Parkinson's Wellness Program

- Research-based program developed at Boston U.
- Focus on gait, strength, flexibility & problem-solving
- Led by PTs
 - 1.5 hr group sessions, 2 days/week for 6 weeks
 - Special sessions with OT, SLP and neurologist
- Results in improved
 - Balance and gait
 - Walking speed
 - Cognition & Quality of life
- <http://www.bu.edu/neurorehab/resource-center/community-wellness-program/>
 - NH: Lebanon, Salem

Dance for PD®

- Developed by Brooklyn Parkinson Group and Mark Morris Dance Group
- Seated and standing dance moves to music
 - 60-90 minute group sessions, weekly or monthly
- Ltd research results (16 sessions, 8 wks, N = 12):
 - Improved gait
- <http://danceforparkinsons.org>
 - NH: Keene, Rochester (“I DANCE for Parkinson’s”)
 - From Brooklyn
 - <http://capture.nbs-enb.ca/dwp.asp> (archived classes)
 - <http://capture.nbs-enb.ca/dwp/page/LiveEvents.aspx> (live stream)

Rock Steady Boxing™

- Non-contact boxing-inspired fitness routine
- Intense, high energy workouts
 - Punching (focus mitt, speed bags and heavy bags)
 - Movements in all planes of motion
 - Endurance
 - Strength
- 1.5 hr group sessions led by trained personnel
- Results (limited, boxing vs trad exercise, N = 31):
 - Both improved balance and balance confidence
 - Boxing improved gait velocity and gait endurance
- www.rocksteadyboxing.org
 - NH: Concord & Lebanon

Hippotherapy

- Lots of neuro-research, limited re Parkinson's*
- Patient/rider matched with horse led by assistants and guided by trained PT/OT/SLP.
- Results in improved
 - Balance and posture
 - Strength
 - Gait*
 - Mood* and cognitive function
- www.PATHintl.org
 - NH: 10 accredited centers

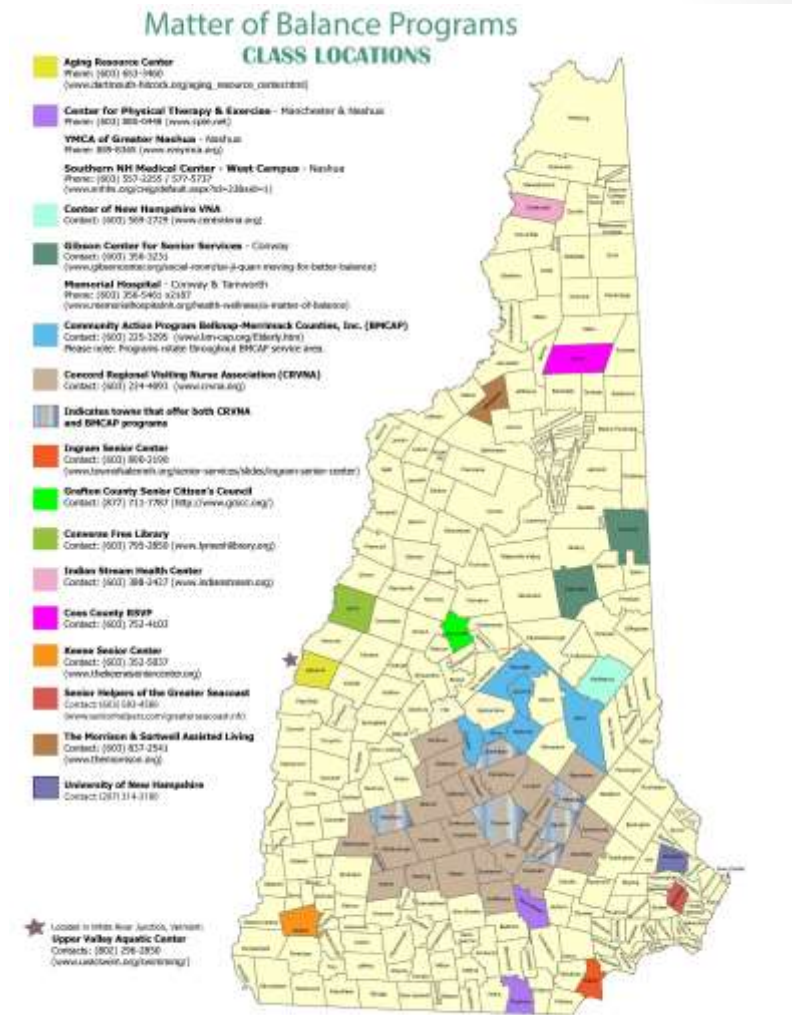


A Matter of Balance

- Evidence-based fall prevention program developed at Boston U.
- Focus on physical, social and cognitive factors that affect the older adult's fear of falling
- Weekly 2 hour group sessions for 8 weeks
- Goals
 - Reduced fear of falling
 - Increased activity levels
- Results
 - Reduced fear of falling

