

# Physiotherapy for Parkinson's



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- Research grants from Parkinson's UK and Health Foundation.
- Service development grants from Parkinson's UK and Parkinson's Foundation.
- Pharmaceutical sponsorship, honoraria and board membership: nil in last 3 years
- Pharmaceutical stock held: nil
- Professional memberships:
  - Royal College of Physicians
  - British Geriatrics Society
  - International Society of Parkinson's and Movement Disorders

1. Describe terms: physical activity, exercise and physiotherapy
2. Describe benefits of and barriers to exercise
3. Describe physiotherapy interventions in stages of Parkinson's
4. Describe challenges and opportunities of remote physiotherapy
5. Derby research project on remote physiotherapy in early Parkinson's [PEEP] (+/- CHIEF-PD)

Physical activity

Exercise

NEAT (non-exercise activity thermogenesis)

Physiotherapy

what a physiotherapist does

holistic and patient-centred

optimises movement, function, participation

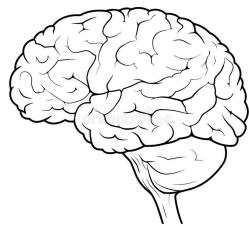
commonly includes an exercise prescription

# Benefits of Exercise

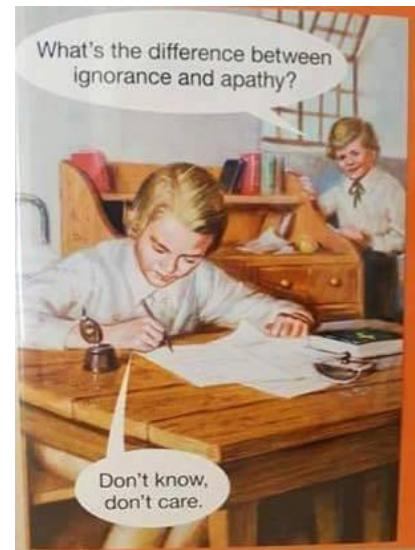
- Improved motor symptoms



- Improved non-motor symptoms

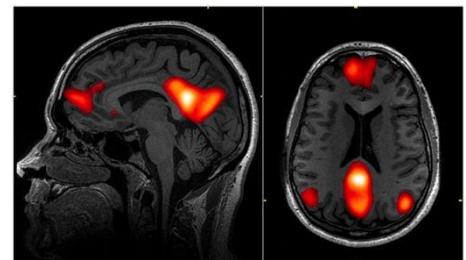


- Social inclusion



# Neuroprotection?

- More synapses
  - More BDNF (neurotrophic growth factors)
  - Improved dopamine neurone longevity
- 
- Greater grey matter volume [volumetric MRI]
  - Greater white matter integrity and connectivity [DW MRI, functional MRI]



- Low expectation of benefit
- Apathy, fatigue, depression and cognitive impairment
- Physical issues related to Parkinson's (stiffness, freezing) or to co-morbidities (e.g. COPD, arthritis)
- Fear of injury
- Perceived lack of time
- Lack of will power
- Lack of exercise partner
- Transport, weather, resources (equipment)
- COVID restriction - social distancing

45 trials, n=2608:

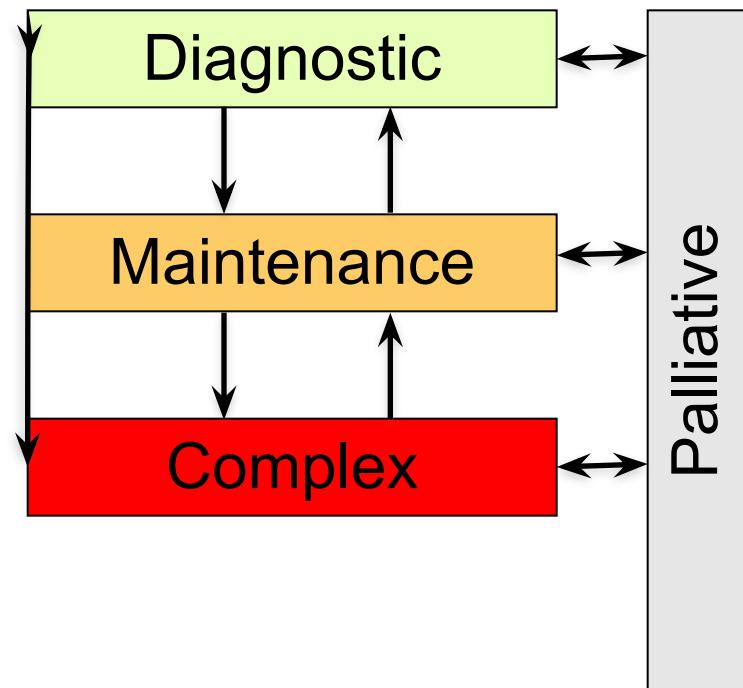
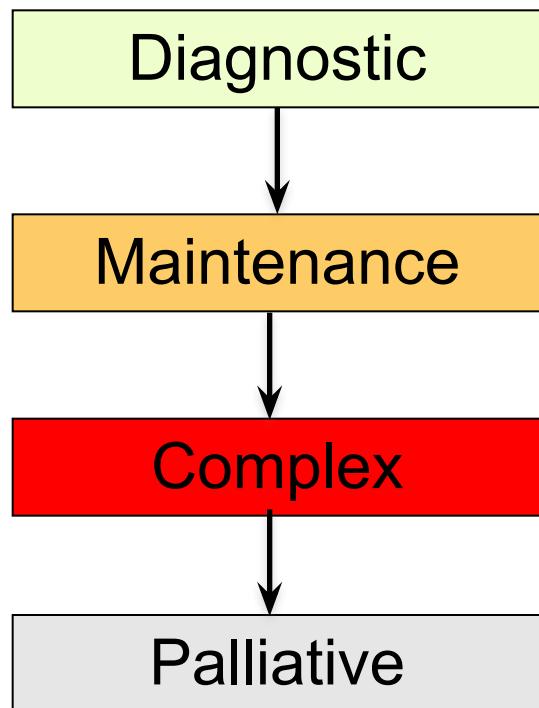
- Motor symptoms
- Gait
- Quality of life
- Fear of falling
- Freezing of gait
  
