Parkinson’s and Falls.
Tips & Resources.

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**Why do people with Parkinson’s fall?**

Falls in people with Parkinson’s are very common. 60% of people with PD have at least one fall per year, with 39% of patients who fall doing so recurrently. Fear of falling is disabling and also increases falls risk in and of itself. In addition, people with Parkinson’s have significantly increased risk of osteoporosis, resulting in people with Parkinson’s having triple the risk of hip fracture compared to controls. Falls risk changes during the course of PD, and often becomes a problem at the time when other complications such as cognitive impairment also start to become a problem.

As with most (older) people with falls, the causes are multi-factorial. Many contributing factors to falls are generic to all patient groups. However, people with PD have additional PD specific factors to address. Therefore, if these patients are seen within general falls services rather than PD specific falls services, there needs to be an understanding of where/when to seek help from the specialist teams. Successful falls prevention requires a multi-disciplinary and multi-faceted approach, with consideration given to all potentially modifiable risk factors. **Note that falls should not be prevented at all costs** – eg. a patient kept in bed in order to reduce falls risk whilst in hospital will rapidly de-condition and develop additional problems.

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**So what is different about PD patients?**

In addition to the many generic falls risks, people with PD also have:

- **Gait dysfunction**
  2. Episodic – freezing, festination. Freezing is a potent risk factor for falls

- **Balance dysfunction**
  - Abnormal posture, increased sway, inability to change sensory weighting, reduced limit of stability, postural strategies to perturbation altered, anticipatory adjustment abnormal.

**Potentially Modifiable Risk factors to Falls in PD**

<table>
<thead>
<tr>
<th>Generic</th>
<th>PD Specific</th>
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</thead>
<tbody>
<tr>
<td>Inappropriate polypharmacy &amp; sedative medication</td>
<td>Disease severity</td>
</tr>
<tr>
<td>Postural hypotension</td>
<td>PD medication (eg anticholinergics, high dose L-D)</td>
</tr>
<tr>
<td>Arrhythmia</td>
<td>Slow mobility</td>
</tr>
<tr>
<td>Arthrosis</td>
<td>Shuffling, small stepping gait</td>
</tr>
<tr>
<td>Improper use of walking aids</td>
<td>Freezing of gait &amp; festination</td>
</tr>
<tr>
<td>Anxiety/fear of falling</td>
<td>Posture</td>
</tr>
<tr>
<td>Weakness due to inactivity or malnutrition</td>
<td>Postural instability</td>
</tr>
<tr>
<td>Visual/oculomotor impairment</td>
<td>Difficulty with transfers</td>
</tr>
<tr>
<td>Daily alcohol</td>
<td>Cognitive impairment</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>Axial rigidity</td>
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<tr>
<td>Other co-morbidities (eg vertigo, neuropathy)</td>
<td>Dyskinesia</td>
</tr>
<tr>
<td>Depression (? medication related)</td>
<td>Dual tasking (PD pts have dysexecutive problems)</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Nocturia (associated with nocturnal falls)</td>
</tr>
<tr>
<td>Loss of arm swing</td>
<td></td>
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</tbody>
</table>

*Details regarding evidence base and suggested approach for each factor available in following paper: Van der Marck et al. Consensus-based clinical practice recommendations for the examination & management of falls in patients with Parkinson’s Disease.*
Flowchart for MDT Falls Assessment in PD

IDENTIFY patients at risk at each review.
ASK about falls, near misses & fear of falling.

