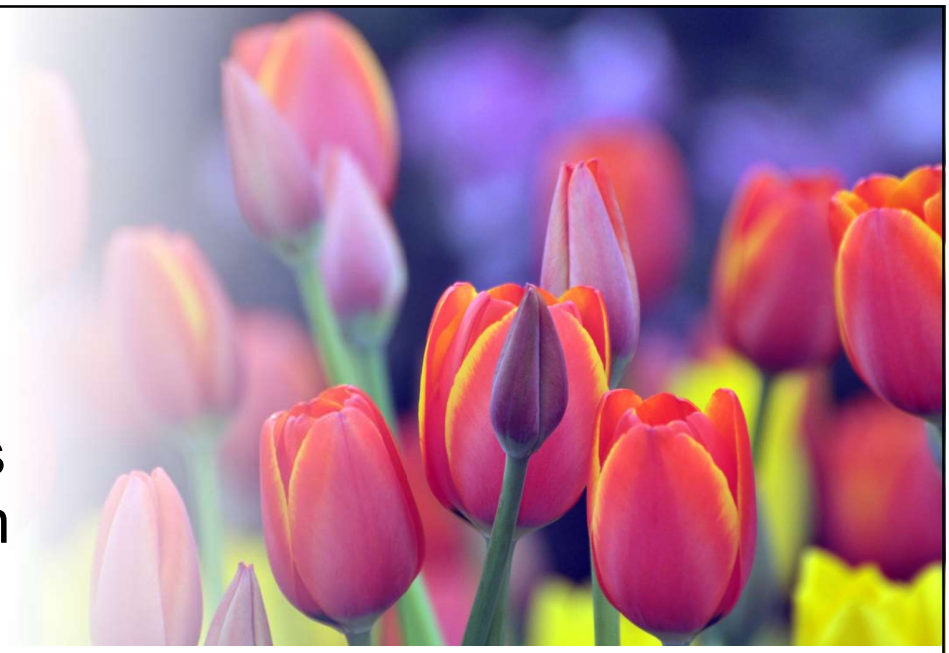
Welcome

Minnesota Spring Parkinson's Symposium



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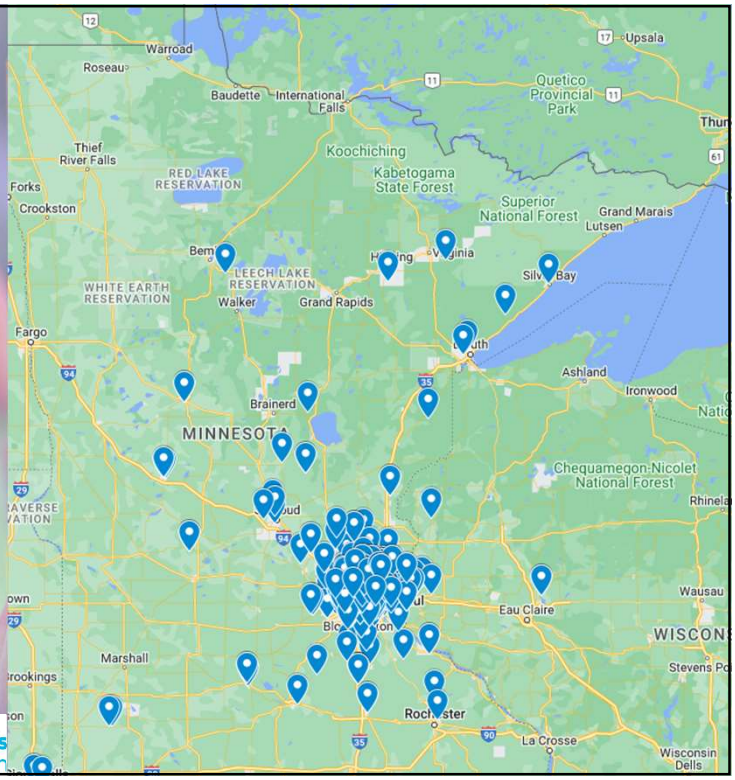
Welcome

- 55% people with PD
- 27% Spouse/Partner
- 34% diagnosed in last 5 years



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Parkinson's Friendly Event

- Pill timers are OK
- Break at 10:40 a.m.
- Questions after each presentation
- Thanks Sponsors!

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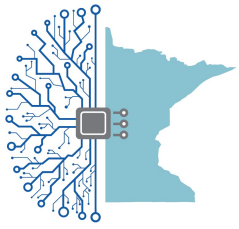
Morris K. Udall Center of Excellence in Parkinson's Disease Research

Circuit-based deep brain stimulation for Parkinson's disease

Morris K. Udall Centers of Excellence for Parkinson's Disease Research
UAB NIH National Institute of Neurological Disorders and Stroke

http://udall.umn.edu



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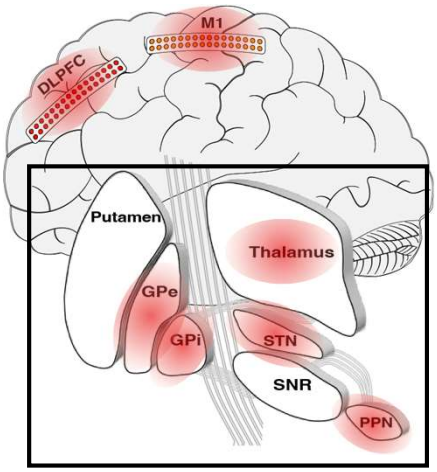

Goals:

- Define the changes in brain circuitry that underlie motor and cognitive dysfunction in Parkinson's disease.
- Develop new deep brain stimulation (DBS) therapeutic approaches.
- Integrate neuroimaging, neurophysiology, clinical assessments and deep brain stimulation technologies to better understand and improve lives of all patients with Parkinson's disease.

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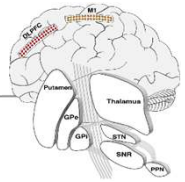
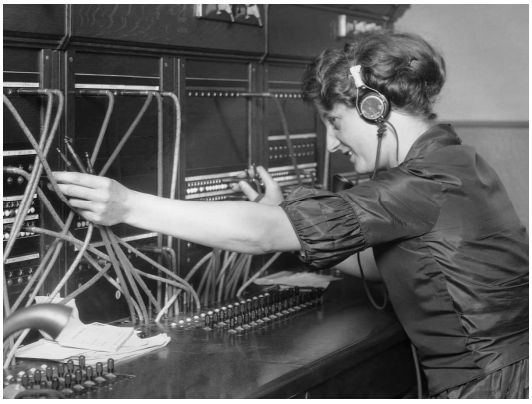
Communication





- Design therapies that are patient-specific, tailored to each individual person's signs and symptoms, that are more effective and more efficient.

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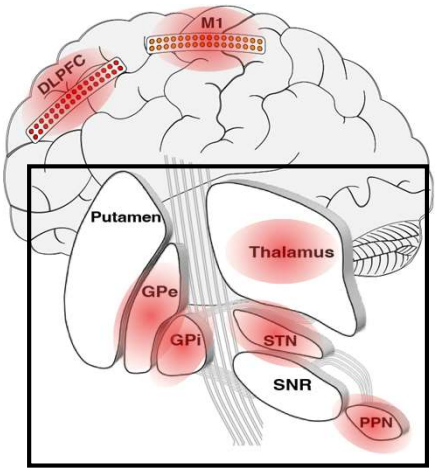

Goals:

- **Cardinal motor signs (bradykinesia, rigidity, tremor)**
- **Cognition (e.g. working memory)**
- **Gait and balance/posture**
- **Speech**
- **Sleep**

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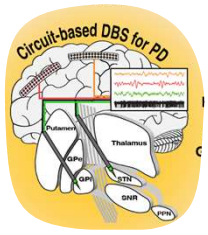

- 3 Large Research Projects
- Catalyst Project
- 4 Cores
  - Imaging
  - Clinical
  - Biostatistics
  - Administrative

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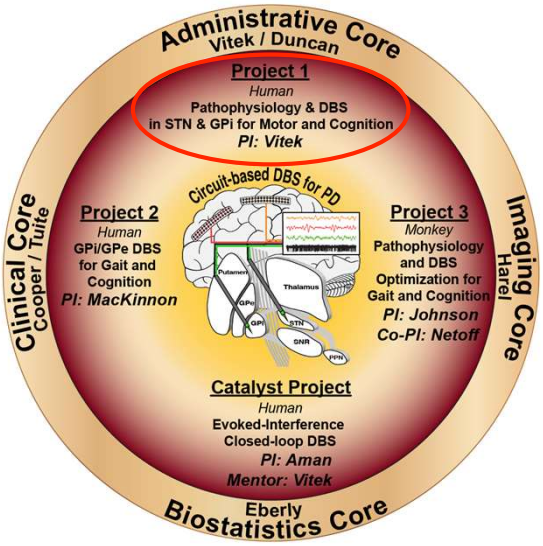

Jerrold Vitek, MD, PhD

PROJECTS

- Project 1: Subcortical and cortical brain recordings to understand how communication between brain structures is related to motor signs and cognition (e.g. short term memory recall)

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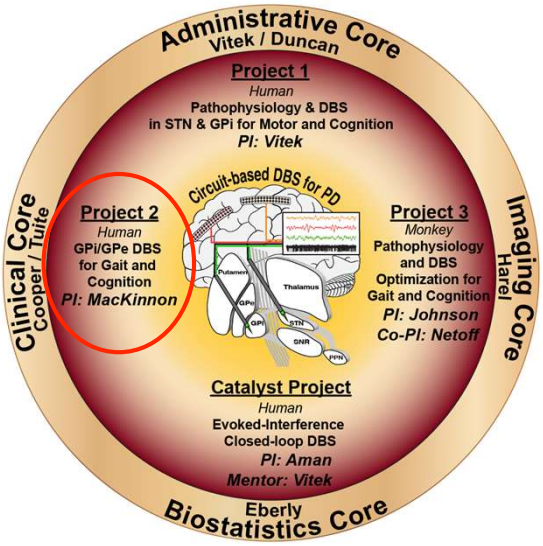

Colum MacKinnon, PhD

PROJECTS

- Project 2: Using brain recordings and functional MRI to analyze the effects of stimulating different locations in the globus pallidus on levodopa resistant motor signs of PD, such as gait, posture, speech and cognition.

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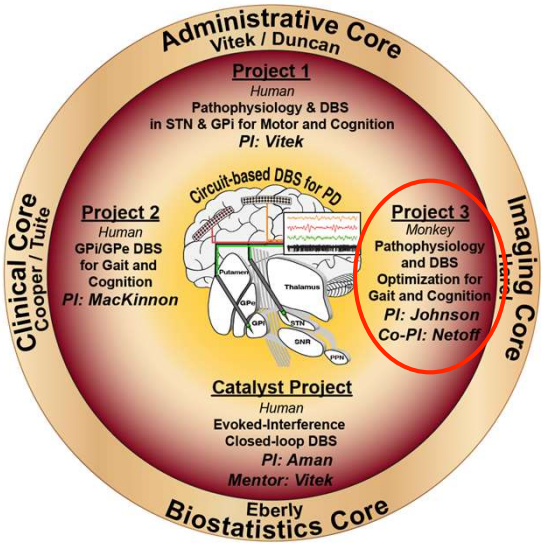

Matthew Johnson PhD
Tay Netoff, PhD

PROJECTS

- Project 3: Changes in brain activity deep in the brain and stimulation in novel brain locations, and analyzing their association with changes in gait and cognitive function.