- Radder et al, 2020



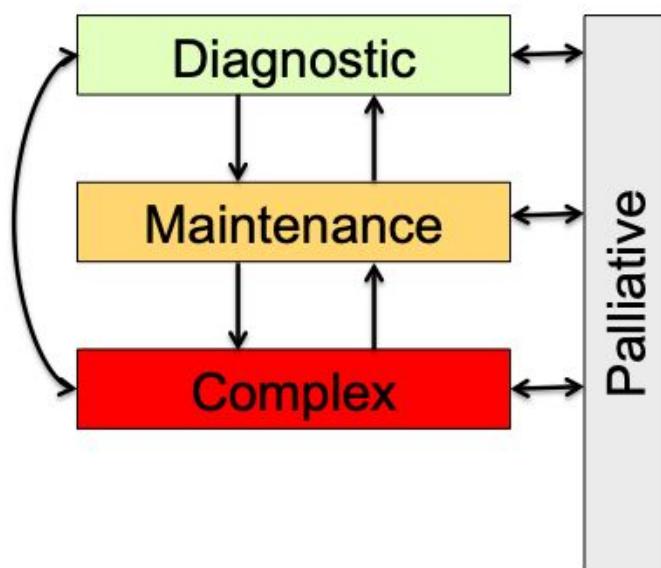
# Hoehn-Yahr staging

Stage	Description
Stage 1	Unilateral involvement only usually with minimal or no functional disability
Stage 2	Bilateral or midline involvement without impairment of balance
Stage 3	Bilateral disease: mild-to-moderate disability with impaired postural reflexes; physically independent
Stage 4	Severely disabling disease; still able to walk or stand unassisted
Stage 5	Confinement to bed or wheelchair unless aided

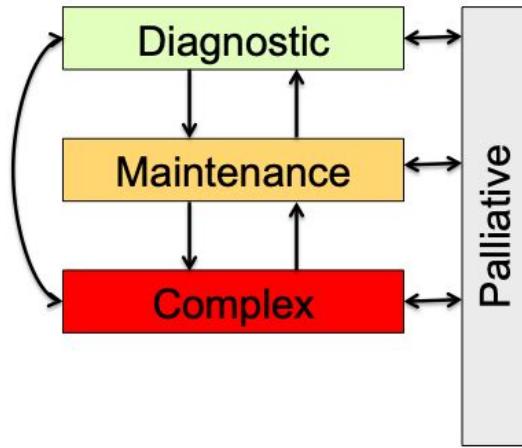
# Staging Parkinson's



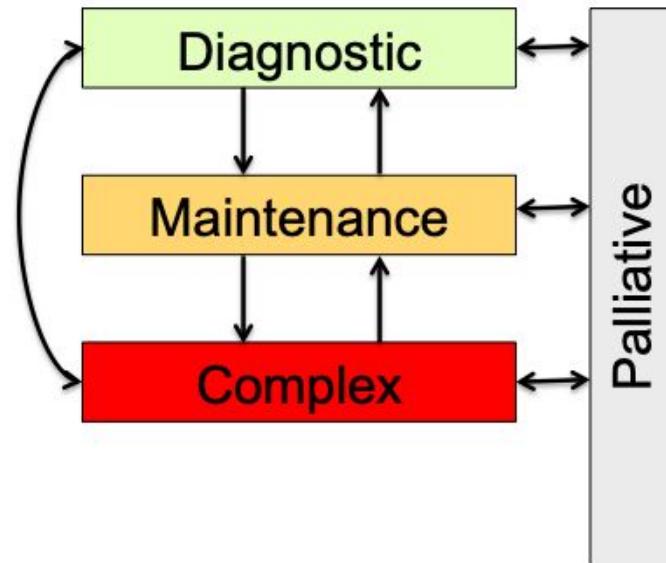
- Activity levels are low.
- 30-40% achieve recommended activity levels
- May be below activity levels in healthy controls
  
- Objectives in early Parkinson's:
  - - encourage physical activity
  - - assess posture
  - - assess gait



