# 567FM.1 FRACTURE PREVENTION FOR ADULTS >50 YEARS OLD



## 1. Introduction

Osteoporosis is a disease characterised by low bone mass and structural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture. Osteoporotic fragility fractures can cause substantial pain and severe disability, often leading to a reduced quality of life, and hip and vertebral fractures are associated with decreased life expectancy.

**Fragility fracture** is defined as a fracture which results from low level trauma i.e. fall from standing height or less. Fragility fractures most commonly affect the spine, wrist, hip, humerus, pelvis, ribs and ankles.

The operational definition of osteoporosis is based on the T-score for bone mineral density (BMD) assessed by DXA (dual energy X-ray absorptiometry), at the femoral neck or spine and is defined as a value for BMD 2.5 SD or more below the young female adult mean.

| WHO criteria for diagnosis of osteoporosis are based on a T-score | |
|---|---|
| T-score ≥-1.0 | Normal |
| T-score between -1.0 to -2.49 | Osteopenia |
| T-score ≤-2.5 | Osteoporosis |

## 2. Who should be assessed for fragility fracture risk?

Several **major risk factors** contribute significantly to fracture risk over and above that provided by BMD measurements. NICE CG 146 recommends that patients with the major risk factors (see Table 1a) have a fracture risk assessment.

**Table 1a: Major risk factors for fragility fracture**

1. All women aged 65 years and over and all men aged 75 years and over.
2. Women aged under 65 years and men aged under 75 years in the presence of risk factors, for example:
   - previous fragility fracture (the highest risk of re-fracture is in the 2 years following the incident fracture. **Assessment and treatment initiation is urgent and should not be delayed.**
   - current use or frequent, recent use of oral or systemic glucocorticoids (prednisolone >7.5 mg daily or more, or the equivalent dose of another steroid for >3 months)
   - history of falls (in particular, those who have had ≥1 fall in the last 12 months)
   - family history of hip fracture
   - other causes of secondary osteoporosis (table 1b)
   - low body mass index (BMI) (less than 18.5 kg/m$^2$)
   - smoking
   - alcohol intake of more than 14 units per week for women and more than 21 units per week for men.
3. People with height loss >4 cm and thoracic kyphosis should have thoracolumbar X-ray to look for vertebral fractures and further risk assessment if vertebral fractures are found.

**Table 1b: Secondary causes of osteoporosis**

| | |
|---|---|
| **Endocrine**<br>• Hypogonadism including untreated premature menopause and treatment with aromatase inhibitors or androgen deprivation therapy<br>• Hyperthyroidism<br>• Hyperparathyroidism<br>• Hyperprolactinaemia<br>• Cushing's disease<br>• Diabetes type I and type II | **Gastrointestinal (GI)**<br>• Coeliac disease<br>• Inflammatory bowel disease<br>• Chronic liver disease<br>• Chronic pancreatitis<br>• Other causes of malabsorption |
| **Haematological**<br>• Multiple myeloma<br>• Haemoglobinopathies<br>• Systemic mastocytosis | **Respiratory**<br>• Cystic fibrosis<br>• Chronic obstructive pulmonary disease |
| **Rheumatological**<br>• Rheumatoid arthritis<br>• Other inflammatory arthropathies | **Other:**<br>• Anorexia nervosa<br>• Chronic kidney disease (CKD)<br>• Immobility (spinal cord injury, stroke, Parkinson's disease)<br>• HIV infection/antiretrovirals |

### 3. Who should NOT be routinely assessed for fragility fracture risk?

People below 50 years of age with minor risk factors (see examples in Table 2) should not be routinely assessed for fragility fracture risk unless they also have major risk factors (Tables 1a and 1b).

Dose optimisation or use of alternative treatments may be considered for patients already at high fracture risk.

**Table 2: Minor risk factors for fragility fracture**: Medications with potential for increased fracture risk.

| |
|---|
| • Selective serotonin reuptake inhibitors (SSRIs).<br>• Anti-epileptic medication — particularly enzyme-inducing drugs, such as carbamazepine.<br>• Proton pump inhibitors (PPIs).<br>• Thiazolidinediones, such as pioglitazone. |

## 4. Fracture risk assessment tools

Use either FRAX (without a BMD value if a DXA scan has not previously been undertaken) or QFracture, within their allowed age ranges, to estimate 10-year predicted absolute fracture risk when assessing risk of fracture. Above the upper age limits defined by the tools, consider people to be at high risk.

**FRAX** https://www.sheffield.ac.uk/FRAX/ can be used for people aged between 40 and 90 years, either with or without BMD values, as specified. The FRAX algorithms give the 10 year probability of hip fracture and the 10 year probability of a major osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture). The link to National Osteoporosis Guideline Group (NOGG) guidelines provides treatment thresholds for individual patients.

| Clinical information required to calculate fracture risk using FRAX | |
|---|---|
| • Age<br>• Gender<br>• Weight (kg)<br>• Height (cm)<br>• Previous fragility fracture<br>• Parental history of hip fracture | • Current smoking<br>• Current use of glucocorticosteroids<br>• Rheumatoid arthritis<br>• Secondary osteoporosis<br>• Alcohol intake |

Limitations of FRAX

- Does not account for dose response for multiple fractures, smoking and alcohol intake
- Provides some adjustment for lower doses of glucocorticoid exposure (prednisolone <2.5 mg/day, 2.5 to 7.5 mg /day and >7.5 mg/day) but does NOT adjust for doses above 7.5 mg daily
- Does not incorporate falls risk
- Does not incorporate type II diabetes mellitus
- May underestimate risk in people with lower spinal compared to hip BMD
- Does not take into account previous treatments

Discordance between lumbar spine (LS) and femoral neck (FN) T-scores is common and may lead to underestimation of fracture risk in some patients. The studies showed approximately 10% change in FRAX calculated fracture risk for each unit of T-score discordance. The following formula helps to adjust this.

Increase/decrease FRAX estimate for a major fracture by one tenth for each rounded T-score difference between LS and FN.

| Example | |
|---|---|
| LS T-score | -3.5 |
| FN T-score | -1.7 |
| Discordance (LS T-score minus FN T-score) | (-3.5) – (-1.7) = (-1.8) (rounded to 2) |
| 10- year risk of major fracture | 17% (moderate risk) |
| Risk correction (+10% per one T-score discordance) | 17% + 3.4% = 20.4 % (high risk) |

Adjustment for trabecular bone score (TBS) is available on the calculation tool.