A Matter of Balance in New Hampshire

- For more information:
 - <http://stopfalls.org/faqs/boston-university-roybal-center/>
 - <http://www.mainehealth.org/mob>
- For NH locations and contact info:
 - www.nhfalls.org
 - NH: 19 class locations



Tai Ji Quan: Moving for Better Balance™

- Evidence-based fall prevention program developed by Fuzhong Li, PhD (Oregon Research Institute)
- Goals
 - Improve strength, balance, mobility and daily functioning
 - Prevent falls
- Results (Li et al. N Engl J Med 2012; 366: 511-519)
 - 55% reduction in falls in older adults
 - 67% reduction in falls in people with PD

Tai Ji Quan: Moving for Better Balance™ program:

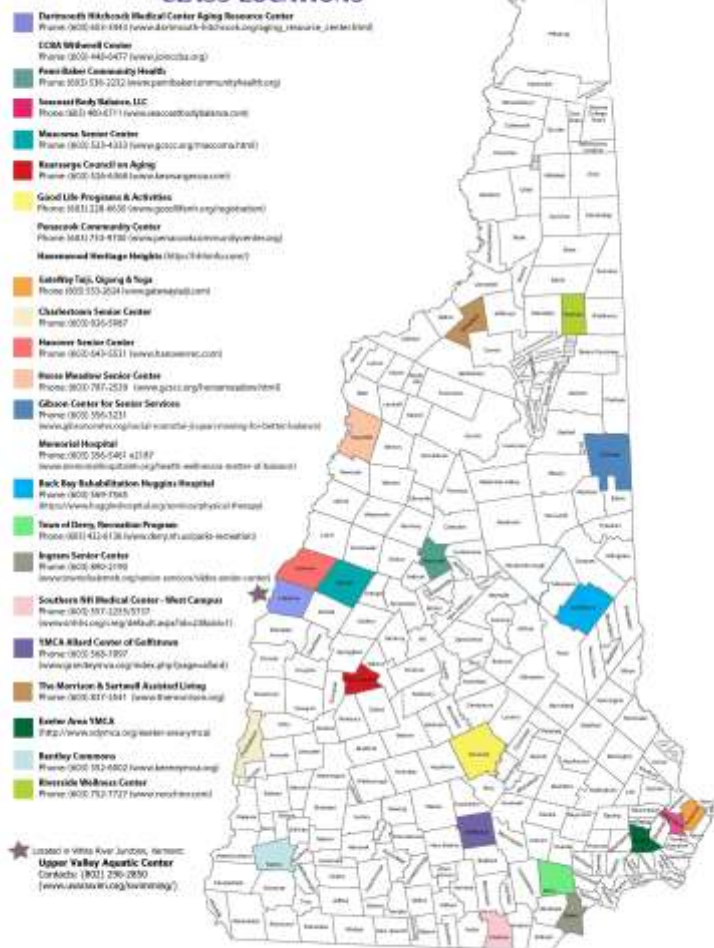
- 1 hour group sessions 2x per week for 24 weeks
- Core practices
 - 8-form core
 - Variations of forms
 - Mini-therapeutic movements
- Forms and protocol include
 - Shifting center of gravity
 - Narrow/wide stance alteration
 - Rotational trunk movements
 - Heel-to-toe, toe-to-heel stepping



Tai Ji Quan: Moving for Better Balance™ in New Hampshire

- For more information and references:
 - <https://tjqmbb.org>
- For NH locations and contact info:
 - www.nhfalls.org
 - NH: 24 class locations

Tai Ji Quan: Moving For Better Balance CLASS LOCATIONS



as of September 2014

Summary: Reducing Parkinson's falls risk

- The range of PD symptoms is challenging.
- Consider
 - Medications
 - Referrals to PT, OT and SLP
 - Community based programs work...
 - ...but more research is needed.

For more help

Please contact me:

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PARKINSON'S DISEASE & MOVEMENT DISORDERS CENTER



Dartmouth-Hitchcock