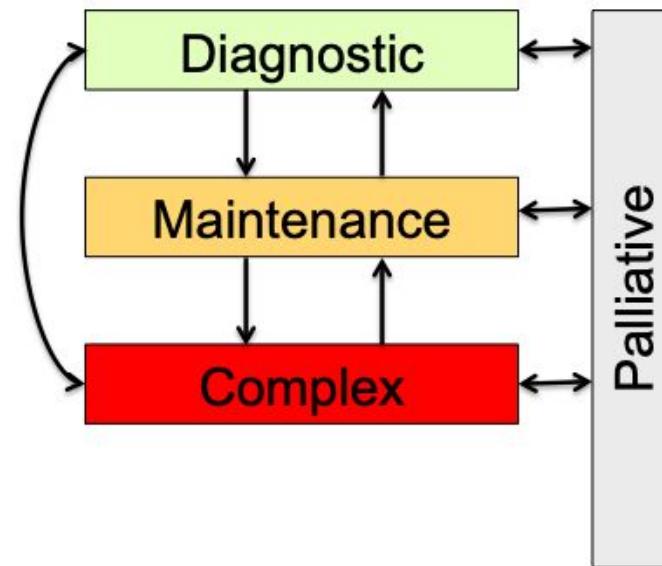
- Encourage physical activity
- Functional assessment: Transfers.
- Pain management
- Falls advice
- Gait assessment: cues and strategies for FOG
  - Auditory cues e.g. Music, metronome
  - Visual cues e.g. Laser cane, lines on floor
  - Avoidance of distraction
  - ? Action observation & mental rehearsal



- Freezing of gait
- Maintain and promote physical activity
- Falls
- Transfers
- Posture
- Apomorphine nodules



- As above
- Positioning
- Transfers



- Challenges
  - Availability (cost) of equipment
  - Connectivity (broadband connection) – inequitable access
  - Unfamiliarity (therapists and patients)
  - Lack of confidence with technology
  - Information governance issues
  - Not able to do full physical examination
  
- Advantages
  - Convenience
  - Accessible
  - Reduced risk of infection
  - Confidentiality
  - Comfort



# Rehabilitation Internet-of-Things



**Figure 1.** Components of a Rehabilitation-Internet-of-Things: wireless chargers for sensors (1), ankle accelerometers with gyroscopes (2) and Android phone (3) to monitor walking and cycling, and a force sensor (4) in line with a stretch band (5) to monitor resistance exercises.

Dobkin, B. H. (2017). A Rehabilitation-Internet-of-Things in the Home to Augment Motor Skills and Exercise Training. *Neurorehabilitation and Neural Repair* 31(3) 217-227.

# Is remote Physiotherapy Effective for Early Parkinson's (PEEP)

- 1. Online survey:
  - experience of physiotherapy for Parkinson's
  - opinions about physiotherapy and exercise
  - attitude to technology
  - use of technology including activity monitors
  - experience of remote consultations
  - open to people with Parkinson's within 4 years of diagnosis
- 2. Feasibility randomised controlled trial
- 3. Qualitative process evaluation

- Overview
  - Remote physiotherapy versus usual care
  - Remote outcome assessment
  - N=40
  - 2 centres
  - Outcomes assessed at 3 and 6 months
- Inclusion criteria
  - Parkinson's, within 4 years of diagnosis
  - Willing to engage in telerehabilitation
  - Stable medication
  - Able to walk and transfer independently
- Exclusion criteria
  - HY 4-5
  - Lacks capacity to consent
  - Prior physiotherapy for Parkinson's
  - Freezing of gait
  - Falls

# PEEP feasibility outcome measures

- Time from enrolment to start of study intervention
- Completeness of data collection
- Adherence of staff to study protocol
- Practicalities (time taken and ease) of collecting data from commercially available activity monitors
- Success of assessor blinding
  
- PDQ-39
- UPDRS
- Step count, sleep duration
- Activity diary
- Falls, single leg stance test, 5x sit-to-stand test



CHOLINESTERASE  
INHIBITORS TO  
PREVENT FALLS IN  
PARKINSON'S DISEASE

- Multicentre double blind RCT of rivastigmine patch to prevent falls in Parkinson's
- Background
  - Falls are common in Parkinson's (25% fall once/month)
  - To compensate for gait instability, need to pay attention to walking
  - Cognitive decline meets less attentional resource
  - Cholinesterase inhibitors improve cognition in Parkinson's dementia
  - Phase 2 study showed rivastigmine reduced stride length variability in Parkinson's (without dementia)





CHOLINESTERASE  
INHIBITORS TO  
PREVENT FALLS IN  
PARKINSON'S DISEASE

- Inclusion

- Parkinson's disease.
- Modified HY 1-4
- 1 or more falls in last year.
- Able to walk  $\geq 10\text{m}$
- 18 years of age or above.

- Exclusion

- ChEi use in last 12 months
- Hypersensitivity to rivastigmine
- Dementia
- Inability to attend or comply with treatment or follow-up
- Non-English-speaking patients
- Falling  $\geq 4\text{x}$  per day.
- Pregnancy and/or breastfeeding

# The Multidisciplinary Team