**QFracture** https://qfracture.org can be used for people aged between 30 and 84 years. QFracture risk assessment tool takes into account the clinical risk factors only (without BMD) and produces a cumulative incidence of hip or major osteoporotic fracture. It is therefore not interchangeable with FRAX.

Consider recalculating fracture risk in the future:

- if the original calculated risk was in the region of the intervention threshold for a proposed treatment and only after a minimum of 2 years, **or**
- when there has been a change in the person's risk factors.

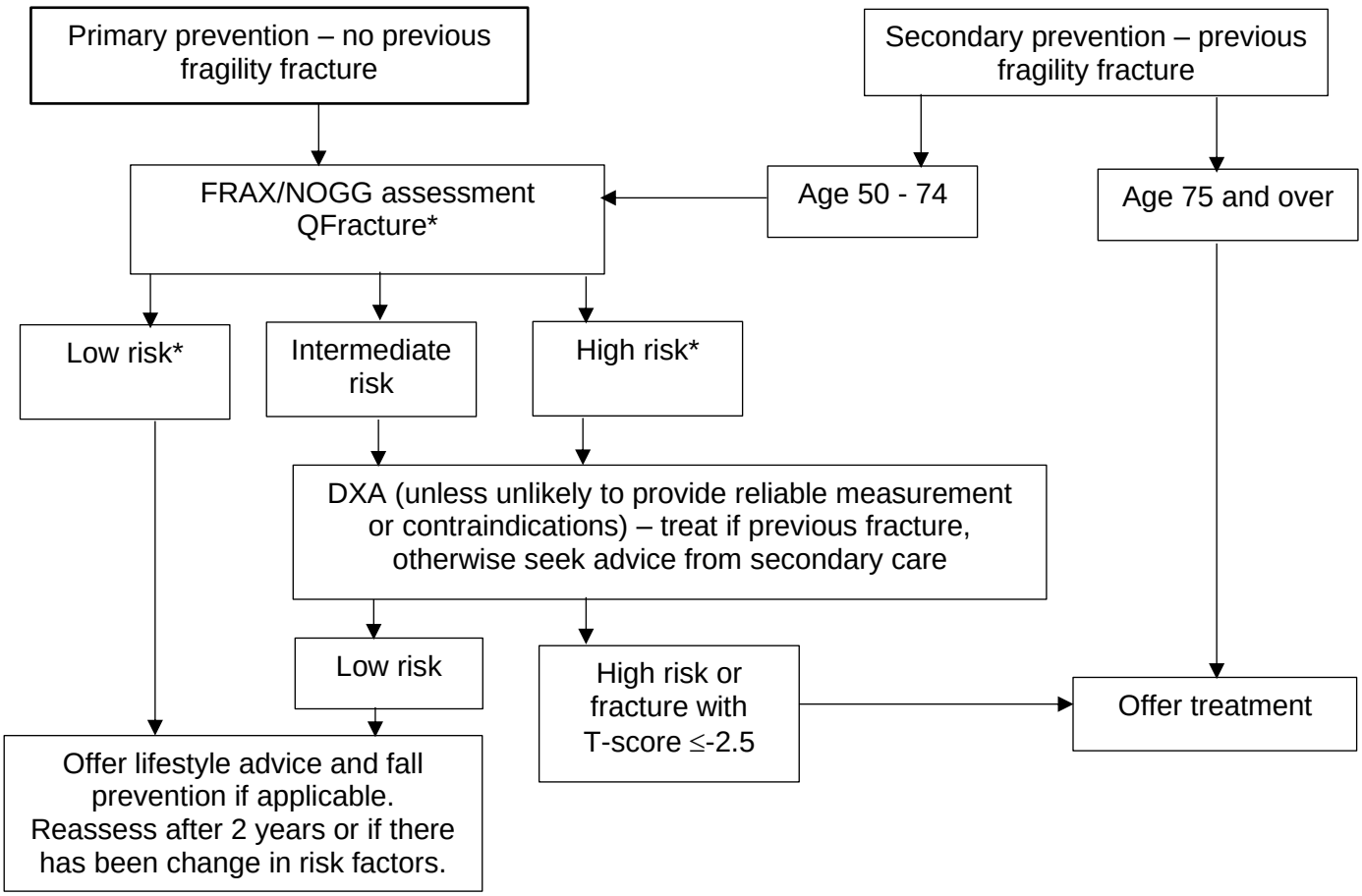
Patients at very high fracture risk.

**The risk of a subsequent fragility fracture is highest in the 2 years after the incidence fracture. It is therefore very important that fracture preventive treatment is started with no delay.**

### 5. Measuring bone mineral density (BMD) with DXA

The objectives of BMD assessment are to provide a diagnosis of osteoporosis, help to estimate future risk of fractures and provide a baseline to monitor treated and untreated patients. BMD is calculated as the amount of bone mass per unit of area (g/cm$^2$). In the report BMD is described as **T-score**, units of SDs by which the BMD of the individual differs from the one in a healthy young adult, and **Z-score**, units of SDs by which the BMD of the individual differs from the mean expected in their age and sex group. Z-score is mostly used in children and adolescents.

DXA scanning is rarely necessary in patients >75 years who have sustained a fragility fracture (secondary prevention). The value of T-score <-2.5 as a predictor of fracture risk diminished in older people whilst prior fragility fracture remains a significant risk factor throughout. Moreover, lumbar spondylosis, aortic calcification and previous lumbar vertebral fractures can lead to falsely high T-scores and make the BMD measurement difficult to interpret. Patients >75 years old who had a fragility fracture should be treated without the need for DXA unless there are specific reasons i.e. funding for teriparatide.



**Please do not request DXA in the following patient groups:**

- Patients who have had bilateral hip replacement with severe lumbar spondylosis or post lumbar fixation
- Patients who require a hoist to transfer
- Weight >350 lbs/25 stones (158 kg)
- Please consider carefully referring patients with **spinal cord injuries** taking into account their mobility and presence of heterotopic calcifications

Please see Appendix 1 for indication for DXA.