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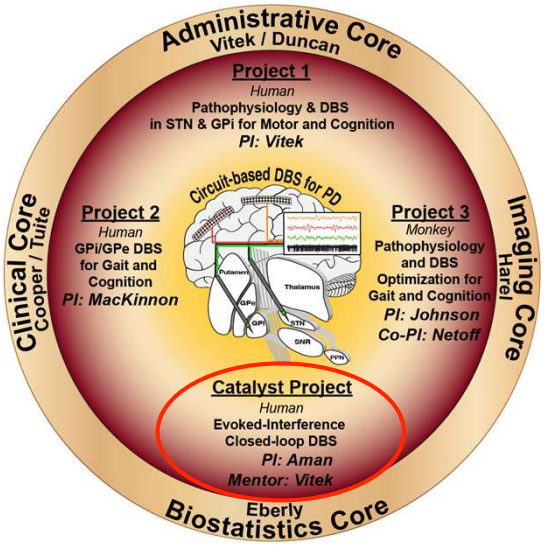

Joshua Aman, PhD

PROJECTS

- Catalyst: Reading patient-specific brain activity in real-time to deliver precisely timed, “on-demand” stimulation and analyzing effects on bradykinesia and rigidity…Interfering with problematic brain signals (“closed loop”).

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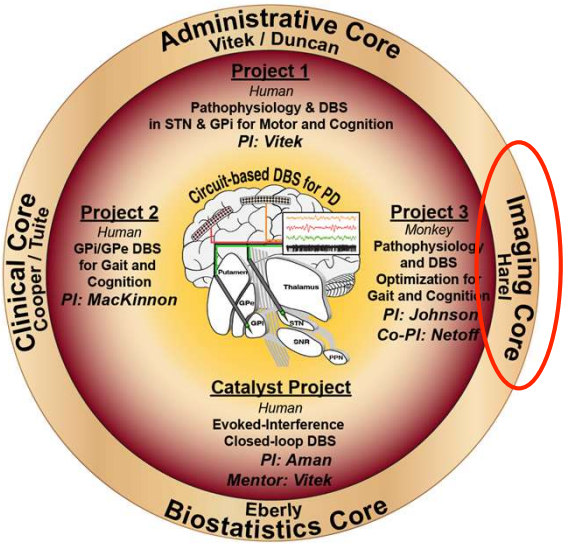

Noam Harel, PhD

CORES

- Imaging: High resolution (7T) MRI and diffusion tensor imaging to define pathways (lines of communication) and subregions of key brain structures.
- fMRI – functional properties of brain structures.

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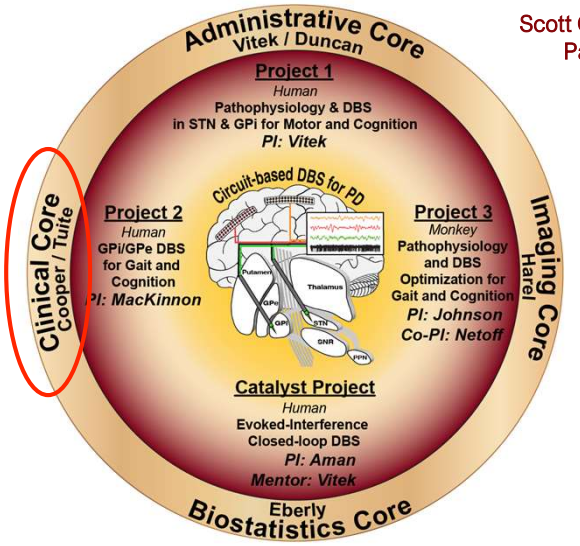

Scott Cooper, MD, PhD
Paul Tuite, MD

CORES

- Clinical: Recruit patients and provides infrastructure to obtain and curate clinical patient data, building a database of high-value, multi-modal datasets of outcomes.
- Performs clinical assessments of patients
- Tracks patients long-term

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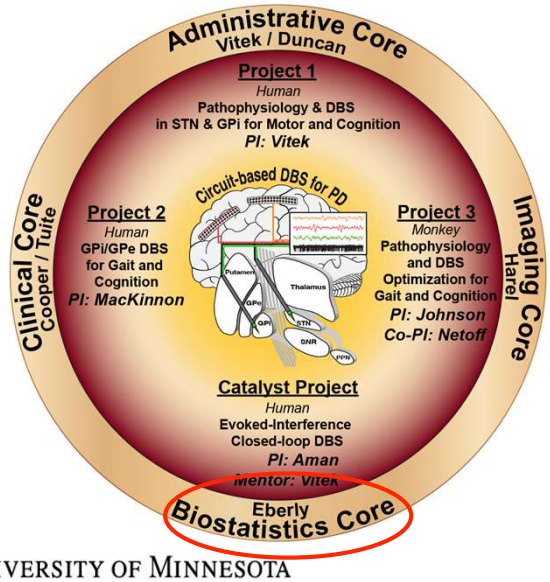

Lynn Eberly, PhD

CORES

- Biostatistics: Provides data management and quality control, statistical and machine learning analysis of all data, from clinical ratings to physiology recordings structures deep in the brain.
- NIH guidelines for handling and sharing data.

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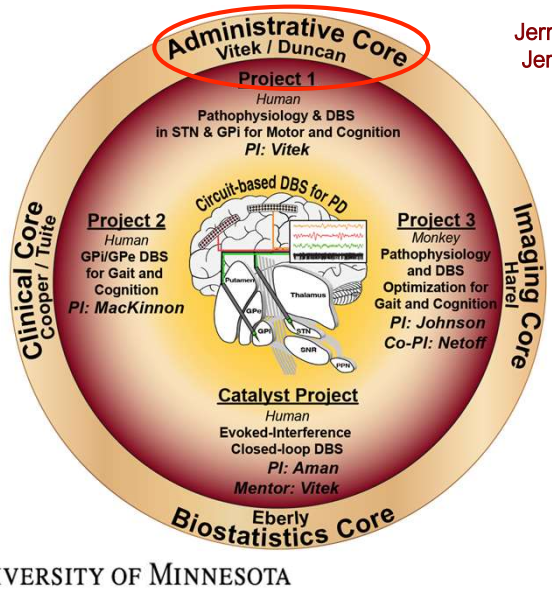

Jerrold Vitek, MD, PhD
Jeremy Duncan, PhD

CORES

- Administrative: Orchestrate and support all Center activities.
- Coordinate career enhancement for Early State Investigators and trainees.
- Promote community engagement/outreach.
- Monitor progress/deliverables.

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People: University of Minnesota Udall Center

Patients Who Volunteer For Research

Michael Park MD PhD
Jing Wang, PhD
Luke Johnson, PhD
Kevin O'Neill PhD
Stephanie Alberico, PhD
Meghan Hill
David Darrow, MD MPH
Alex Herman, MD PhD
Ken Baker, PhD
Gregory Thompson
Merrie Harrison
Hafsa Farooqi, PhD
Matthew Petrucci, PhD
Lingling Yang, PhD
Sommer Amundsen-Huffmaster
Emily Lecy
Joshua De Kam

Brandon Parks, PhD
Jaejin Lee, PhD
David Sanabria Escobar, PhD
Seth Koenig, PhD
Rebecca Hayes
Kate Dembny
Eric Maurer, MPH
Biswaranjan Mohanty, PhD
Ajay Verma, PhD
Devyn Bauer
Mark Fiecas, PhD
Ben Pobiel
Tay Netoff, PhD
Sendréa Best
Paige Petschl
Ming Lei
Shivansh Pandey
Ben Hayden, PhD

Ann Fieberg, MS
Niecy Beltz, RN
Marina Bryants
Allyson Connor, MD
Erin Holker, PhD
Kelly Brown, RN
Emily Weatherill
Jeremy Duncan, PhD
Kelly Ryberg, MA
Leonardo Brito de Almeida, MD
Kristine Domingo, DO
Kelsey Gagesch, MD
Julie Madsen
Robert McGovern III, MD
Sandra Safo, PhD
Tsega Orcutt, NP
Alik Widge. MD
Peter Watson, PhD

Henry Braun, PhD
Camille Merhi, MD
Oren Solomon, PhD
Tara Palnitkar, PhD
Remi Patriat, PhD
Sarah Bedell
Ziad Nahas, MD
Essa Yacoub, PhD
Steen Moeller, PhD
Kristin Garland
Teryl Grosz
Leah Davis, PhD

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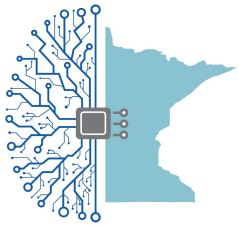
Thank You

http://udall.umn.edu



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Every day, we provide the support, education, and research that will help everyone impacted by Parkinson's disease live life to the fullest.

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AMERICAN PARKINSON DISEASE ASSOCIATION: OUR NATIONWIDE NETWORK

- APDA Chapters
- APDA Information & Referral (I&R) Centers
- APDA Centers for Advanced Research

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AMERICAN PARKINSON DISEASE ASSOCIATION

- Online resources
- Virtual Calendar of Events
- Publications
- Webinars

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AMERICAN PARKINSON DISEASE ASSOCIATION: MINNESOTA CHAPTER

Connection with support groups and PD exercise classes statewide

Annual Optimism Walk (September 9 in Roseville, MN)

Free educational programs and publications

Weekly e-newsletter

Financial Support Program for people who need financial assistance

APDA Minnesota: 651-392-8199 | apdamn@apdaparkinson.org | apdaparkinson.org/MN

@APDAMN on Facebook

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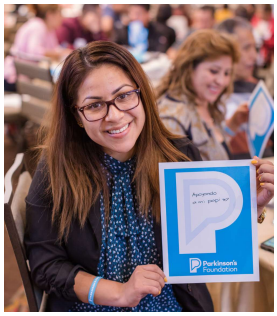
Our Mission

The Parkinson's Foundation makes life better for people with Parkinson's disease by improving care and advancing research toward a cure. In everything we do, we build on the energy, experience and passion of our global Parkinson's community.

We have everything you need to live better with Parkinson's.

Our Goals

To help our global community live better with Parkinson's, we pursue **three goals:**



- **Improve care for everyone with Parkinson's**
- **Advance research toward a cure**
- **Empower and educate our global community**

Become part of the PD GENEration

Your participation will help drive discoveries **impacting people with PD today and for generations to come.**

Visit Parkinson.org/PDGeneration

Better Lives. Together.

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Improving Care for All

Parkinson's Foundation
COMMUNITY PARTNERS IN PARKINSON'S CARE

Community Partners in Parkinson's Care is a program designed to educate and prepare staff to provide better care for people with Parkinson's disease (PD) living in care communities and home care agencies. The program, formerly Struthers Parkinson's Care Network, has continued to expand and now includes more than 100 member sites.

Visit **Parkinson.org/CommunityPartners.**

Parkinson's Foundation STRUTHERS Parkinson's Care Network

EDMOND J. SAFRA PHILANTHROPIC FOUNDATION

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We Need Your Input: Parkinson's Foundation Surveys

Parkinson's Foundation

Your experience matters!

Research should be driven by the experiences of people with Parkinson's disease and their care partners. Join the Parkinson's Foundation Surveys initiative to make sure your voice is heard!

Join our Parkinson's Foundation Surveys initiative here: Parkinson.org/PFSurveys

Better Lives. Together.

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Movement Matters:

Why and How to Keep Exercising Across All Stages of PD

Beth Wittry, PT, DPT

Board-Certified Clinical Specialist in Neurologic and Geriatric Physical Therapy

CKRI United – OP Neuro Rehab

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Objectives

- Explain importance of exercise for individuals with Parkinson's Disease.
- Identify PD-specific exercise guidelines and recommendations.
- Discuss strategies and resources to optimize exercise.

