Osteoporosis: Who is at risk and current treatment strategies

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Overview

• What is osteoporosis?
• Why is it important?
• What can we do about it?
  – Identification of those at risk
  – Risk assessment / Investigation
  – Current treatment options/strategies
What is Osteoporosis?
"Mary, you haven't been taking your calcium pills, have you?"
Definition of Osteoporosis

‘A disease characterised by low bone mass and micro-architectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility in fracture risk’\(^1\)

A Healthy Skeleton Requires a Balance of Bone Resorption and Bone Formation

Activation

Resorption: 10 days

Formation: 3 months

Resting

When bone turnover is increased, bone loss dominates

Reversal

Why does osteoporosis occur?

- Bones stop growing in length between the ages of 16 and 18, but bone density continues to increase slowly until a person’s late 20s.
- At this point the balance between bone demolition and bone construction becomes stable.
- After the age of around 35, bone loss increases very gradually as part of the natural ageing process.
- This can lead to osteoporosis and an increased risk of fractures, especially in later life.
- Women are particularly susceptible because bone loss becomes more rapid for several years following the menopause.

Why is it important?
Life-time prevalence of fragility fracture* in the over-50s

* From standing height or less
Worldwide

• Osteoporosis affects an estimated 75 million people in Europe, USA and Japan

• Worldwide, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds

• By 2050, the worldwide incidence of hip fracture in men is projected to increase by 310% and 240% in women

• Osteoporosis takes a huge personal and economic toll. In Europe, the disability due to osteoporosis is greater than that caused by cancers (with the exception of lung cancer) and is comparable or greater than that lost to a variety of chronic non-communicable diseases, such as rheumatoid arthritis, asthma and high blood pressure related heart disease
Consequences of Fracture
Consequences of Fracture

• Pain
• Reduction in mobility
• Progressive deformity
• Difficulties with activities of daily living
• Loss of independence
• Fear
• Isolation
• Depression
A broken hip can lead to serious disability

- Admitted to nursing home
- Restricted driving & shopping
- Difficulty with daily activities
- Unable to walk independently

Cooper. 1997
UK Health Economics (2010)

- ~ 3.21 million people aged 50+ with osteoporosis
- ~ 536,000 new fragility fractures each year
- economic impact of new and prior fractures = £3.5 billion each year
- by 2025 impact will increase by 24% to > £5 billion

Osteoporosis, Risk Factors & Fracture

Helen Veevers
Osteoporosis Clinical Nurse Specialist
Risk factors can be helpful because there maybe actions you can take to reduce these risks and ultimately make the “fragility fractures” that mostly occur in older age less likely.
Risk factors….

Risk factors are often used to build up a picture of the overall fracture risk (the chance of you having a fragility fracture as a result of osteoporosis.)

If your risk factor for fracture is high, a drug treatment will be recommended to strengthen your bones and reduce your fracture risk.
Risk factors…..

Some risk factors don`t directly affect bone strength but still may increase your fracture risk.

These can often be tackled via lifestyle changes.
Risk factors that can be changed

- A BMI (body mass index) below 19kg
- Smoking
- Alcohol
- Falling
- Poor diet
- Lack of exercise
Risk factors that cannot be changed

- Some risk factors cannot be changed but it is important to know about them as some research suggests they make it much more likely you will have fragile bones and fractures in later life.

- Often osteoporosis and fractures aren’t caused by something “you have done” or could have changed.

- Their cause may just be part of you genetic make up or like many medical condition something that just happens but we don’t fully understand why
Risk factors that cannot be changed

- Genes
- Age
- Gender
- Menopause
- Race
- Previous Fracture
Medication that can increase risk

- Steroids (Prednisolone) taken for longer than 3 months.
- Anti epileptic drugs.
- Aromatase inhibitors (Breast cancer)
- Prostate cancer therapy.

Others which are under research

- PPI drugs
- Glitazones for diabetes
- SSRI(Antidepressants)
Medical conditions

- Rheumatoid arthritis
- Reduction in oestrogen causing an early or surgical menopause before the age of 45
- Anorexia Nervosa
- Reduced Testosterone
- Crohn’s or coeliac disease
- Long periods of immobilisation
FRAX…. What is it?

- The FRAX® tool has been developed by WHO to evaluate fracture risk of patients. It is based on individual patient models that integrate the risks associated with clinical risk factors as well as bone mineral density (BMD) at the femoral neck.

- The FRAX® algorithms give the 10-year probability of fracture. The output is a 10-year probability of hip fracture and the 10-year probability of a major osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture).