## 6. Recommended investigations

**Routine**

- Full blood count (FBC), erythrocyte sedimentation rate (ESR), liver function tests (LFTs), urea and electrolytes (U&Es), bone profile, vitamin D, thyroid stimulating hormone (TSH)
- Male patients: serum testosterone, sex hormone binding globulin

**Other, if indicated**

- Lateral X-ray of thoracic and lumbar spine if height loss >4 cm (2 inches) or kyphosis
- Myeloma screen
- Parathyroid hormone (PTH) if hypercalcaemia
- Follicle stimulating hormone (FSH), luteinising hormone (LH), prolactin (PRL)
- 24 hour urinary free cortisol
- Dexamethasone (DXT) overnight suppression test
- Tissue tranglutaminase (TTG)
- Procollagen type 1 N-terminal-propeptide (P1NP)
- Urinary calcium or phosphate
- Bone biopsy

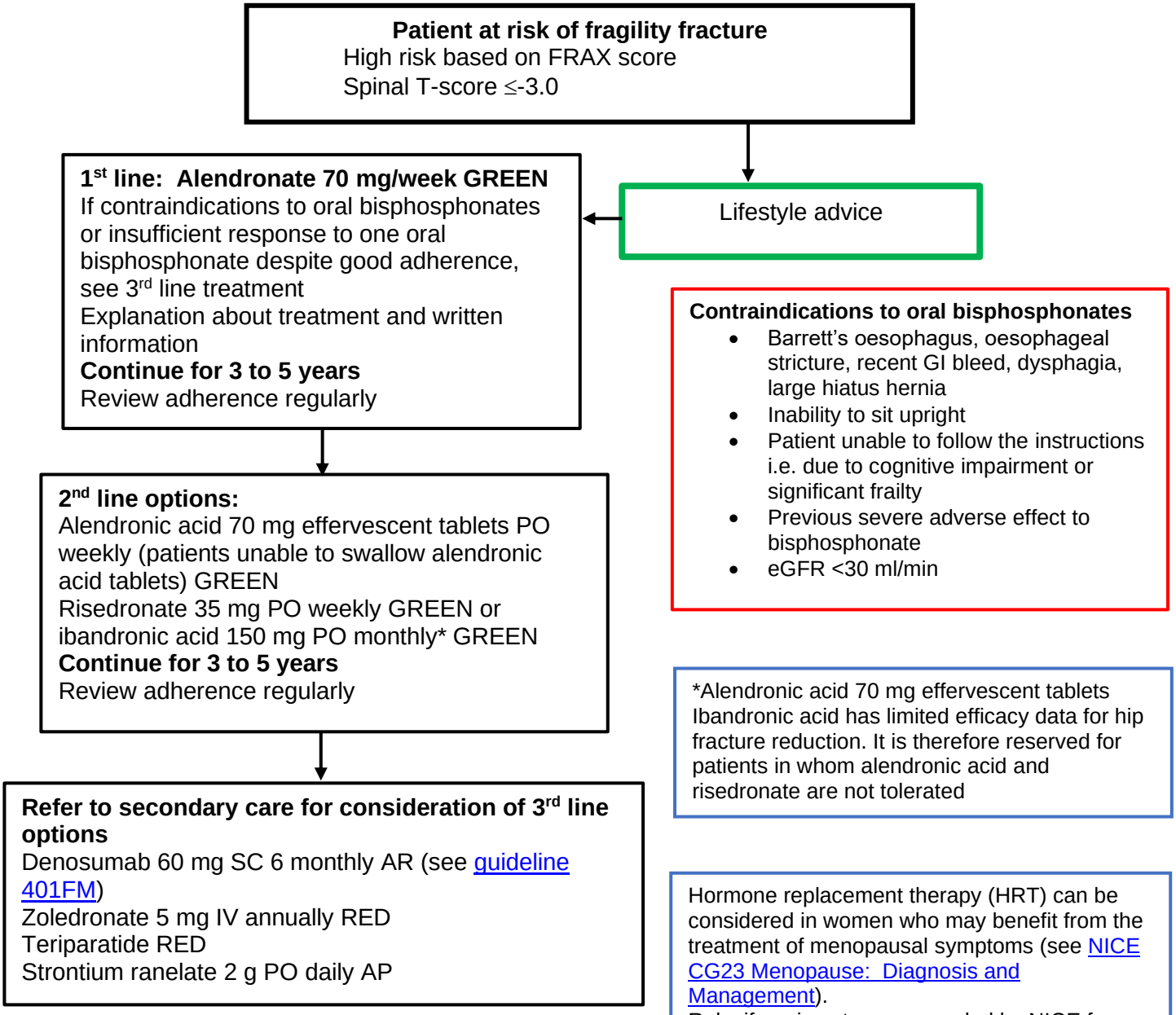
## 7. Lifestyle advice

Recommend Royal Society of Osteoporosis website at https://theros.org.uk

- Dietary calcium intake: 800 to 1200 mg daily (see Appendix 2). If insufficient intake, add supplemental calcium so that the intake is 800 to 1200 mg daily.
- Sufficient dietary protein intake ideally from dairy products
- Vitamin D: 800 Units PO daily
- Advise on alcohol intake, smoking, weight bearing exercise
- If history of falls in the last 12 months refer to Falls services

See Appendix 2 for calcium assessment intake tool.

## 8. Treatment pathway for primary fracture prevention




NICE TA464 guidance recommends oral bisphosphonates as an option for treating osteoporosis in adults who are eligible for risk assessment (as per NICE Guidance 146) and who have a 10-year probability of fragility fracture over 1%. This threshold is based on the cost effectiveness of bisphosphonates and should not be used as intervention threshold. The intervention threshold should be based on NOGG recommendations using FRAX.