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Exercise is Important…

- Decreases risk of cardiovascular disease
- Decreases risk of diabetes
- Decreases risk of certain cancers
- Lowers blood pressure
- Helps manage weight
- Strengthens bones and muscles
- Improves thinking and memory
- Boosts mood
- Increases energy
- Improves sleep
- Improves mobility and performance of daily activities
- Decreases risk of falls
- Improves quality of life
- Helps maintain independence

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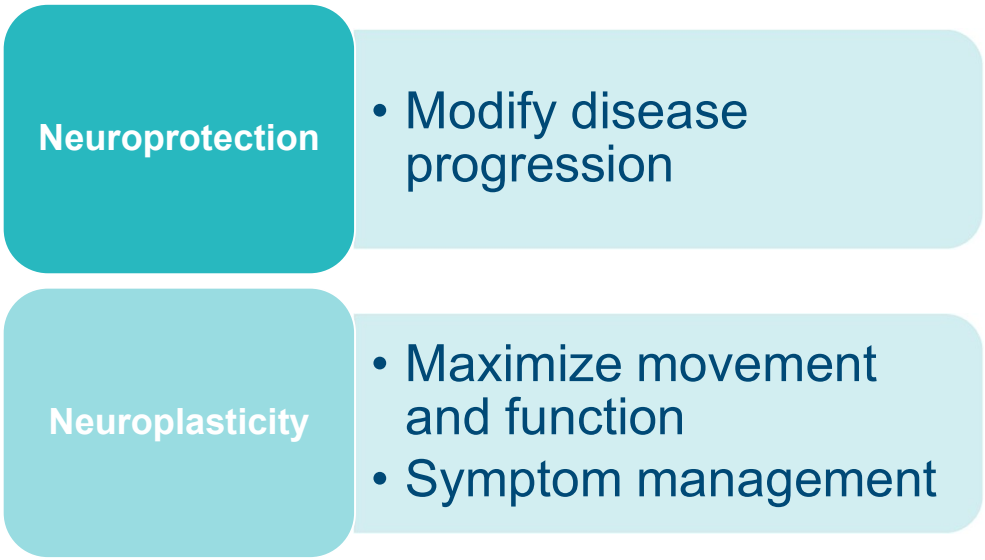
…and Even More Important in Parkinson's Disease.



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PD-Specific Exercise Benefits

- Improved MDS-UPDRS score
  - Indicator of disease severity
- Improved quality of life
- Improved memory and attention
- Improved balance and postural control
  - Decreased fall risk
- Improved walking
- Improved freezing of gait
- Improved flexibility and posture
- Improved sleep quality
- Impact on both motor and non-motor symptoms

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Allina Health

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Exercise Guidelines

150 minutes/week of moderate to high intensity exercise

Exercise program = Aerobic exercise + Strength training + Balance and agility

Allina Health

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Aerobic Exercise

- Frequency and Time:
  - 3 days/week
  - 30 minutes or more
- Intensity:
  - Moderate to high intensity
- Type:
  - Walking
  - Nordic walking
  - Biking
  - Boxing
  - Swimming
  - Chair aerobics
  - Exercise class

Strength Training

- Frequency and time:
  - 2-3 days/weeks
  - 30 minutes or more
  - 2 sets, 8-12 repetitions
- Intensity:
  - Moderate to high intensity
- Type:
  - Functional exercises i.e. sit to/from stand, getting on/off floor, reaching overhead
  - Postural strength
  - Exercise class

Balance and Agility

- Frequency and Time:
  - 2-3 days/week
- Intensity:
  - Moderate to high intensity
- Type:
  - Large amplitude training – PWR!, LSVT BIG
  - Yoga
  - Tai Chi
  - Dancing
  - Dual tasking

What's the Best Type of Exercise?

- Enjoyable
- Fun
- Motivating

Intensity

- Drives brain changes

- Breathing heavy
- Difficult to hold a conversation
- Need to take intermittent rest breaks

Rating	Perceived Exertion
6	No exertion
7	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Extremely hard
20	Maximal exertion

Table 1. The Borg Rating of Perceived Exertion Scale

Optimizing Exercise Performance

- Make a plan
- Schedule it + set reminders
- Bring a friend, get family involved
  - Social support
- Be confident
  - Expect to be successful
- Set goals – what motivates you?
  - "Stay independent"
  - "Walk in the grocery store"
  - "Play with grandkids"
- It's not all or none

Optimizing Exercise Performance

- Move BIG
  - Music
  - Cues
  - “Forced-exercise”
- Choose the time of day
  - Medication “on” time
  - When you feel the best
- Utilize technology
  - Step counter
  - Activity tracker

Addressing Barriers

- Movement is hard
  - Exercise will look different for everyone
  - Start where you are
  - Make it functional
  - Modify, modify, modify – be creative
  - Adaptive equipment, assistive devices
- Balance/fall concerns
  - Upper extremity support
  - Seated options
- Energy/fatigue
  - Break it up
  - Intervals

Addressing Barriers

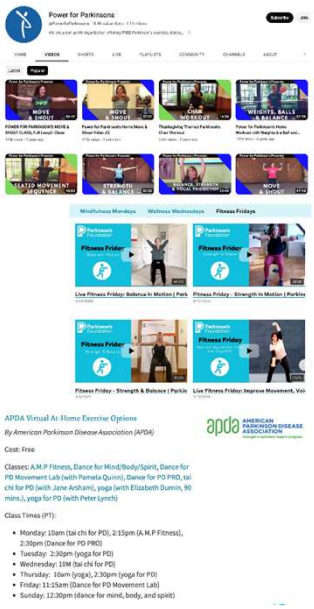
- Pain
- Orthostatic hypotension
  - Discuss with doctor
  - Recumbent/seated exercises
  - Abdominal binder
- Accessibility
- Cost
  - Free options
  - APDA Financial Support Program
  - Insurance programs
- Transportation
  - Virtual options
  - Metro Mobility
- Weather

Community Resources

- Gyms/fitness centers
  - YMCA – Silver Sneakers
  - Community recreation centers
  - Indoor walking tracks
- Community classes
  - CKRI
  - Struthers Parkinson's Center
  - MHealth Fairview
  - RockSteady Boxing
  - YMCA Pedaling for Parkinson's Program

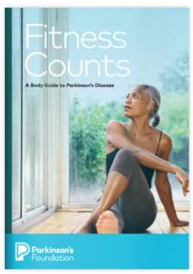
Virtual Resources

- On demand
  - Stanford Parkinson's Community Outreach – PD Exercise Videos
  - Working on Wellness Foundation
  - Power for Parkinson's
  - Parkinson's Foundation – Fitness Friday
- Live
  - Stanford Parkinson's Community Outreach – PD Exercise Classes Live Online
  - Rogue Physical Therapy and Wellness
  - PWR! Exercise for Brain Change
- Modifications
  - Decrease playback speed
  - Pause



Educational Resources

- Parkinson's Foundation: **Fitness Counts**
- Davis Phinney Foundation For Parkinson's: **Every Victory Counts**



When Should I See a Physical Therapist?

- Establish an exercise program
- Address new goals
- Change in function
- "Tune up"

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Questions? Comments? Concerns?

beth.wittry@allina.com

"I don't have any choice whether or not I have Parkinson's, but surrounding that non-choice is a million other choices that I can make."

Michael J. Fox

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References

- Jacqueline A Osborne, PT, DPT, Rachel Botkin, PT, MPT, Cristina Colon-Semenza, PT, MPT, PhD, Tamara R DeAngelis, PT, MPT, Oscar G Gallardo, PT, DPT, Heidi Kosakowski, PT, DPT, PhD, Justin Martello, MD, Sujata Pradhan, PT, PhD, Miriam Rafferty, PT, DPT, PhD, Janet L Readinger, PT, DPT, Abigail L Whitt, PT, DPT, Terry D Ellis, PT, PhD, FAPTA, Physical Therapist Management of Parkinson Disease: A Clinical Practice Guideline From the American Physical Therapy Association, Physical Therapy, Volume 102, Issue 4, April 2022, pzab302, https://doi.org/10.1093/ptj/pzab302
- Johansson, M.E., Cameron, I.G.M., Van der Kolk, N.M., de Vries, N.M., Klimars, E., Toni, I., Bloem, B.R. and Helmich, R.C. (2022), Aerobic Exercise Alters Brain Function and Structure in Parkinson's Disease: A Randomized Controlled Trial. Ann Neurol, 91: 203-216. https://doi.org/10.1002/ana.26291
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- Zhen, K., Zhang, S., Tao, X. et al. A systematic review and meta-analysis on effects of aerobic exercise in people with Parkinson's disease. npj Parkinsons Dis. 8, 146 (2022). https://doi.org/10.1038/s41531-022-00418-4

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Break

- Return at 10:50 a.m.

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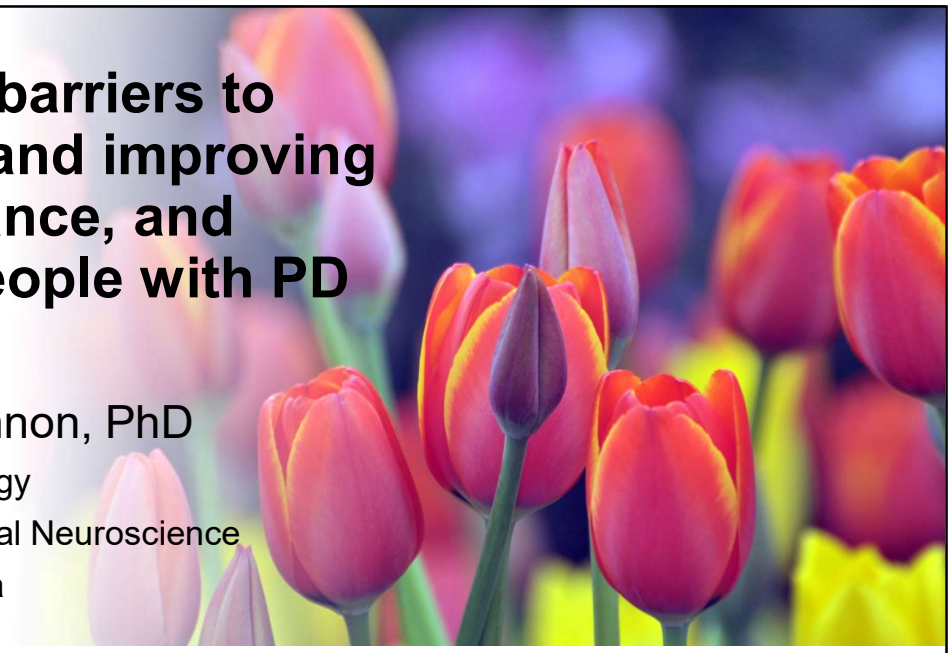
Bridges and barriers to maintaining and improving posture, balance, and walking in people with PD



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Department of Neurology
Institute for Translational Neuroscience
University of Minnesota

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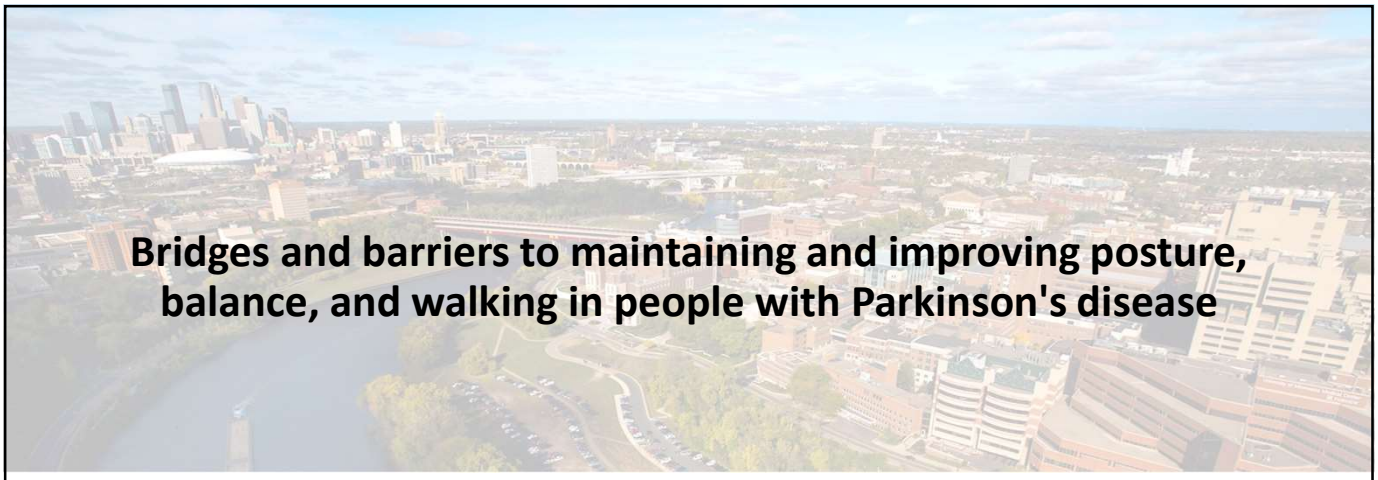

Bridges and barriers to maintaining and improving posture, balance, and walking in people with Parkinson's disease

Morris K. Udall Centers of Excellence for Parkinson's Disease Research

Movement Disorders Laboratory
Department of Neurology
University of Minnesota

Colum D. MacKinnon, PhD
Department of Neurology
Institute for Translational Neuroscience
University of Minnesota

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Objectives

1. Discuss the **five primary barriers** to improved gait and postural control
2. Provide **strategies to overcome the movement barriers**.
3. Discuss the **ingredients for quality movements.**
4. Discuss the importance of exercise for breaking the cycle of sedentary lifestyle and inactivity.