History

- Frequency, circumstances, significant injuries, including fractures/long lie
- Anything to suggest syncope/seizure/arrhythmia (will need further medical assessment +/- further investigation if so)
- Patterns – e.g. time of day, place, activity, medication or motor state, association with freezing of gait
- Comprehensive medication history (including alcohol)

Examination & Assessment

- Cardiac & neurological examination, including ECG and lying/standing BP - record associated symptoms
- Gait, balance, muscle weakness – include TUG, Dual Tasking
- Cognition (use ACE or MoCA)
- Vision, feet & footwear, continence
- Functional Assessment - ADL’s, transfers etc

Interventions to consider

- Reduce inappropriate polypharmacy/sedating medication
- Postural hypotension – rationalise diuretics and antihypertensives, lifestyle advice including fluids/salt, consider fludrocortisone/midodrine
- Investigations if indicated by history and assessment (eg 24hr ECG, echo, EEG)
- Adjustment of PD meds if falls related to motor fluctuations
- Physiotherapy for strength, balance and cueing intervention
- OT assessment – ADL, home hazards, aids & equipment
- Consider onward referrals as appropriate – eg memory, continence, podiatry, ophthalmology etc.

“Damage Limitation” if falls occur

Bone Protection (see table on p3-4)

Proactive falls action plan & education:
- How will patient raise the alarm & get off the floor?
- Can a long lie be prevented?
- Consider pendant alarms and other assistive technologies
- Consider hip protectors (limited evidence but helpful in some settings – eg confidence in a well motivated patient)

If patient well & not falling (eg in early disease), still give targeted advice regarding maintaining posture/balance/activity. Ensure patients know how to seek help if problems occur.

Note: This algorithm is intended for use in the STABLE OUTPATIENT setting. PD patients presenting acutely with falls will need to have additional consideration of acute medical issues precipitating the fall (eg delirium, sepsis, cardiac event, haemodynamic compromise or electrolyte disturbance).
Algorithm for Bone Health in PD patients (1).

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Calcium &amp; Vitamin D</th>
<th>Check dietary calcium. If insufficient prescribe supplement. Measure baseline vit D level. Replace if deficient/insufficient. Start maintenance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Record</td>
<td>1. Falls (no. in past year) 2. Prior fragility fracture 3. Back pain (consider X ray)</td>
</tr>
<tr>
<td>Step 3</td>
<td>Q Fracture Score</td>
<td>10 year probability of major osteoporotic fracture (MOF) and Hip Fracture (#NOF)</td>
</tr>
<tr>
<td>Step 4</td>
<td>10-year probability</td>
<td>≥5% #NOF Or ≥ 20% MOF &lt;5% #NOF and &lt;20% MOF</td>
</tr>
<tr>
<td>Step 5</td>
<td>Age</td>
<td>Over 75 75 or younger Calculate FRAX* NOGG advice** Amber Green</td>
</tr>
<tr>
<td>Step 6</td>
<td>DXA/Treat</td>
<td>No DXA Baseline DXA Start treatment pending DXA Request DXA &amp; recalculate FRAX with BMD*** Red Green</td>
</tr>
</tbody>
</table>

**LIFESTYLE ADVICE:**
Smoking cessation, alcohol reduction, weight-bearing exercise, diet, calcium & vitamin D Falls prevention strategies; consider hip protectors.

**TREATMENT (see notes):**
First line: oral bisphosphonate (weekly or monthly) Second line: consider iv zolendronic acid/ subcut denosumab

Review fracture risk annually; or after 5y if on treatment. Assess compliance at each appointment. Review sooner in the case of a new fracture, or deterioration towards a more palliative disease phase.

**Resources:**
www.shef.ac.uk/FRAX  www.qfracture.org  www.nos.org.uk


Algorithm for Bone Health in PD patients (2)

NOTES:

Step 1: NOS ‘Healthy Bones – facts about food’ leaflet guides dietary requirements

**Vitamin D replacement**: Cholecalciferol 40,000iu once weekly for 7 weeks if deficiency (<30nmol/l)
Cholecalciferol 20,000iu once weekly for 7 wks if insufficiency (<50nmol/l)

**Vitamin D maintenance**: Ca/Vit D preparation (eg Calceo T bd)
Or if high calcium diet Fultium T od

Step 2: Acute back pain should trigger X-ray investigation for vertebral fracture
If falls, consider contributing causes.  
*Move on to step 3 even if no falls/fractures.*

Step 3:  
[www.qfracture.org](http://www.qfracture.org)
Q fracture calculates fracture risk for any period from one to ten years.