- [www.shef.ac.uk/FRAX](http://www.shef.ac.uk/FRAX)
## Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

### Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
   - **Age:** 58
   - **Date of Birth:** Y: [ ] M: [ ] D: [ ]

2. **Sex**
   - Male
   - Female

3. **Weight (kg)**
   - 70

4. **Height (cm)**
   - 168

5. **Previous Fracture**
   - No
   - Yes

6. **Parent Fractured Hip**
   - No
   - Yes

7. **Current Smoking**
   - No
   - Yes

8. **Glucocorticoids**
   - No
   - Yes

9. **Rheumatoid arthritis**
   - No
   - Yes

10. **Secondary osteoporosis**
    - No
    - Yes

11. **Alcohol 3 or more units/day**
    - No
    - Yes

12. **Femoral neck BMD (g/cm²)**
    - [Select BMD]

### About the risk factors

- **BMI:** 24.8
  - The ten year probability of fracture (%)
    - Without BMD:
      - Major osteoporotic: 5.7
      - Hip Fracture: 0.9
    - View NOGG Guidance
Assessment threshold - Major fracture

10 year probability of major osteoporotic fracture (%)

- Treat
- Measure BMD
- Lifestyle advice and reassure
What happens in our locality

- Until recently Osteoporosis CNS attended Fracture clinic and the trauma wards twice a week to assess patients.
- Worked along side orthogeriatrician and orthopaedic consultants.
- Identification & Assessment – referral for Bone Density Scan
- Complex patients
- Prescribed medication
Fracture Liaison Service (FLS)

- In the ideal world this would be the way forward but it is complex in its setting up.
- Needs to be a robust service commissioned by the CCGs for either Primary or Secondary care services to manage.

Help provided by:

- National Osteoporosis Society (NOS)
- Clinical Standards/Implementation Tool Kit.
- Development Officers
DXA Scanning

- THE GOLD STANDARD
- Assess patient’s bone density at 2 sites (lumbar spine and hip)
- Forearm can be used in certain circumstances.

- Compares to a gender-matched adult at peak bone mass (T-score) and also to a gender-matched person of same age (Z-score)

- T-score < -2.5 = osteoporosis.
DXA Scanning

- A DXA scan is performed on those who qualify for it through their risk factors.
- You cannot just request one because you want one!
- Results are interpreted by myself, a Consultant Radiologist and a radiographer and report is made individual to that person. It is not computer generated.
- The results go to the person who has requested the scan unless otherwise specified.
- Recommendations as to treatment, investigations and follow up are given.
DXA Scanner
DXA Scanning Limitations

- Age
- Osteoarthritis/degenerative changes
- Weight – Increased BMI
- Ability to get on and off the scanner
- Cannot use a hoist
- Fracture- defer
- **Need to be able to lie semi recumbent and still.**
Dr Rao....

I keep finding these all over the house!

My doctor says bone loss is normal at my age.
How can the risk of fragility fractures be reduced?

- Poor bone strength
- Fragility fractures
  - Falls (except fractures in the spine)
    - Impact of falls
      - Lack of padding
    - Flooring, hip protectors
  - Drugs, including Vit D
    - Lifestyle
      - Exercise
      - Healthy eating
      - Sunlight
      - Healthy pregnancy
      - No smoking/excessive alcohol
      - & Other interventions for falls prevention
Sources of Dietary Calcium

[Diagram showing various food items as sources of calcium]
Vitamin D

• Helps the body use calcium and is essential for healthy bones
• Sunlight provides the vitamin D we need
• Daily sunlight exposure between May and September increases vitamin D levels
• Stored by the body for the winter months
• 10 minutes of sun exposure to bare skin once or twice/day
• **Important not to burn**
• Some people need supplements: 10-20 micrograms daily
Exercise

• Load/weight-bearing exercise reduces bone loss and improves bone strength
• High impact exercise in early years to increase bone mass
• Exercise to prevent falls - increase muscle strength and improve balance
• Exercise improves mood, mental health and well being, and prevents or delays many other medical conditions
• Choose something you enjoy and keep doing it!
Drug treatments to strengthen bones and prevent fractures

- Decisions should be based on the likelihood of having a fragility fracture in the next 10 years
- For about 5 years but may be long-term
- Usually later in life when the risks are highest
- Government or local guidelines may affect prescribing
- Best treatments only reduce fracture risk by 50%
Drug treatments: bisphosphonates

• Alendronic acid
• Risedronate
• Ibandronate
• Zoledronate
Drug treatments: others

- Denosumab (Prolia)
- Raloxifene (Evista)
- Strontium ranelate (Protelos)
- Parathyroid hormone (PTH)
- Hormone replacement therapy (HRT)
- Calcitriol (Rocaltrol) (active form of vitamin D)
## Anti-fracture efficacy of approved treatments for postmenopausal women with osteoporosis

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<th>Hip fracture</th>
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Duration Of Treatment

• Depends on individual’s risk of fracture
• Need to balance risks and benefits
• Generally, 5 years
• May consider “treatment holiday”, then re-assess risk
• Regular DXA scans not warranted
Summary 1

- Osteoporosis is a common condition that can lead to painful and disabling fractures
- Those at risk need appropriate assessment of their bone fragility
- A healthy lifestyle can help to build and maintain strong bones and prevent fractures
Summary 2

- Drug treatments to reduce the risk of fractures are available for those at the highest risk
- Support and pain management after fractures are essential so that people regain a good quality of life and further fractures are prevented
Publications and Resources

• The National Osteoporosis Society produces a **FREE** 68 page book covering everything you need to know about osteoporosis

• Contents of the book also appear on the website

• To order a copy go to: [www.nos.org.uk](http://www.nos.org.uk) or call 01761 471771
NOS publications and website resource

To order any of the publications, ring General Enquiries on 01761 471771
Thank you for your attention!