## 9. Treatment pathway for secondary fracture prevention

**Patient with history of fragility fracture**

Age >75 (without the need for DXA)
Age 50 - 75 and T-score of ≤-2.5 or fracture risk using FRAX/NOGG above treatment threshold

Lifestyle advice

**1st line: Alendronic Acid 70 mg/week GREEN**
If contraindications to oral bisphosphonates see 3rd line treatment
Explanation about treatment and written information
**Continue for 5 years**
Review adherence regularly

**Contraindications to oral bisphosphonates**

- Barrett's oesophagus, oesophageal stricture, recent GI bleed, dysphagia, large hiatus hernia
- Inability to sit upright
- Patient unable to follow the instructions i.e. due to cognitive impairment or significant frailty
- Previous severe adverse effect to bisphosphonate
- eGFR <30 ml/min

**2nd line options:**
**Alendronic acid** effervescent tablets **70 mg PO weekly GREEN**
**Risedronate 35 mg weekly GREEN or** ibandronic acid **150 mg monthly* GREEN**
**Continue for 5 years**
Review adherence regularly

HRT can be considered in women who may benefit from the treatment of menopausal symptoms (see NICE CG23 Menopause: Diagnosis and Management)

**Refer to secondary care for consideration of 3rd line options**
Denosumab 60 mg** SC 6 monthly AR (see guideline 401FM)
Zoledronate 5 mg IV annually RED
Teriparatide (NICE TA 161) RED
Raloxifene* (NICE TA 161) AR
(Raloxifene has no data on hip fracture reduction)
Strontium ranelate 2 g PO daily AP

**** Do NOT stop or delay denosumab treatment without specialist advice. Use Advice and Guidance via ERS.**

Patients taking oral bisphosphonates should be asked about GI symptoms and checked if they are taking the medicine correctly. Patients should be advised to have regular dental checks. Patients on long term antiresorptive treatment (>5 years) should be asked about symptoms of atypical fracture (new pain in the thigh, groin or hip).
Patient with GI side effects should be offered alternative and not prescribed PPI.

*Note that Ibandronic acid has limited efficacy data for hip fracture reduction

AR = Amber Recommendation
AP = Amber Protocol

NICE TA464 guidance recommends oral bisphosphonates as an option for treating osteoporosis in adults who are eligible for risk assessment (as per NICE Guidance 146) and who have a 10-year probability of fragility fracture over 1%. This threshold is based on the cost effectiveness of bisphosphonates and should not be used as intervention threshold. The intervention threshold should be based on NOGG recommendations using FRAX.

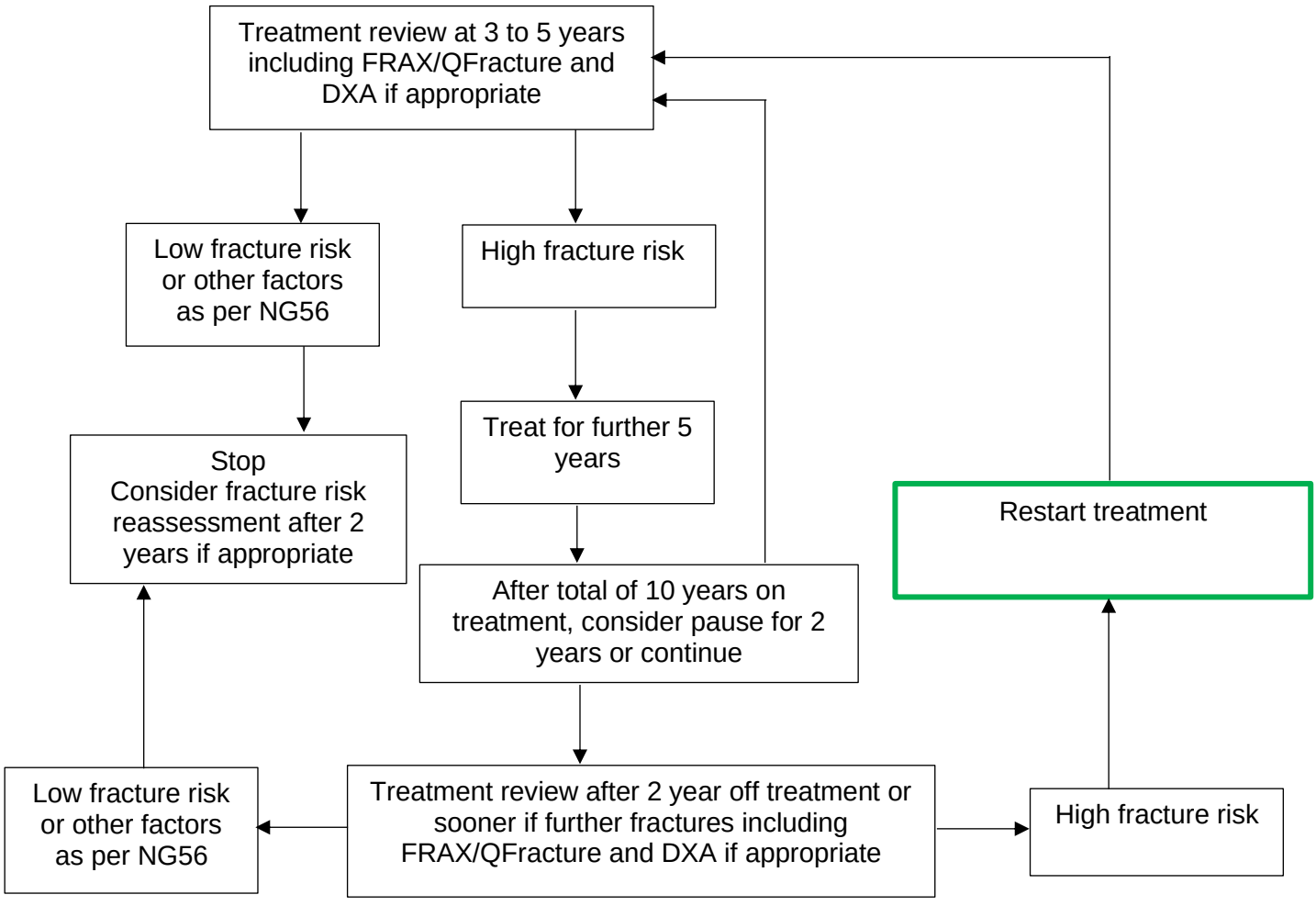
## 10. Duration of treatment

Treatment duration is determined by the choice of medication, patient's fracture risk, presence of comorbidities and treatment response. NICE multimorbidity guidance (NG56) recommends treatment review at 3 years in frail patients in the community (for example, people in nursing homes, people who are housebound, people with well-defined frailty, people with high levels of multimorbidity or polypharmacy, people with limited life expectancy). The potential side effects of the treatment and treatment interactions need to be carefully balanced against the risk of fracture.