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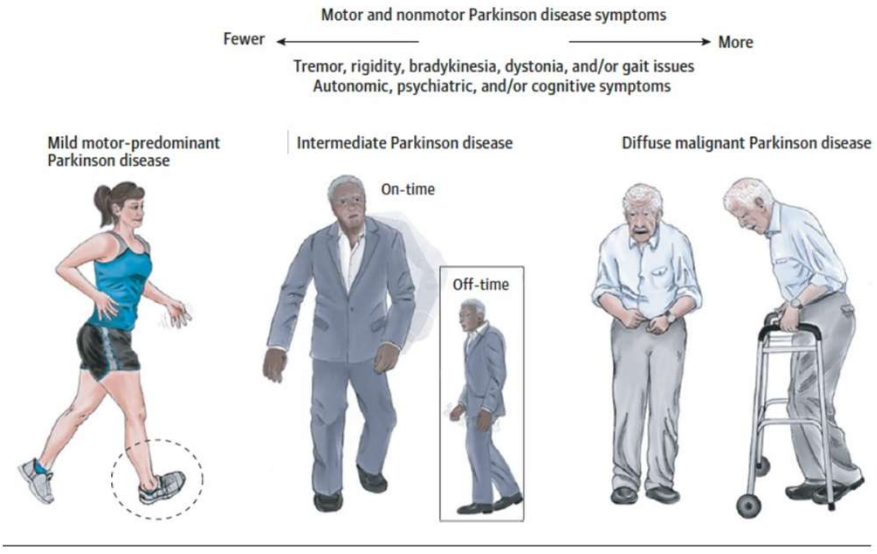
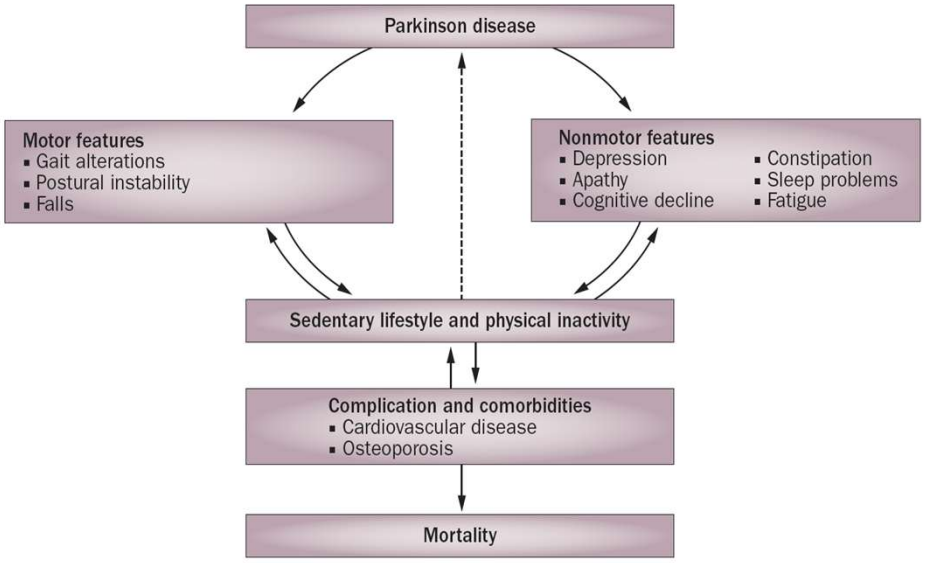
PARKINSON'S DISEASE



Armstrong and Okun, JAMA Neurology, 2020

54

Vicious Circle of Parkinson's disease



Speelman et al. Nature Reviews Neurology 2011

55

Breaking the Cycle

Recipe for a Great Movement Hotdish

1. Strength
2. Range of motion
3. Balance
4. Adaptability
5. Endurance
6. Tater Tots

56

The key to great movement is <u>POWER</u>

Power = Rate of energy generation
= FORCE x VELOCITY

To get Force: need muscle STRENGTH

To get Velocity: need RANGE OF MOTION

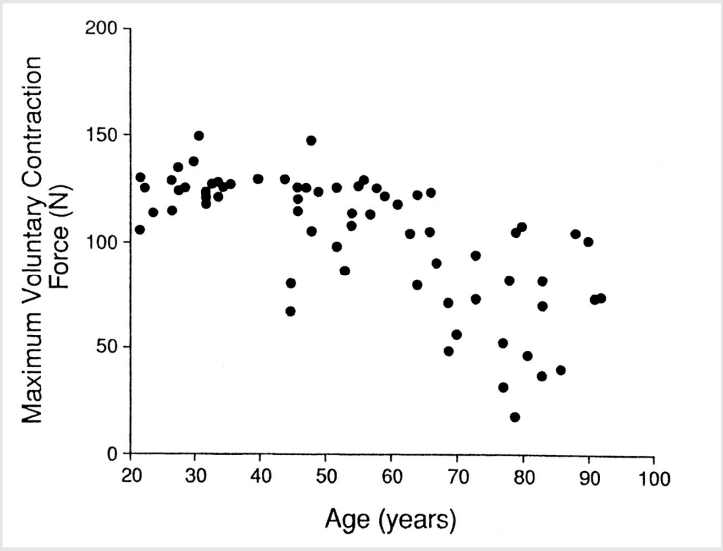
57

BARRIERS TO QUALITY MOVEMENT

- **FORCE GENERATION (Strength)**
- MOVEMENT RATE
- RANGE OF MOTION
- SELF INITIATION
- BALANCE AND POSTURE

58

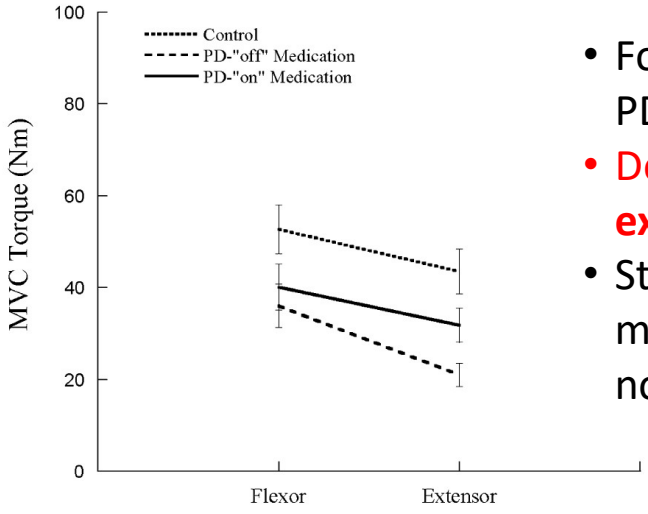
Age Influences Muscle Strength



Narici et al. J App Physiol, 1991

59

Strength in Parkinson's Disease



- Force production is reduced in PD
- Deficits are greater in **extensors** than flexors
- Strength is improved with medication or DBS, but not to normative states

Robichaud et al., Exp Brain Res, 156, 2004

60

Strength be improved in people with Parkinson's Disease? YES!

RESEARCH ARTICLE

A Two-Year Randomized Controlled Trial of Progressive Resistance Exercise for Parkinson's Disease

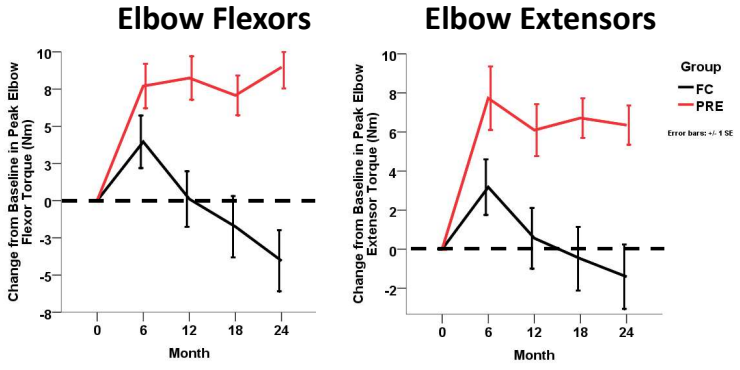
- 24-month (2 year) exercise period
- Participants randomized to:
  - **Progressive resistance exercise** or
  - **Fitness Counts**

- **24 months of exercise:**
  - ***2 x per week***
  - **90 minutes per session**
  - **No other exercise**

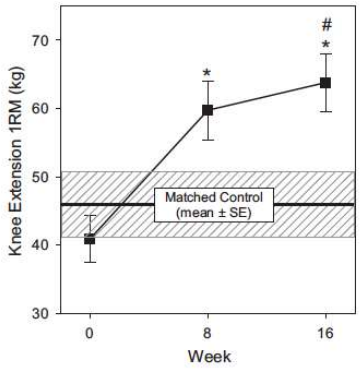
Corcos et al., Movement Disorders, 28(9), 2013

61

Did people get stronger: Yes!!



Corcos et al., Movement Disorders, 28(9), 2013

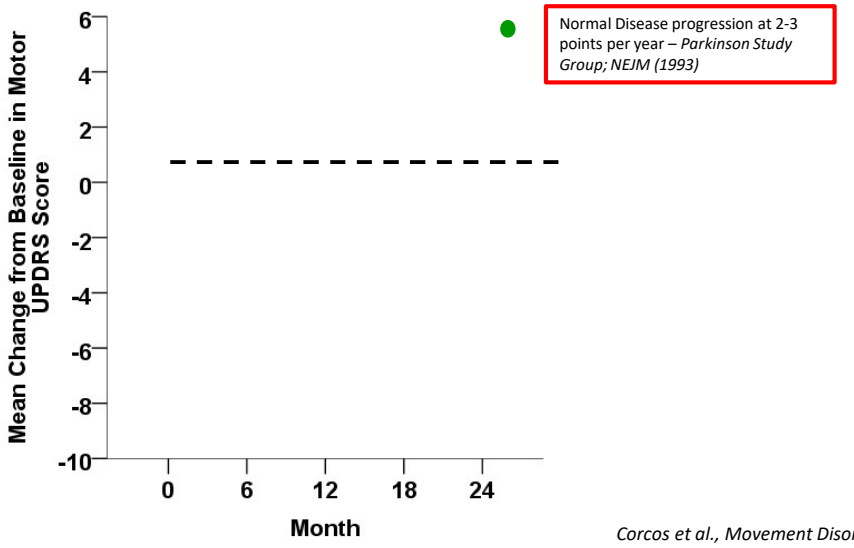


Kelly et al. 2014 J. Applied Physiology

62

Did people's symptoms improve: Yes!!

