BONE-PARK—Algorithm for Fracture Risk Assessment & Bone Health Management in Parkinson's Disease

This algorithm is designed for use in all outpatients (in primary and secondary care) with a diagnosis of Parkinson's Disease or a related movement disorder. Fracture risk and adherence to previous management decisions should be reviewed annually. This guidance is not applicable in end-stage disease when a patient is unable to mobilise from bed or is in the last year of life.

STEP 1 Optimise **VITAMIN D** and **CALCIUM** intake
Address **LIFESTYLE** factors: **alcohol, smoking and physical activity**

STEP 2 Assess **FALLS**, previous **FRACTURES** and **BACK PAIN**
Include spine imaging if occult vertebral fracture suspected

STEP 3 Using **FRAX**, calculate the risk of MOF and hip fracture
Include PD as a secondary cause of secondary osteoporosis
For comorbid or life-limited patients, consider using Qfracture†

STEP 4 Use the **NOGG** treatment algorithm (as weblink)

LIFESTYLE

MEASURE BMD

Is DXA appropriate / feasible?

YES

Recalculate FRAX incorporating BMD values; apply NOGG

NO

TREAT if:
a) in **MEN**, probability of hip fracture is ≥5%
b) in **WOMEN**, probability of hip fracture is ≥5%
and MOF ≥20%.

Otherwise, lifestyle advice

TREAT

† Qfracture can be used to estimate hip fracture risk:
a) in patients with multiple comorbidities that are not captured by FRAX **b)** over shorter time periods (< 10 years)
Consider treatment when hip fracture risk ≥5%. Qfracture cannot include DXA measured BMD in fracture risk calculations.

TREAT

- Generic **alendronic acid** is first line treatment in the majority of cases (if eGFR ≥35ml/min)
- **Risedronate** is an alternative for patients with low eGFR (down to 30ml/min)
- If intolerance or contraindications to oral bisphosphonates, consider **iv zoledronic acid** or **sc denosumab**
- If <75 years and/or expected treatment duration >5 years, start treatment AND measure baseline BMD
- After 5 years (oral) or 3 years (parenteral) therapy, treatment should be reviewed
- Continuation of bisphosphonate treatment beyond 3-5 years can generally be recommended in those over 75 years, those with a history of hip or vertebral fracture, those who sustain a fracture while on treatment, and those taking oral glucocorticoids. No evidence is able to guide treatment beyond 10 years. Cessation of denosumab needs careful planning given rebound increases in bone turnover

MEASURE BMD

- A DXA is usually considered in those ≤75 years and/or when a baseline DXA will be required for comparison after 3-5 years of treatment; this is a clinical decision encompassing local availability and patient fitness **DXA requires patients to get onto a firm couch and lie flat for approximately 10 minutes**

LIFESTYLE

- Advise/manage as per Step 1
- If close to 'Measure BMD' threshold AND ≥2 falls in previous year: measure BMD, or even TREAT if DXA not appropriate (especially if hip probability ≥5%)
- 10yr hip fracture probability may be inflated by factor of 30% per fall (for up to 5 falls maximum in last year)

MOF: Major osteoporotic fracture risk; PD: Parkinson's disease; DXA: Dual-energy X-ray absorptiometry;
NOF: Neck of femur fracture risk; NOGG: National Osteoporosis Guideline Group; BMD: Bone Mineral Density
FRAX: www.sheffield.ac.uk/frax

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