**High risk patients:**

- Patients >75 years old
- Previous hip or vertebral fracture
- Multiple fractures
- Further fractures on treatment
- Patients on long term steroids (prednisolone >7.5 mg daily or equivalent)
- Patients with T-score below <-2.5 after a course of treatment

**Oral bisphosphonates**




Fracture on treatment requires adherence review and blood tests. Do not stop current treatment unless patient sustains atypical femoral fracture (AFF). If patient was taking the treatment correctly for >12 months – seek secondary care advice.

| Drug | Action | Duration of treatment cycle | Duration of drug holidays if appropriate | Treatment duration in RCTs |
|---|---|---|---|---|
| Zoledronate 5 mg IV annually | Antiresorptive | 3 years | 2 - 3 years | 6 years |
| Denosumab 60 mg SC every 6 months | Antiresorptive | Initially at least 5 years | Not appropriate for drug holidays as rapid loss of BMD after stopping treatment. **Do not stop or delay denosumab without prior specialist advice. Use Advice and Guidance via ERS.** | 10 years |
| Raloxifene | SERM - antiresorptive | 4 - 5 years | Not appropriate for drug holidays | 5 years |
| Hormone replacement therapy (HRT) | Antiresorptive | Up to 5 years | Not appropriate for drug holidays | 5 - 7 years |
| Teriparatide | Anabolic | 24 months | Not appropriate for drug holidays | **Up to 2 years** |
| Strontium ranelate | | 3 to 5 years | | |

## 11. Pharmacological interventions

It is important that patients receive adequate calcium and vitamin D supplementation with bone specific therapy. This is particularly important in the elderly and those with low calcium dietary intake and limited sun exposure. Use Appendix 2 calcium intake assessment tool to assess dietary calcium intake.

If calcium intake is insufficient, it is recommended that calcium 1200 to 1800 mg PO daily and colecalciferol 800 Units daily are prescribed as supplements e.g. calcium carbonate 1.5g/ colecalciferol 400 Unit tablets one tablet PO twice daily. See Bucks formulary for preparations.

IF dietary calcium intake is sufficient but there is limited sun exposure, colecalciferol 800 units PO daily may be purchased OTC or prescribed if OTC purchase is not possible.

See also guideline 785FM Vitamin D Testing and Treatment in Adults.

### Bone specific therapy

### Bisphosphonates

**Bisphosphonates** are stable analogues of pyrophosphate with strong affinity to the bone and potent antiresorptive effect. Oral bioavailability of bisphosphonates is around 1% of the ingested dose it is therefore crucial that they are taken with water only and 30 - 45 minutes before breakfast. They are contraindicated in patients with eGFR <30 ml/min. They should not be prescribed in patients who have difficulties swallowing, severe GORD, Barrett's oesophagus, oesophageal stricture or erosions and recent upper GI bleeding. Explanation of how to take the treatment is essential and links to PILs from Royal Osteoporosis Society are included in this section.

**Alendronic acid 70 mg weekly PO** (Green) is the most cost effective of the bisphosphonates at current prices. Alendronic acid 70 mg effervescent tablets may be preferable in patients who have difficulties taking tablets.

https://theros.org.uk/media/lcwnpxth/ros-alendronic-acid-and-osteoporosis-fact-sheet-august-2017.pdf

Alternatives: **Risedronate 35 mg weekly PO** (Green) preferable if patient is prone to upper GI side effects or **ibandronic acid 150 mg monthly PO** (Green). The effect of ibandronic acid on non-vertebral fractures was demonstrated only in post hoc analysis.

https://theros.org.uk/media/txupx3ve/ros-risedronate-fact-sheet-january-2016.pdf

https://strwebstgmedia.blob.core.windows.net/media/3n3ni0w0/ibandronate-bonviva-fact-sheet-january-2016.pdf

**Zoledronate 5 mg IV annually (Red)** – a potent antiresorptive agent with additional effect on reduction in mortality rates in people with hip fractures. Zoledronate has a prolonged antiresorptive effect on the bone lasting 2 - 3 years after treatment cessation. Patients have to be vitamin D replete (25OH Vit D level >50 nmol/l) before treatment.

https://theros.org.uk/media/2cmhexi4/ros-zoledronic-acid-fact-sheet-january-2016.pdf

**Adverse effects of bisphosphonates**

**Common**

- GI disturbance, rarely oesophagitis with oral bisphosphonates
- Infusion reactions with flu-like symptoms can occur after the first dose of zoledronate or ibandronic acid IV
- Joint and muscle pains
- Alopecia
- Scleritis
- Atrial fibrillation (AF) reported more commonly in patients receiving IV zoledronate

**Rare (seen also with denosumab)**

- Jaw osteonecrosis is very rare (1/100,000 patient years). Patients should be advised to maintain good oral hygiene with regular dental checks. There is no benefit in stopping oral bisphosphonate prior to dental procedure.
- Atypical subtrochanteric fractures (<1/100,000 patient years). Patients should be advised to report new or unusual pain in the groin or thigh. X-ray of the femur is indicated.
- Osteonecrosis to the external auditory canal. Suspect in patients with ear symptoms including chronic infections or suspected cholesteatoma.

**Denosumab 60 mg s/c injection Prolia® every 6 months**. When used for fracture prevention in patients >50 years at high risk of fracture:

- with estimated glomerular filtration rate (eGFR) >30 mL/min or not on dialysis, patients are discharged by the specialist **(amber recommendation)**
- with eGFR <30 mL/min or on dialysis, patients are not discharged and are followed up by the specialist. Prescribing, monitoring and administration takes place in primary care (**amber recommendation**)

The course of treatment is initially for at least 5 years (depending upon the risk of fracture), followed by reassessment (see the Denosumab guideline). Due to an increased risk of fracture, **denosumab treatment should not be stopped or delayed without prior specialist advice.** See 401FM Denosumab for Primary and Secondary Fracture Prevention in Women and Men over the Age of 50 - Amber recommendation guideline and patient information leaflet Denosumab (Prolia®) for Treatment of Osteoporosis available on the Trust website.

https://strwebstgmedia.blob.core.windows.net/media/sxif4dxc/denosumab-prolia-fact-sheet-octobe-2017.pdf

**HRT** may have a short/medium term secondary role in the management of postmenopausal osteoporosis where oestrogen deficiency symptoms are prominent. HRT should not be considered first line therapy for long term prevention of postmenopausal osteoporosis in women over 50 years. Bone loss resumes (possibly at an accelerated rate) on stopping HRT. Treatment should continue for 5 years followed by reassessment.

https://theros.org.uk/information-and-support/osteoporosis/treatment/hormone-replacement-therapy/

**Teriparatide 20 micrograms subcutaneously daily (Red)** has a place in the secondary prevention of osteoporotic fragility fractures in postmenopausal women who have had an unsatisfactory response to, or intolerance of, bisphosphonates. The Movymia® brand of teriparatide s/c injection is a biosimilar and is the first choice teriparatide brand for new patients. The Forsteo® brand of teriparatide s/c injection is reserved for existing patients.