Motor UPDRS Scores



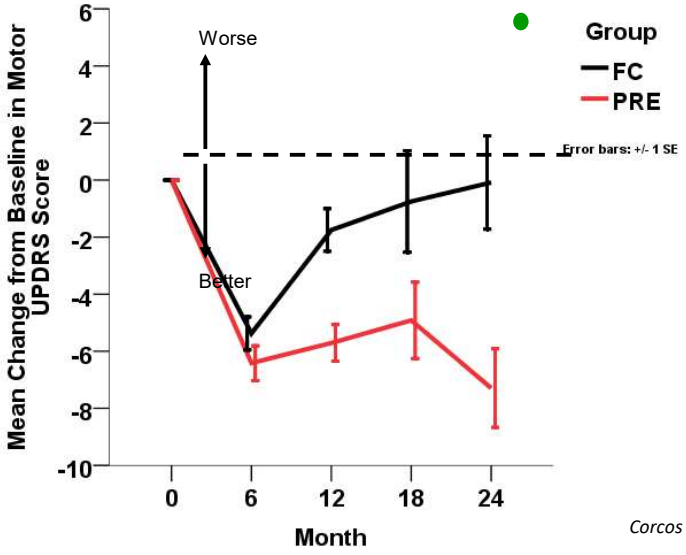
Normal Disease progression at 2-3 points per year – *Parkinson Study Group; NEJM (1993)*

Corcos et al., Movement Disorders, 28(9), 2013

63

Did people's symptoms improve: Yes!!

Motor UPDRS Scores



Corcos et al., Movement Disorders, 28(9), 2013

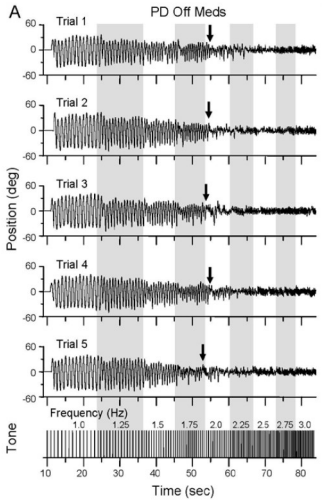
64

BARRIERS TO QUALITY MOVEMENT

- FORCE GENERATION (strength)
- **MOVEMENT RATE**
- RANGE OF MOTION
- SELF INITIATION
- BALANCE AND POSTURE

65

Low vs. High Tempo (Rate) Movements



Stegemöller et al., Movement Disorders, 24(8), 2009

66

Movement Rate Barrier

- Repetitive movements often have a rate-dependent impairment
- Most individuals with PD show impairments in limb movement at rates near 2 movements/s
  - the "2 Hz Barrier"
- This impairment is resistant to levodopa replacement therapy
- This impairment is resistant to STN-DBS therapy
- **Strategies to overcome difficulties with repetitive movements:**
  1. **Slow down (reduced the movement rate)**
  2. **Keep the movement large**
  3. **Execute the movement with vigor!**

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BARRIERS TO QUALITY MOVEMENT

- FORCE GENERATION (strength)
- MOVEMENT RATE
- **RANGE OF MOTION (Movement Amplitude)**
- SELF INITIATION
- BALANCE AND POSTURE

68

The key to great movement is <u>POWER</u>

Power = Rate of energy generation
= FORCE x VELOCITY

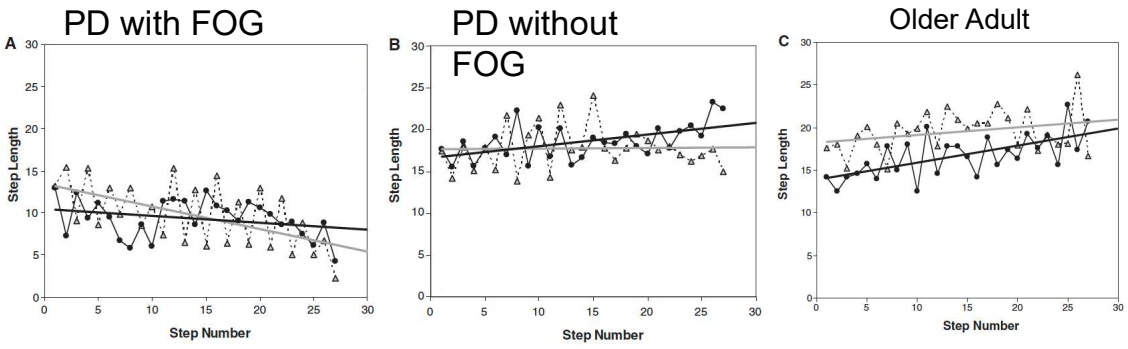
To get Force: need muscle STRENGTH

To get Velocity: need RANGE OF MOTION

69

The Gait Sequence Effect

Stepping at 25% of Preferred Step Length (lines on floor)



Chee et al., Brain, 132(8), 2009

70

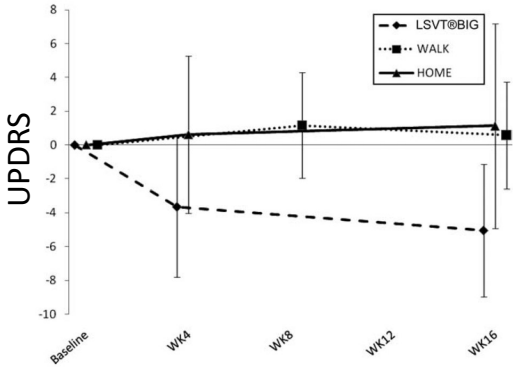
Lee Silverman Voice Therapy (LSVT LOUD & LSVT BIG)

71

LSVT BIG

Principles of LSVT BIG

- Amplitude (large ROM)
  - Large movements are associated with higher velocity
  - Large movements take longer to complete
- High Intensity (effort)
- Calibration (proprioceptive sense)



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BARRIERS TO QUALITY MOVEMENT

- FORCE GENERATION (strength)
- MOVEMENT RATE
- RANGE OF MOTION
- **SELF INITIATION**
- BALANCE AND POSTURE

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“Paradoxical” movement in Parkinson’s disease

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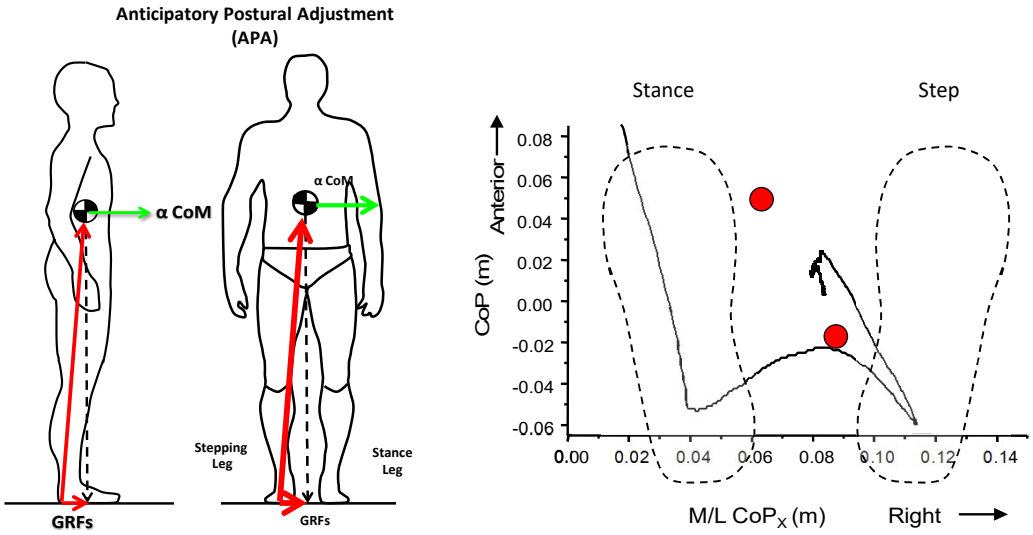
How do you initiate walking?



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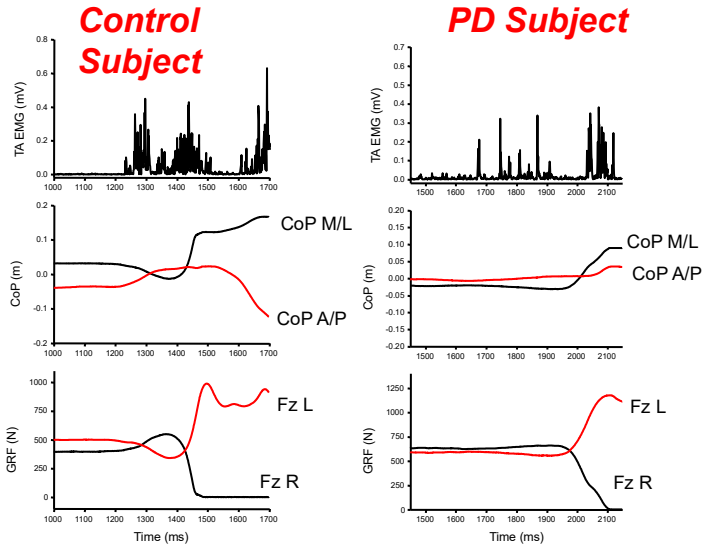
Step Initiation in Parkinson's Disease

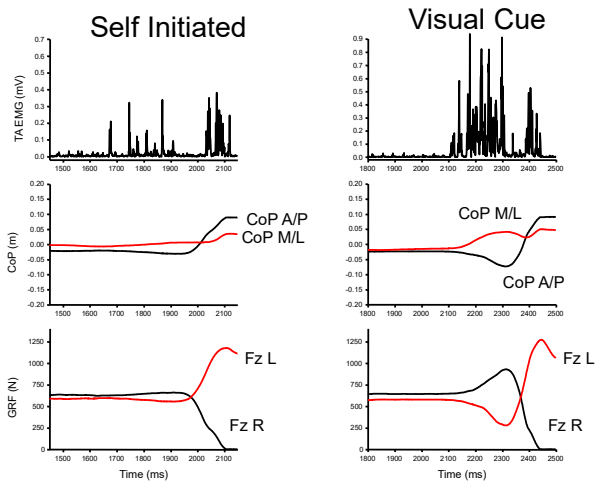


Rogers et al., J Neurophysiol, 106, 2011

76

Impact of a simple visual cue on gait initiation in PD

Representative Parkinson's Subject



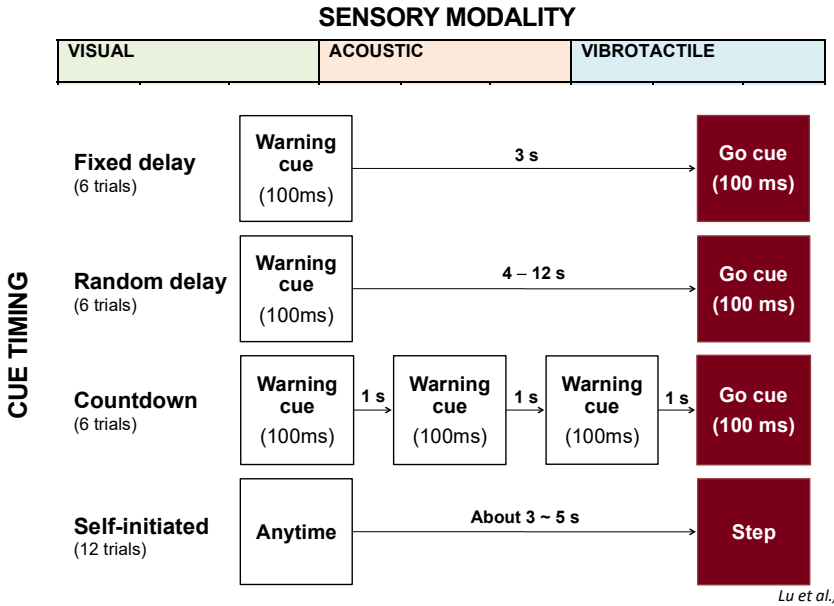
APAs Absent: 20% < 1%

Rogers et al., J Neurophysiol, 106, 2011

77

What is the best method to cue?