Step 5: Consider ‘physiological’ age when using the 75yrs treatment threshold.

*FRAX*  
[www.shef.ac.uk/FRAX](http://www.shef.ac.uk/FRAX)

**NOGG** connect to NOGG advice direct from FRAX website
If falls reported in the last year, inflate the FRAX calculated MOF risk by 30% per fall

Step 6:  
***BMD*** If Q fracture score above threshold in under 75yrs, treat pending DXA result.
If BMD is known, calculate FRAX by including hip BMD value
If falls in the last year, inflate FRAX calculated MOF risk by 30% per fall (maximum 150%)

Treatment options. Calcium and vitamin D supplements should be co-prescribed with all anti-resorptives

**First line oral treatment**
- Alendronate 70mg weekly  
  *if no GI symptoms and eGFR >30ml/min*
- Risedronate 35mg weekly  
  *if mild, non-specific GI Sx and eGFR is >30ml/min*

**Second line oral treatment**
- Ibandronate 150mg monthly  
  *if once monthly dosing more practical*
  *Licensed in postmenopausal women with vertebral fractures only*

**Second line parenteral treatment options (referral to rheumatology services)**
- Annual iv zolendronic acid (for 3 years) *if first line agents contra-indicated/not tolerated and GFR>35ml/min*
  *Not endorsed by NICE as a primary prevention agent; but may be particularly appropriate in PD*
- 6-monthly sc Denosumab (5+ years) *if first line agents contra-indicated/not tolerated and eGFR>15ml/min*
  *Can be used for primary prevention if T-score ≤3.5 with independent clinical risk factors*
- Daily sc Teriparatide (2 years) named patient basis only  
  *Not endorsed by NICE as a primary preventative agent*

**Cautions**
- Oral bisphosphonates contraindicated if eGFR<30; IV bisphosphonates if GFR<35
- Denosumab can be given if eGFR>15, but once eGFR<30 increased risk of hypocalcaemia (monitor levels)
- Strontium ranelate is no longer recommended for treatment of osteoporosis

**Review of treatment**
- Royal National Hospital for Rheumatic Diseases length of treatment recommendations  
  [www.rnhrd.nhs.uk/page/99](http://www.rnhrd.nhs.uk/page/99)

**Age Ageing. 2015; 44(1):34-41.** Dr Veronica Lyell.  
*Updated February 2016.*
## Links to useful resources and guidelines

### Resources and Guidelines for Falls in Parkinson’s

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<thead>
<tr>
<th>Useful Papers</th>
<th>Links</th>
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<tr>
<th>NICE Guidelines</th>
<th>Links</th>
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<tr>
<td>Falls in older people: assessing risk and prevention (CG161)</td>
<td><a href="https://www.nice.org.uk/guidance/cg161">www.nice.org.uk/guidance/cg161</a></td>
</tr>
<tr>
<td>Parkinson’s Disease (CG35)</td>
<td><a href="https://www.nice.org.uk/guidance/cg35">www.nice.org.uk/guidance/cg35</a> NB Currently being updated.</td>
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<tr>
<th>Physiotherapy</th>
<th>Links</th>
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<tr>
<td>Register (free) to receive European PT guidelines</td>
<td><a href="https://www.parkinsonnet.info/euguideline">www.parkinsonnet.info/euguideline</a></td>
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<th>Patient Information</th>
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<th>Pharmacy / Medicines &amp; Falls</th>
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<tr>
<td>Guidance regarding medicines &amp; falls</td>
<td><a href="https://www.rcplondon.ac.uk/guidelines-policy/fallsafe-resources">https://www.rcplondon.ac.uk/guidelines-policy/fallsafe-resources</a> then choose Guidance sheet medicines and falls in hospital</td>
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References

In addition to the resources cited and links provided within body of document:


Acknowledgements

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