Teriparatide is limited to a single course of treatment over 24 months. Important contraindications include Paget's disease of bone, abnormal calcium homeostasis and previous therapeutic X-ray exposure of the skeleton (e.g. radiotherapy for breast cancer). Calcium levels should be monitored during treatment. A NICE/high cost drugs form should be completed and prior approval granted before commencement of teriparatide.

https://theros.org.uk/media/yt1loo5s/ros-parathyroid-hormone-treatment-fact-sheet-december-2019.pdf

**Raloxifene 60 mg daily (Amber Recommendation)**
Raloxifene is a selective oestrogen receptor modulator (SERM). NICE Guidance TA 161 recommends raloxifene as an alternative treatment option for the secondary prevention of osteoporotic fragility fractures in postmenopausal women who are unable to comply with the special instructions for the administration of alendronate and risedronate, or have a contraindication to or are intolerant of alendronate and risedronate and have a combination of very low T-score, age and number of independent clinical risk factors for fractures. Raloxifene has been shown to reduce the risk of vertebral fractures by 30 - 50% in postmenopausal women with low BMD. It is associated with increased risk of DVT, hot flushes and leg cramps. There is additional benefit of breast cancer risk reduction.

https://strwebstgmedia.blob.core.windows.net/media/xmfjjuek/raloxifene-evista-fact-sheet-june-2017.pdf

**Strontium ranelate (Aristo) 2 g daily orally (Amber Protocol)** has a dual mechanism of action combining an antiresorptive and anabolic effect. Strontium is effective in reducing vertebral fractures (and to a lesser extent non-vertebral fractures) in postmenopausal osteoporotic women.

It is contraindicated in patients with cerebrovascular disease, current or previous venous thromboembolisms (VTEs), ischaemic heart disease; peripheral arterial disease; temporary or permanent immobilisation and uncontrolled hypertension. Risk factors for cardiovascular disease need to be assessed before and every 6 - 12 months during treatment. Side effects include diarrhoea, gastrointestinal discomfort, VTEs and myocardial infarctions and rarely severe skin reactions such as DRESS.

https://strwebstgmedia.blob.core.windows.net/media/ivocdnd4/strontium-ranelate-aristo-fact-sheet-january-2019.pdf

### 12. Treatment monitoring

The success of treatment is determined by reduction in fracture rate. Fracture despite treatment for >1 year necessitates reassessment including (see Appendix 3):

- Adherence to treatment
- Calcium and vitamin D intake
- Comorbidities
- Concomitant medications
- Falls risk
- Repeated blood tests as per clinical assessment
- Consider change of treatment if adverse effects - may need a specialist advise

Treatment for osteoporosis requires fracture risk assessment at the end of the treatment cycle, usually every 3 - 5 years. This may include repeated DXA (see Appendix 1).

## 13. Indications for referral to Osteoporosis clinic

- Secondary osteoporosis
- Suspected metabolic bone disease i.e. osteogenesis imperfecta
- Patients who require parenteral treatment
- Osteoporosis due to complex medical diseases, including cancer therapies and CKD

## 14. Advice on treatment duration via ERS

The specialist can provide electronic advice via Advice and Guidance on ERS regarding treatment duration in patients who have completed treatment. The information below should be included in the request for advice:

- Fragility fractures after the age of 50 – sites and year
- Fractures on treatment in the last treatment cycle -site and year
- Adherence to treatment Y/N
- Current FRAX score for major osteoporotic fracture and hip fracture (with or without BMD) with NOGG recommendation regarding the treatment threshold. If no FRAX can be provided the clinical information needed to calculate the FRAX will be needed (see table in Section 4 Fracture Assessment Tools).
- Indicate if DXA was done and include current and past reports if done outside the Trust
- Comorbidities
- Current medications including current and past treatments for osteoporosis (unless patient seen in the department in the last 5 years)

## 15. Back-up support and advice

| Contact Details | Wycombe and Amersham | Stoke Mandeville |
|---|---|---|
| **Rheumatology** | 01494 734119 (specialist nurse helpline)<br>Consultant secretary:<br>Dr R Stevens: 01494 734079 or via switchboard<br><br>Email: bht.rheumatology@nhs.net | 01296 315960 (specialist nurse helpline)<br>Consultant secretary:<br>Dr M Magliano: 01296 316664 or via switchboard<br><br>In an emergency contact Rheumatologist of the week (ROW) on 01296316664<br><br>Email: bht.rheumatology@nhs.net |
| **Endocrinology** | Medical Day Unit (MuDAS)<br>Suzanne Busby 01494 426318<br>Dr Henrietta Brain 01494 425349 (sec)<br>or via switchboard | |
| **Fracture liaison Service** | Dr Ana Phelps<br>Jane Sutherington | |
| **Medicines Resource Centre** | 01494 425355<br>Email: bucks.medicinesresourcecentre@nhs.net | |
| **Switchboard** | Amersham 01494 434411<br>Wycombe 01494 526161 | 01296 315000 |

## 16. References:


1. Osteoporosis NICE Quality Standard 149.
2. Bisphosphonates for treatment of osteoporosis NICE TA 464 https://www.nice.org.uk/guidance/ta464/chapter/1-Recommendations
3. Osteoporosis: assessing the risk of fragility fracture NICE 146