Chiahao Lu, PhD



Lu et al., Arch Phys Med Rehab, 98, 2017

78

What is the best method to cue?

Chiahao Lu, PhD

Percentage of Trials Without an Anticipatory Postural Adjustment

SELF INITIATED	VISUAL			ACOUSTIC			VIBROTACTILE		
	FIXED	RANDOM	COUNT-DOWN	FIXED	RANDOM	COUNT-DOWN	FIXED	RANDOM	COUNT-DOWN
17 ± 25%	1 ± 3%	0 ± 0%	2 ± 10%	0 ± 0%	0 ± 0%	2 ± 7%	1 ± 4%	2 ± 5%	2 ± 5%

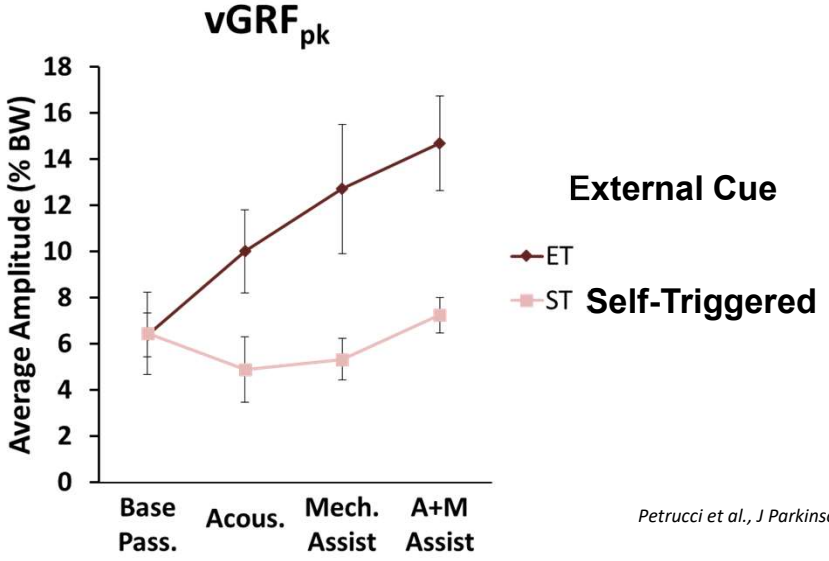
Lu et al., Arch Phys Med Rehab, 98, 2017

79

Can you "self-trigger" gait initiation?

Matthew Petrucci, PhD

Ground Reaction Force



Petrucci et al., J Parkinson's Disease, 12, 2022

80

Overcoming the "self-initiation" problem
Use a "self-warning" cue

Matthew Petrucci, PhD

External Warning
(tone)

Delay

External "Go" Tone

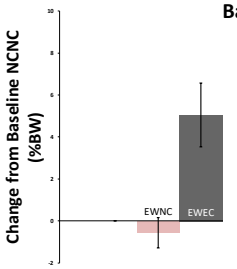
Fixed delay

Warning cue (100ms)

3 s

Go cue (100 ms)

Change in Magnitude Compared to Baseline



Petrucci et al., J Parkinson's Disease, 12, 2022

81

Overcoming the "self-initiation" problem
Use a "self-warning" cue

Matthew Petrucci, PhD

Self-Warning
(Button press for warning tone)

Delay

External "Go" Tone

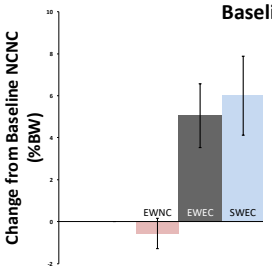
Fixed delay

Warning cue (100ms)

3 s

Go cue (100 ms)

Change in Magnitude Compared to Baseline

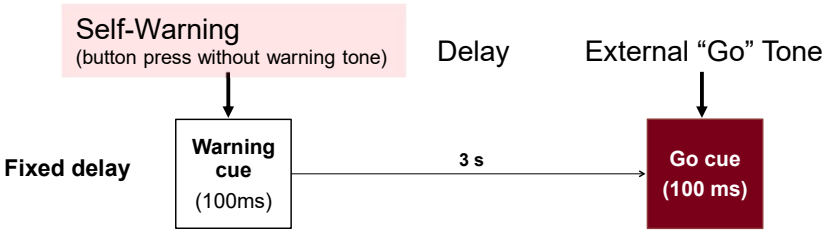


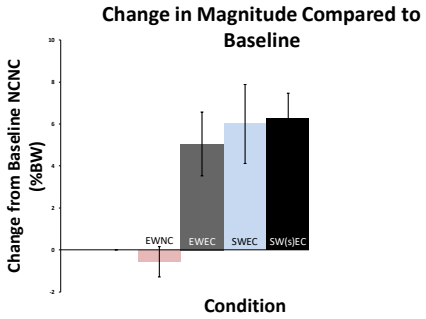
Petrucci et al., J Parkinson's Disease, 12, 2022

82

Overcoming the "self-initiation" problem
Use a "self-warning" cue

Matthew Petrucci, PhD





Petrucci et al., J Parkinson's Disease, 12, 2022

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BARRIERS TO QUALITY MOVEMENT

- FORCE GENERATION (strength)
- MOVEMENT RATE
- RANGE OF MOTION
- SELF INITIATION
- **BALANCE AND POSTURE**

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Core Locomotion Pattern

85

The Problem of Human Biped Locomotion

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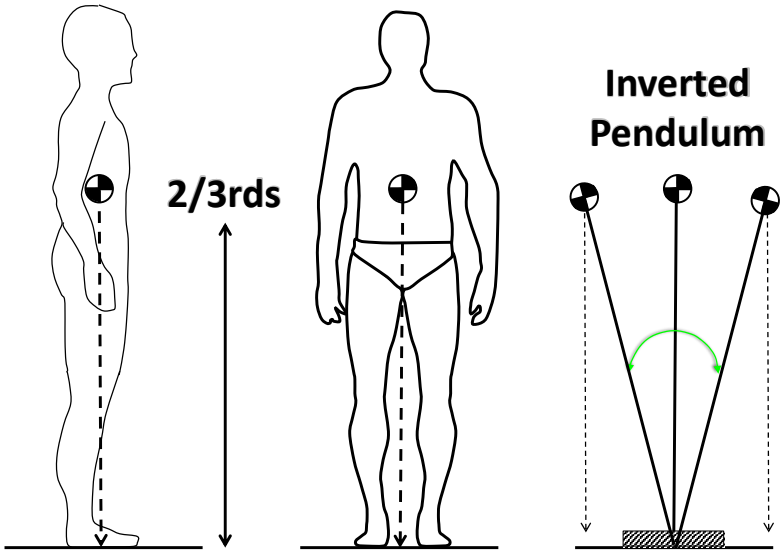
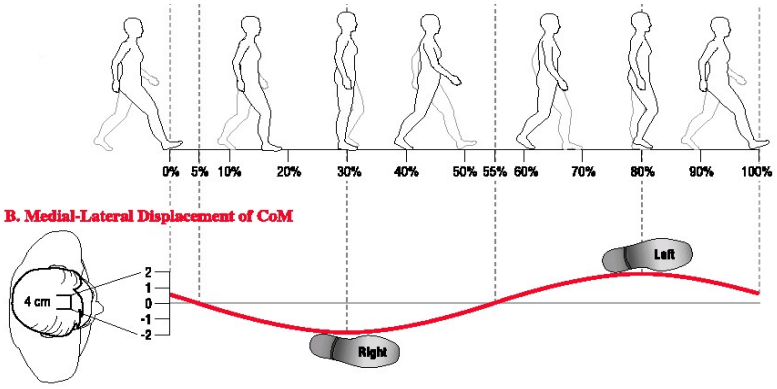
The 2/3rds-2/3rds Problem



87

Dynamic Equilibrium (Balance) during Walking

Path of the Center of Mass (CoM) when walking



Adapted from Neumann DA, Kinesiology of the Musculoskeletal System, 2nd Ed, 2010

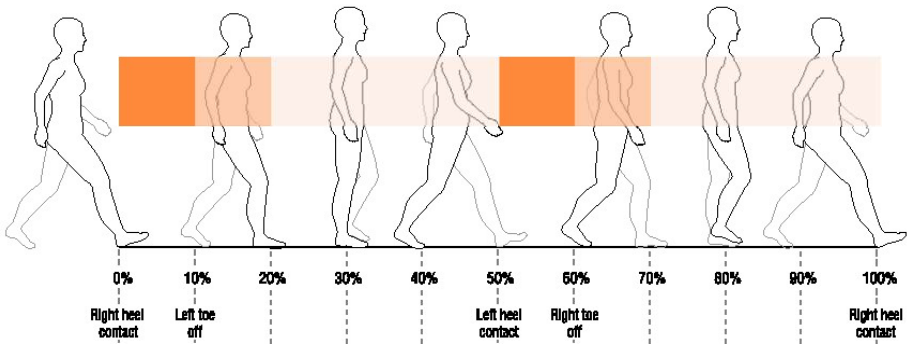
88

Dynamic Equilibrium (Balance) during Walking

Single support for up to 80% of the stride cycle

Double Support for 20% of the stride cycle

Increasing Double Support Time Increases Stability at the Cost of Velocity



Adapted from Neumann DA, Kinesiology of the Musculoskeletal System, 2nd Ed, 2010

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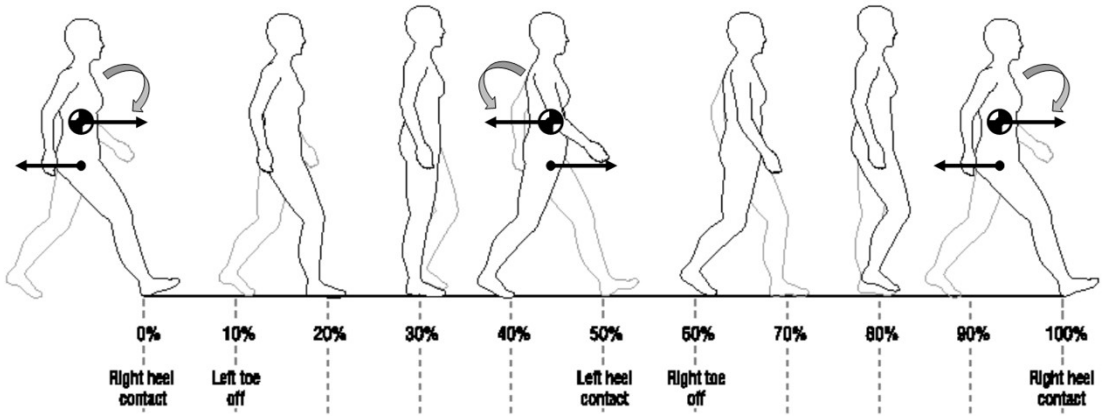
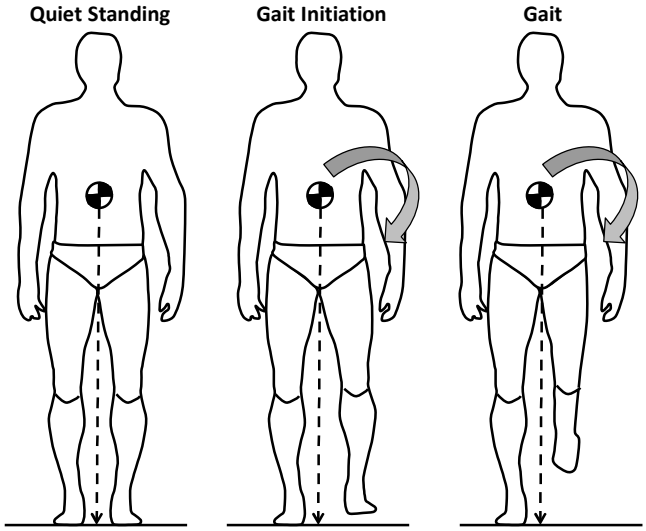
Controlling Forward and Backward Movement of the Trunk