4. Raloxifene for the primary prevention of osteoporotic fragility fractures in postmenopausal women NICE TA 160
5. Raloxifene and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women NICE TA 161 updated 7th Feb 2018
6. NOGG 2017: https://www.sheffield.ac.uk/NOGG/NOGG%20Guideline%202017%20July%202019%20Final%20Update%20290719.pdf
7. https://www.nice.org.uk/guidance/ng56/resources/multimorbidity-clinical-assessment-and-management-pdf-1837516654789
8. https://www.nice.org.uk/guidance/ng23/chapter/Recommendations#long-term-benefits-and-risks-of-hormone-replacement-therapy
9. European guidance for the diagnosis and management of osteoporosis in postmenopausal women. Kanis JA, Cooper C, Rizzoli R, Reginster JY; Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis (ESCEO) and the Committees of Scientific Advisors and National Societies of the International Osteoporosis Foundation (IOF). Osteoporos Int. 2019 Jan;30(1):3-44.
10. Algorithm for the management of patients at low, high and very high risk of osteoporostic fractures. Kanis et al, Osteoporosis International 2020; 31:1-12.
11. National Osteoporosis Society leaflet, Healthy bones - facts about food, Calcium content at a glance. June 2011

*See also:*

*Guideline 222* *Adult and Paediatrics Injectables Guide* *(BHT users only)*
*Guideline 401FM* *Denosumab for Primary and Secondary Fracture Prevention in Women and Men over the Age of 50 – Amber recommendation guideline*
*Guideline 782FM* *Guidance for the Management of Breast Cancer Treatment-Induced Bone Loss*
*Guideline 785FM* *Vitamin D Testing and Treatment in Adults*

*Patient information leaflet: Denosumab (Prolia®) for Treatment of Osteoporosis*

| | |
|---|---|
| Title of Guideline | Fracture Prevention for Adults >50 years old |
| Guideline Number | 567FM |
| Version | 1 |
| Effective Date | March 2021 |
| Review Date | March 2024 |
| This guideline combines, updates and supersedes the following Bucks clinical guideilines: | 403FM Osteoporosis: secondary fracture prevention in men and women over the age of 50 who sustain a fragility fracture<br><br>402FM Osteoporosis: primary fracture prevention in men and women over the age of 50 with risk factors. |
| *Approvals:* | |
| Medicines Value Group | 26th November 2020 |
| Medicines Check (Pharmacy) | 8th February 2021 |
| Clinical Guidelines Group | 16th February 2021 |
| Author/s | Dr M Magliano, Consultant Rheumatologist<br>Dr Shona Lockie, Clinical Director for Medicine, Bucks CCG<br>Maire Stapleton, Formulary Manager, MRC |
| SDU(s)/Department(s) responsible for updating the guideline | Rheumatology<br>Endocrinology |
| Uploaded to Intranet | 9th March 2021 |
| Buckinghamshire Healthcare NHS Trust/Buckinghamshire Clinical Commissioning Group | |

## Appendix 1: Clinical indications for first and follow up DXA scans

### Clinical indications for first DXA scan

- Previous fragility fracture <75 years
- Intermediate FRAX score in patients assessed for primary prevention
- Presence of secondary causes of osteoporosis (see Table 1b)
- Treatment with GnRH agonists or aromatase inhibitors (see treatment for breast cancer guideline 782FM)
- Treatment with medroxyprogesterone acetate (Depo-Provera®) for >5 years
- Prolonged amenorrhoea >6 months (except polycystic ovary syndrome (PCOS)) or hypogonadism in men
- Premature menopause <45 years - if not HRT (natural/surgical)
- Low BMI <19 kg/m$^2$/anorexia
- Other secondary cause (hyperparathyroidism, Cushing's, prolonged untreated hyperthyroidism, inflammatory bowel disease, inflammatory arthritis, malabsorption, coeliac disease)
- Prolonged corticosteroid therapy

### Clinical indications for the follow up DXA scan

- Assessing response to treatment after the treatment cycle in patients <75 years old
- Fracture on treatment for >1 year with adequate adherence
- Follow up of BMD in patients on steroids, aromatase inhibitors or GnRH agonists
- Follow up in patients with secondary osteoporosis after therapeutic intervention i.e. introduction of gluten free diet in a patient with coeliac disease or parathyroidectomy in a patient with primary hyperparathyroidism

## Appendix 2: Calcium intake assessment tool

| **Milk (include milk with cereals, fortified soya, etc) per day** | | | | | | | | **Calcium (mg)** |
|---|---|---|---|---|---|---|---|---|
| Milk | None | <⅓ pint (<200 ml) | ⅓ pint (~200 ml) | ½ pint (~300 ml) | ⅔ pint (~400 ml) | 1 pint (~600 ml) | 1½ pint (~900 ml) | |
| Calcium (mg) | 0 | 100 | 200 | 300 | 400 | 600 | 900 | |
| **Servings of dairy (not including milk) per day** | | | | | | | | |
| Serving | 0 | 1 | 2 | 3 | 4+ | | | |
| Calcium (mg) | 0 | 200 | 400 | 600 | 800 | | | |
| **Other sources: See list below or details from food labels** | | | | | | | | |
| Calcium (mg) | From: | | | | | | | |
| **Add totals from milk, servings of dairy and other sources to give: Total calcium intake (mg)** | | | | | | | | |

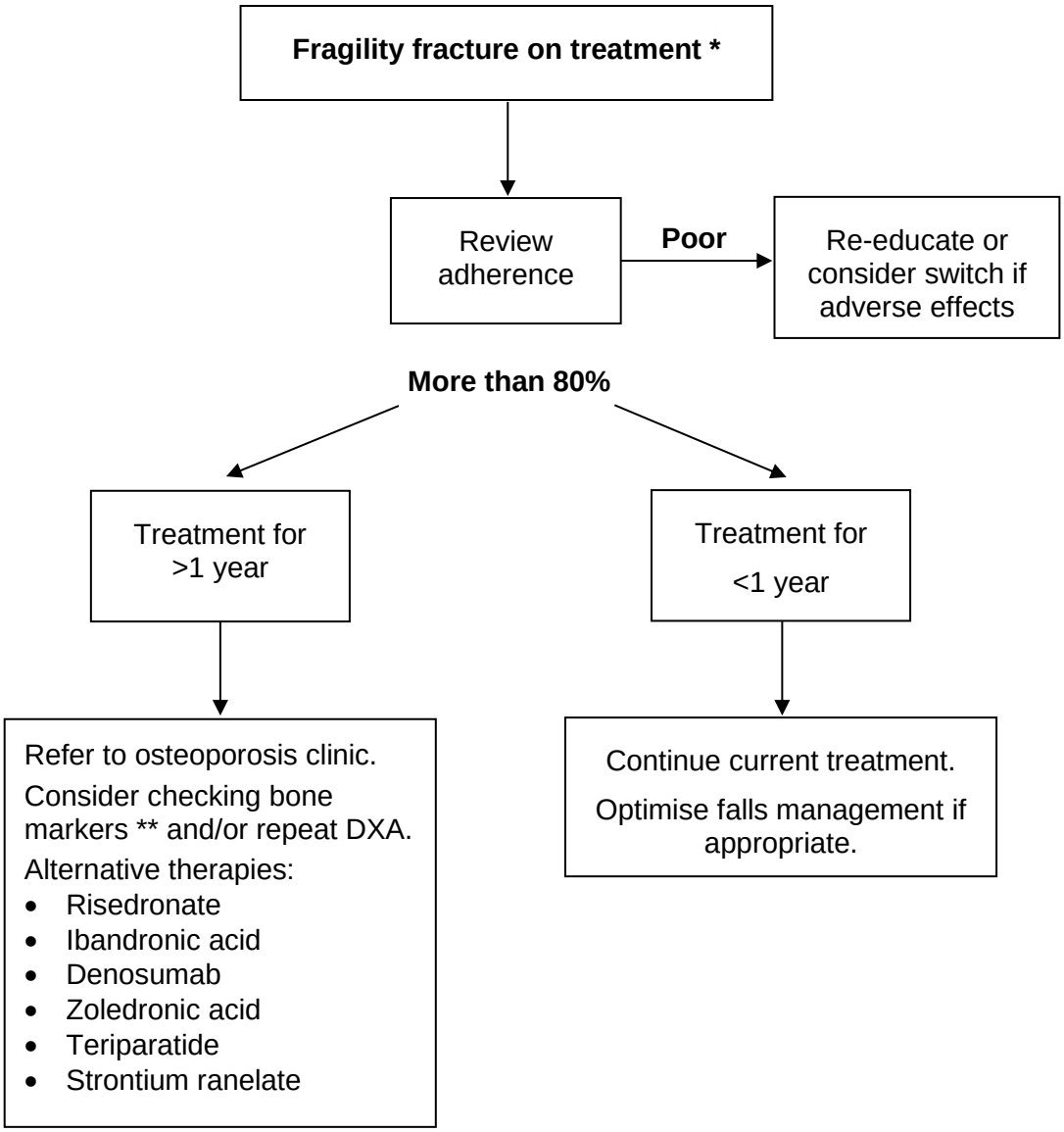
| **Calcium intake assessment result** (tick to indicate) | Replete (1000 mg) | | Intermediate (500 – 1000 mg) | | Low (500 mg) | |
|---|---|---|---|---|---|---|

## Food (calcium content (mg) in brackets[11])

| | | |
|---|---|---|
| **Dairy products** | | |
| Dried, skimmed milk powder | 3½ oz/100 g | (1590) |
| Milk soya | 100 ml | (89) |
| Cheese Cheddar | 3½ oz/100 g | (739) |
| Cheese cottage | 3½ oz/100 g | (127) |
| Yoghurt fruit low fat | 3½ oz/100 g | (140) |
| Yoghurt fruit | 3½ oz/100 g | (122) |
| Fromage frais fruit | 3½ oz/100 g | (86) |
| Ice cream dairy | 3½ oz/100 g | (100) |
| Custard from powder | 3½ oz/100 g | (140) |
| Rice pudding | 3½ oz/100 g | (88) |
| **Fish** | | |
| Pilchards in tomato sauce | 3½ oz/100 g | (250) |
| Sardines in tomato sauce | 3½ oz/100 g | (430) |
| Sardines in oil | 3½ oz/100 g | (500) |
| Salmon tinned | 3½ oz/100 g | (91) |
| Tuna in oil tinned | 3½ oz/100 g | (12) |
| **Vegetables** | | |
| Curly kale boiled | 3½ oz/100 g | (150) |
| Okra stir fried | 3½ oz/100 g | (220) |
| Spring greens boiled | 3½ oz/100 g | (75) |
| Watercress | 3½ oz/100 g | (170) |
| **Pulses beans & seeds** | | |
| Red kidney beans canned | 3½ oz/100 g | (71) |
| Tofu steamed | 3½ oz/100 g | (510) |
| Green/French beans | 3½ oz/100 g | (56) |
| Baked beans | 3½ oz/100 g | (53) |
| Sesame seeds | 3½ oz/100 g | (670) |

| | | |
|---|---|---|
| **Cereal products** (may be calcium enriched) | | |
| White bread | 3½ oz/100 g | (177) |
| Wholemeal bread | 3½ oz/100 g | (106) |
| Muesli Swiss style | 3½ oz/100 g | (110) |
| Fortified instant cereals | 3½ oz/100 g | (up to 1333) |
| **Fruit** | | |
| Apricots dried | 3½ oz/100 g | (73) |
| Figs dried | 3½ oz/100 g | (250) |
| Currants | 3½ oz/100 g | (93) |
| Mixed peel | 3½ oz/100 g | (130) |
| Olives in brine | 3½ oz/100 g | (61) |
| Orange | 3½ oz/100 g | (47) |
| **Convenience foods** | | |
| Lasagne frozen | 3½ oz/100 g | (80) |
| Sausage low fat grilled | 3½ oz/100 g | (130) |
| Cornish pasty | 3½ oz/100 g | (60) |
| Omelette cheese | 3½ oz/100 g | (287) |
| Quiche cheese & egg | 3½ oz/100 g | (262) |
| Macaroni cheese | 3½ oz/100 g | (170) |
| Pizza cheese & tomato | 3½ oz/100 g | (210) |

## Appendix 3: Fragility fracture on treatment




* Patients should be reviewed in osteoporosis clinic or as an inpatient by a consultant with an interest in osteoporosis.

** P1NP needs to be taken within 48 hours of fracture.