Adapted from Neumann DA, Kinesiology of the Musculoskeletal System, 2nd Ed, 2010

90

Controlling Side-to-Side Movement of the Trunk



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Keys to Balance during Walking

- **Strength:**
  - Core (abdominals and back)
  - Hip **extensors** & flexors
  - Hip abductors and adductors
- **Foot placement**
  - Too narrow: increased likelihood of a fall
  - Too wide: leads to a shortened step length
- Practicing losing and regaining balance while taking steps
  - Forward, backward
  - Left, right, diagonal
- Continually adjusting to changing demands of environment

Hu & Woollacott, Journal of Gerontology 1 and II 1994
Hirsch et al. Arch Phys Med Rehabil 2003

92

Exercise Programs that Improve Balance

- **Elements of effective balance programs**
  - Can be performed in a safe environment (postural support as needed)
  - Movement puts the body in an extended position that challenges the postural control system (center of mass outside the base of support).
  - (Advanced): Challenging terrain; obstacles, uneven surfaces, uphill/downhill
- **Examples:**
  - Aqua Aerobics (water provides support & resistance)
  - Tai Chi (whole body, controlled, balance challenging)
  - Dance (e.g. tango) (social, balance challenging)
  - Rock Steady Boxing (balance challenging, vigor!)
  - Yoga (controlled, balance challenging)

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BARRIERS

- FORCE GENERATION
- MOVEMENT RATE
- RANGE OF MOTION
- SELF INITIATION
- BALANCE AND POSTURE

BRIDGES

- **Strength**
- **Range of motion**
- **Lower rate movements**
- **Balance**
- **Cueing**

- ***Exercise!**

94

Breaking the Cycle

Recipe for a Great Movement Hotdish

1. Strength
2. Range of motion
3. Balance
4. Adaptability
5. Endurance
6. Tater Tots

95

Exercise Prescription

1. Do what you enjoy or are willing to do to maintain activity level.
   - Quality of life improves.
2. Weight training twice per week.
   - Best evidence for symptom improvement.
3. Endurance training 2-3 times per week.
   - Best evidence for potential neuroprotection.
4. Balance training 1-2 twice per week – mind body development.
   - Best evidence for postural control.
5. No known detrimental side effects but do listen to your body.

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Thank You!

Movement Disorders Laboratory
Department of Neurology
University of Minnesota

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Udall Center of Excellence in Parkinson's Disease Research

Morris K. Udall Centers of Excellence for Parkinson's Disease Research
UAB NIH National Institute of Neurological Disorders and Stroke

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Questions?

Bridges and barriers to maintaining and improving posture, balance, and walking in people with PD

Colum D. MacKinnon, PhD
Department of Neurology
Institute for Translational Neuroscience
University of Minnesota

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Thank you for joining us online!
• Evaluation will pop up as your zoom closes
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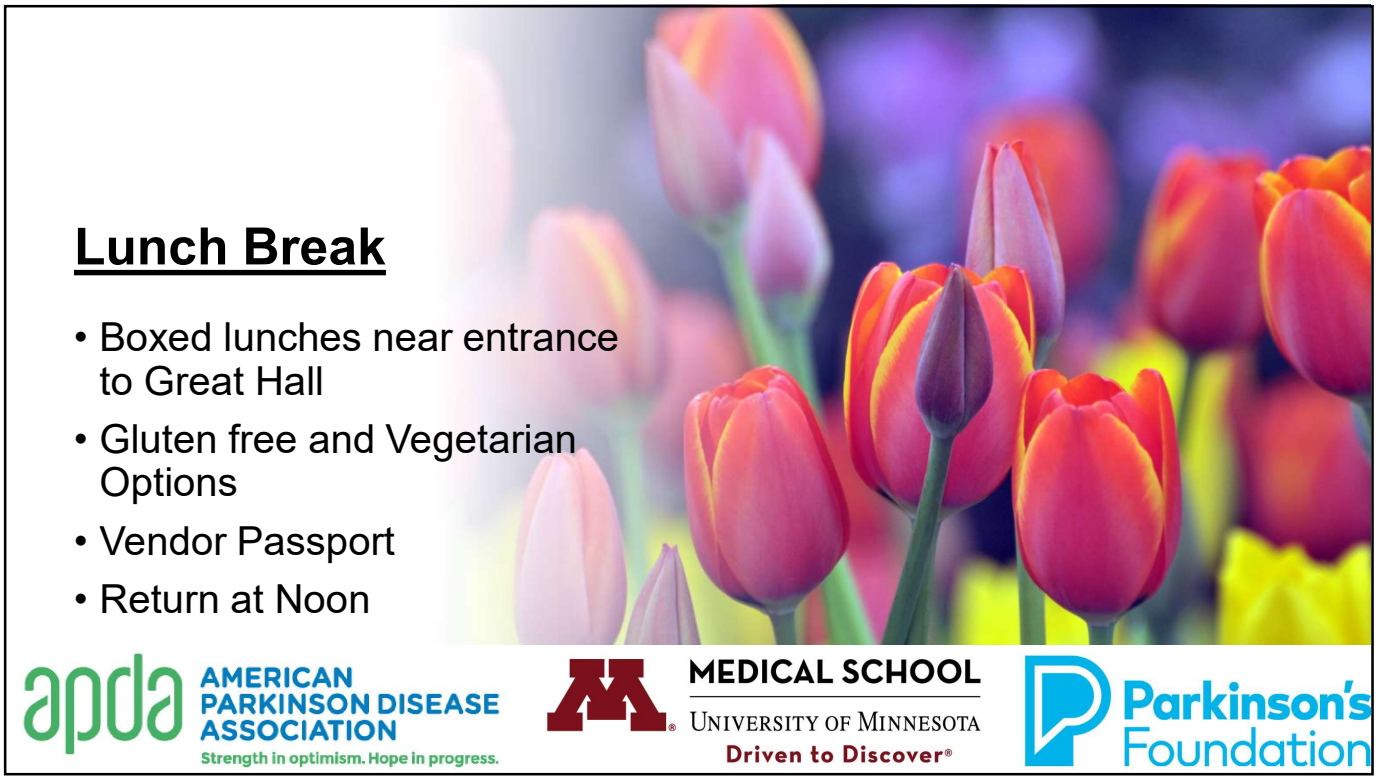
Lunch Break
• Boxed lunches near entrance to Great Hall
• Gluten free and Vegetarian Options
• Vendor Passport
• Return at Noon
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5 Minutes
Before we Start
• Finish up your Vendor Passport
• Will have time at 12:40 Break
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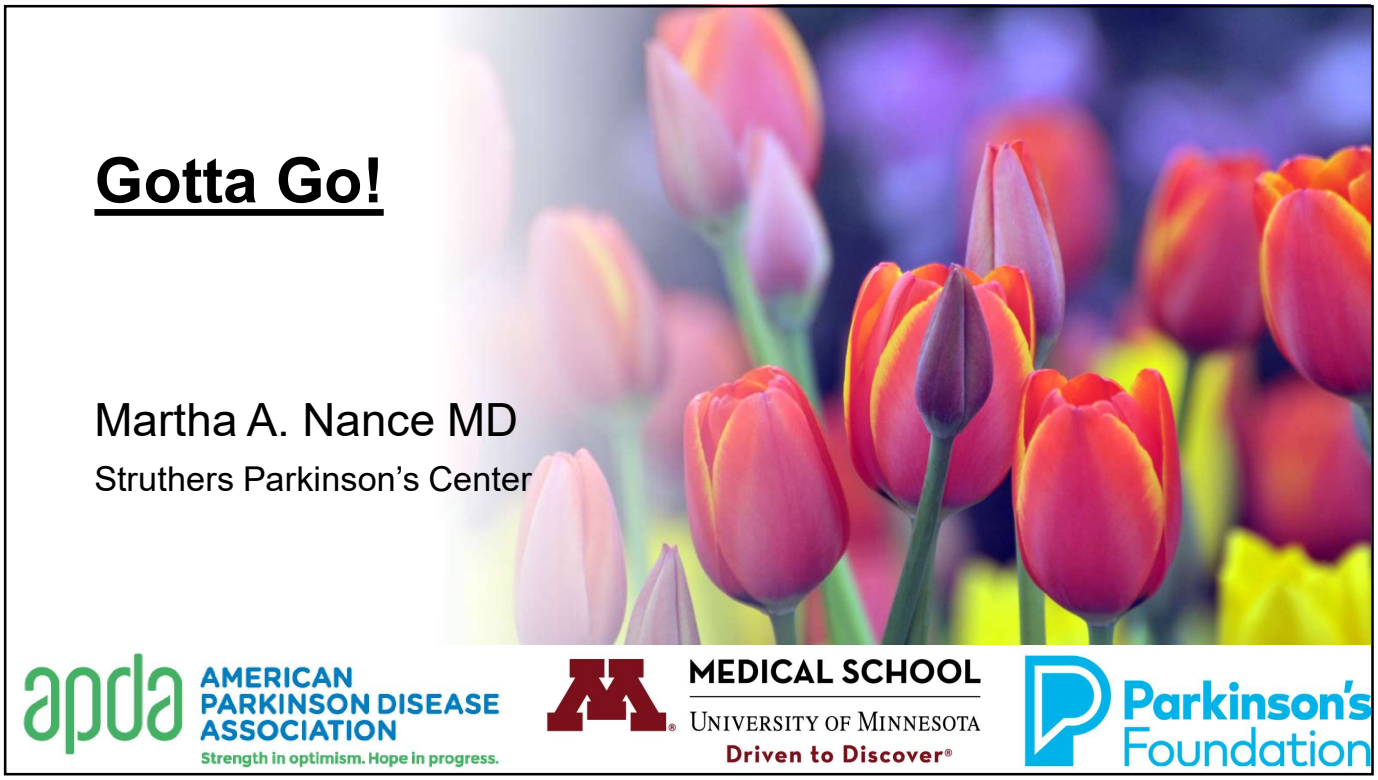
Gotta Go!
Martha A. Nance MD
Struthers Parkinson's Center
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Autonomic dysfunction in Parkinson's disease

- Digestion/intestinal motility (including bowel movements)
- Bladder control
- Sexual function (erection, orgasm, ejaculation)
- Blood pressure regulation
- Secretion of sweat, saliva, tears
- Other (pupil response to light, aspects of heart and breathing rate)

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HealthPartners

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Off to the bathroom…or not…

- Constipation is reported in up to 16% of people
- Up to 1/3 of people over age 60
- Up to 80% of people with PD

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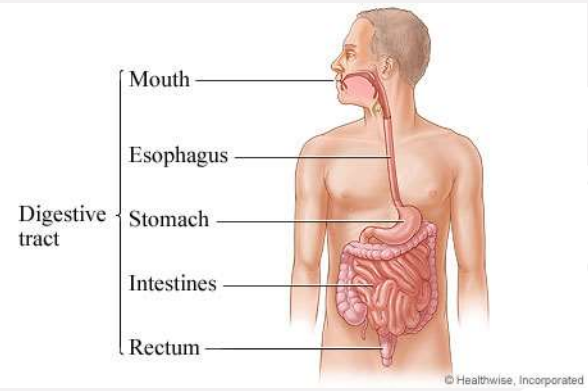

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GI tract

- Mouth--inserting food, chewing, swallowing
- Esophagus (throat)—food passes to stomach
- Stomach—digestion, absorption of nutrients
- Intestines—absorption of levodopa (small intestine), absorption of additional nutrients, consolidation of waste
- Rectum—waste materials retained until time for bowel movement

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What could go wrong?

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Oral (mouth) issues

- Problem
  - Poor dentition
  - Loss of interest in eating
  - Poor food selection
  - Reduced swallow frequency (48/hour vs 71/hr) causing excess saliva
  - Impaired coordination of breathing and swallowing
  - Delayed swallow reflex
- Management
  - Address dental issues
  - Food preferences
  - High fiber, increased fluids
  - Frequent small meals/snacks
  - Speech pathology evaluation and discussion (alter food texture, smaller bites, different utensils, possibly electrical stim)
  - Adjust PD meds if swallow issues seem dose-related

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Throat and stomach issues

- Problem
  - Delayed esophageal emptying
  - Delayed stomach emptying (70-100%)—can cause nausea, vomiting, early satiety, fullness
  - More levodopa could make gastric emptying even slower
- Management
  - Diagnostic evaluation through GI or ENT
  - Botox? Novel medications? DBS?
  - Consider emphasizing non-stomach route for PD meds (eg rotigotine patch, apomorphine injection or sublingual strip, continuous infusion levodopa)

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Intestine issues

- Problems
  - Slow slow slow
  - Levodopa has to get through the stomach and past the duodenum (part 1) to the jejunum (part 2) before it is absorbed
  - If nothing is moving, levodopa may not be absorbed
  - This can cause pain, reduce appetite, and lead to constipation
  - Secondary effects of constipation
- Management
  - Drink lots of fluids!
  - Eat foods high in fiber
  - Avoid constipating foods (rice, bananas,
  - Physical activity helps keep things moving
  - ?probiotics
    - Fermented foods like sauerkraut, kefir, kimchi
    - Probiotic supplements

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Over-the-counter constipation treatments

- Fiber supplements
  - Add bulk (most patients have plenty of bulk….)
- Stimulants
  - **Senna products (Senokot)**
- Stool softeners
  - **Docusate (Colace)**
- Osmotic agents
  - Magnesium citrate, milk of magnesia
  - **Polyethylene glycol (Miralax)**
- Suppositories
  - Glycerin, **dulcolax**
- Intestinal lubricants
  - Mineral oil
- Enemas
  - Tap water, mineral oil, other

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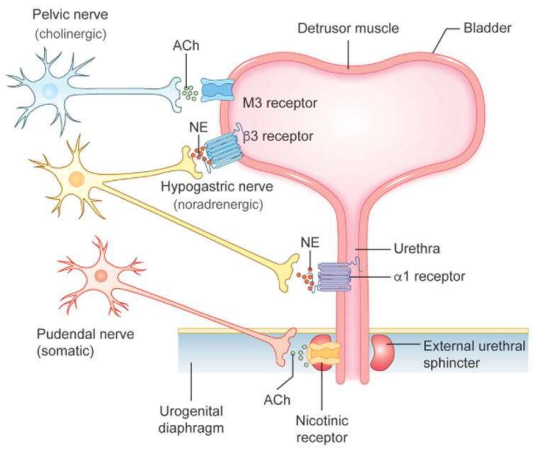
Prescription treatments for constipation

- Lactulose
  - Osmotic agent, similar effects to polyethylene glycol
- Linaclotide (Linzess)
  - Draws water into the bowels
- Lubiprostone (Amitiza)
  - Also draws water into the bowels
- Plecanatide (Trulance)
  - Helps the intestine make softer stools
- Prucalopride (Motegrity)
  - Stimulates colonic activity
- Other treatments
  - Biofeedback
  - ?sacral nerve stimulation
  - Surgery (eg to relieve blockage or repair a tear, bulge, or stricture in the colon)

111

Moving forward…bladder issues in PD

- Nocturia (80%)
- Frequency, urgency (both 70%)
- Urge incontinence (40%)
- Underactive bladder/hesitancy (40%)
- Bladder infections



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Urology evaluation

- Overactive and underactive bladder can have similar symptoms, but the treatments are opposites
- Many other things can affect bladder function
  - Prostate issues
  - Pelvic muscle weakness (stress incontinence)
  - Recurrent infections
  - Polyps, strictures, diverticuli, etc etc

- Look on the outside
- Look on the inside (ultrasound)
- Look on the inside (cystoscopy)
- Measure the pressure in the bladder
- Measure the post-void residual
- Look at the urine (blood, infections, stones, etc)

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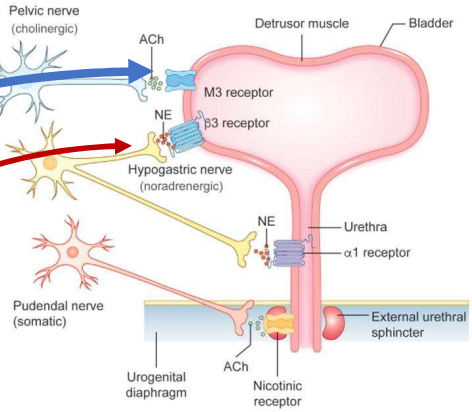
Treating overactive bladder

- Nonmedication strategies
  - Toilet schedule
  - Biofeedback
  - Kegel exercises
- Anticholinergic drugs
  - Oxybutinin, tolterodine, solfenacin, **trospium, darifenacin**
  - All can cause constipation, dry mouth dry eyes, low BP, mental fogginess
- Proadrenergic drugs
  - Mirabegron
- Condom catheter, botox, indwelling catheter



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Sexual dysfunction

- Includes erectile dysfunction, problems with orgasm and ejaculation; decreased libido, vaginal dryness
- Confounded by/caused by/contributed to by psychogenic issues, alcohol use, many medications (SSRIs, beta blockers), prostate and prostate cancer treatments
- Treatments for men include PDE-5 inhibitors (Cialis etc) (can lower the BP), injections, vacuum pump devices, urethral suppositories, and penile prostheses
- For women, vaginal lubricants, hormone therapy
- For both, counseling can be helpful

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In summary…

- Bowel, bladder, sexual issues are VERY COMMON in people with PD
- They affect quality of life…a lot!
- Don't be afraid or embarrassed to talk about it, because
- There are treatments for some of the symptoms!

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Questions?
Gotta Go!
Martha A. Nance MD
Struthers Parkinson's Center
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Break
• Final time for Vendor Passport
• Return at 1pm for Panel Discussion
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Patient Panel Discussion with Susan Vold

- Scott Balke
- Tom Renshaw
- Mary Daley
- Dave Egemo

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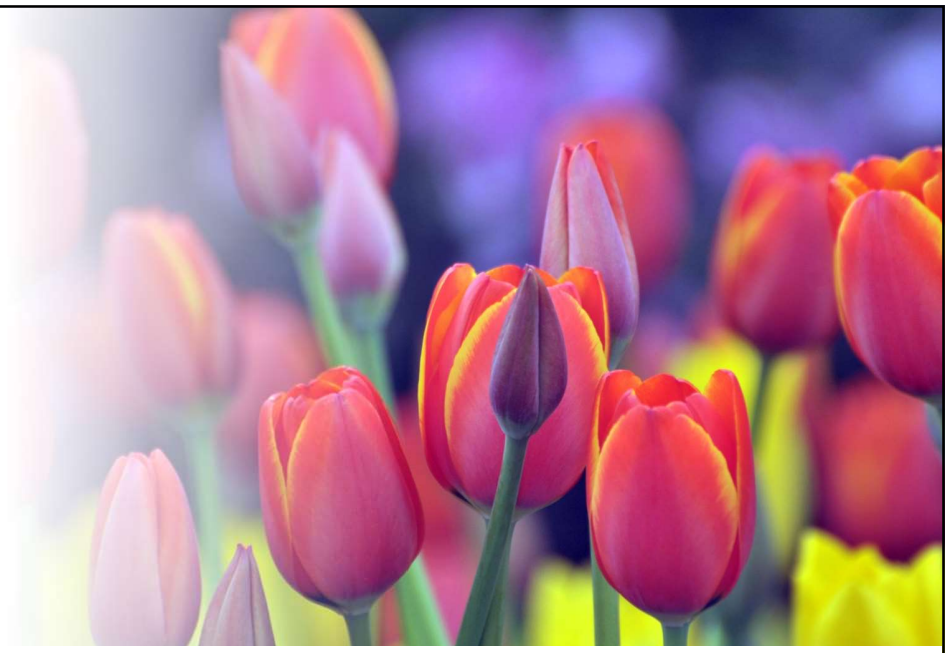
First Raffle



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University of Minnesota Udall Center
Get to know us

Morris K. Udall Centers of Excellence for Parkinson's Disease Research

National Institute of Neurological Disorders and Stroke

http://udall.umn.edu

@UMNUdall

Contact Kelly Brown
ksbrown@umn.edu

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Stay connected with APDA Minnesota:

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OPTIMISM WALK
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Join Us at Moving Day Twin Cities!

Parkinson's Foundation

Saturday, May 6th

10:00a.m. Walk

Hilde Performance Center, Plymouth, MN

Visit MovingDayTwinCities.org

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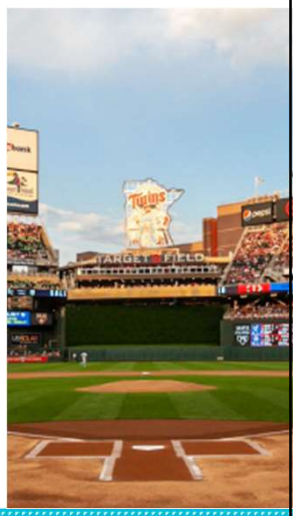
Parkinson's Awareness Day at Target Field

Thursday, June 22 12:10 PM Vs Boston Red Sox

Tickets available starting at $22.
$5 from each ticket purchased through this promotion benefits one of the following organizations

- Michael J Fox Foundation
- Parkinson's Foundation
- Struthers Parkinson's Center
- Veterans Affairs

Purchase tickets online at
https:fevo.me/parkinsons2023



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Join Us! Search 'Parkinson's' on Eventbrite

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Second Raffle

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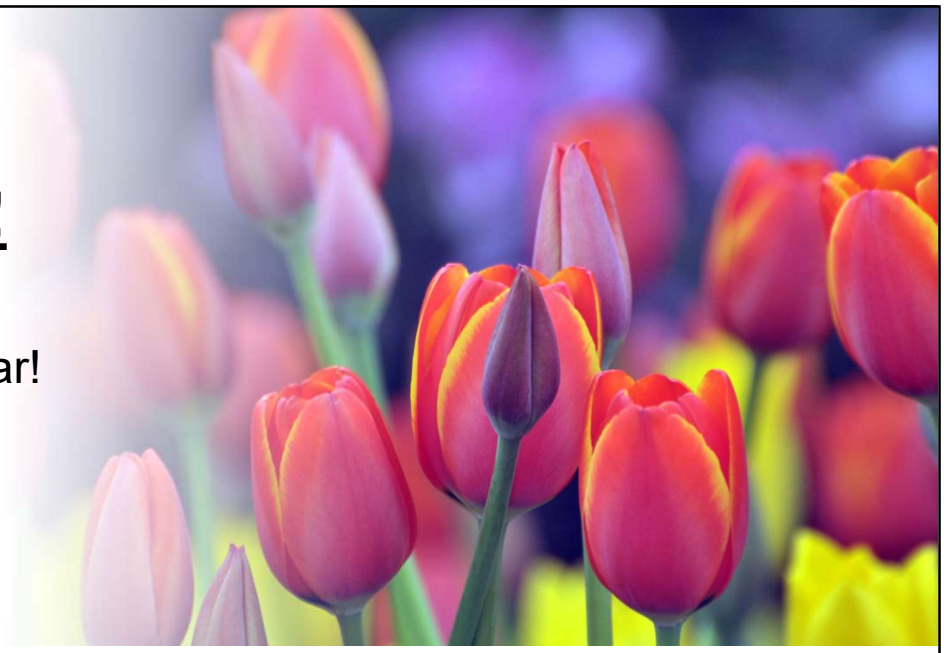
Thank you for coming!

See you next year!



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