

My Bones and Me

ALL ABOUT OSTEOPOROSIS

AND

BONE HEALTH



Department of Bone and Joint Disease

**University Hospital Galway
Merlin Park University Hospital**

Department of Bone and Joint Diseases

Merlin Park

Galway University Hospitals

Galway, Ireland

Phone: +353-91-775961

Fax: +353-91-771410

Bones are Important!

“Bones are Important,

They do a big job,

Without them you’d be

A big squishy blob”

Jeff Moss, in Bone Poems

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ALL ABOUT ME

Name _____ Hospital No _____

Address: _____

Contact No: _____ E-mail: _____

Osteoporosis Nurse: _____

Contact No: _____

Consultant Name: _____

GP Name: _____

GP Address: _____

GP Contact No: _____

Pharmacy Name: _____

Pharmacy Contact No: _____

Date: _____ How Tall I am: _____ How Much I weigh: _____

My Broken Bones:

No	Which One	Date
1		
2		
3		
4		
5		

Introduction to Bones

Bones are living tissues containing cells, collagen (a type of fibre), matrix (the environment cells are found in) and minerals (calcium, phosphate, others).

The average human has 206 bones in their body, making up the entire bone family known as the skeleton. The skeleton is divided into 2 parts:

- i) The central or axial skeleton (spine, skull, chest, pelvis)
- ii) The peripheral skeleton (Bones of the arms, legs, hands and feet).

The skeleton is constantly working hard to keep you healthy by:

- 1) Providing support for muscles and tendons so we can stand, walk, breathe and move our arms and hands for all activities.
- 2) Protecting the body's soft tissues like the brain, heart and lungs.
- 3) Making blood cells which fight infection, transport oxygen, food and minerals to your tissues and stop you bleeding.
- 4) Regulating Calcium, Phosphorous and other minerals in your body.

The skeleton is constantly being repaired and replaced throughout our lives and the average human turns over their entire skeleton 7 times during their lifetime.

As we grow the process helps us build bone to become taller and stronger but, as we age and in certain diseases, this process results in bone loss and bone fragility.



There are many diseases of the skeleton (primary) that can affect bone (secondary) which can result in pain, disability, loss of function and death in severe cases including:

- Osteoporosis
- Osteomalacia
- Arthritis
- Cancer
- Diseases of the kidney, liver, pancreas, intestines, brain and lungs
- Medications

It is very important to look after your bones as healthy living requires a healthy skeleton. The most important thing you can do to manage your bones is to educate yourself on your skeleton and to stay active, fit and healthy.

What is Osteoporosis?

Osteoporosis is derived from Greek, and literally means “a bone with too many holes”. This is the most common skeletal disease in humans. Today more than one billion people worldwide have or are at risk of osteoporosis which results in millions of broken bones, hospitalisations and deaths each year. Osteoporosis can affect people of all ages, ethnicities and genders.

In osteoporosis, bone is reduced in quantity and quality, and therefore fragile and prone to breaking. The medical term for a broken bone is a ‘fracture’ (the words mean the same thing): the clinical event resulting from osteoporosis. As bones become more porous and fragile, the risk of fracture increases. Bone loss occurs “silently” and progressively. Over an average lifetime men lose roughly 30% of their bone, and women lose around 40%.

There are **no** symptoms until a fracture occurs. 1 in 2 women and 1 in 5 men will experience an osteoporotic fracture in their lifetime. The risk of fracture each year for a postmenopausal caucasian woman exceeds her combined risk of heart attack, stroke, death from cardiovascular disease and invasive breast cancer. A 2017 report from the International Osteoporosis Foundation shows Ireland ranks 5th highest in the world for risk of hip fracture.

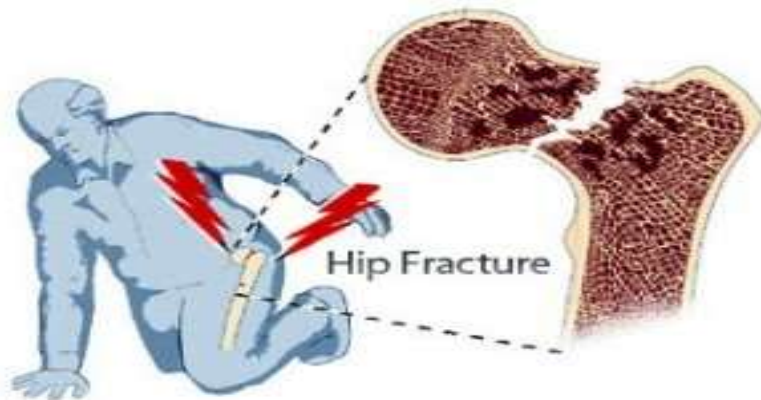


Fractures which occur because of reduced bone strength are described as ‘fragility fractures’, the majority of which are due to osteoporosis. Many occur following a simple fall. The human skeleton has evolved over millions of years to be able to sustain a fall from a standing height, so if the bone breaks following a simple fall, then that is not normal. Sometimes the bone is so fragile it breaks without even falling, from simple actions like bending, coughing or turning in bed. Broken bones can cause pain, inability to move, stand or walk, incontinence and breathing problems. Complications include height loss, chronic pain, loss of mobility and independence, breathing problems, blood clots, depression and death.

The most common skeletal sites for osteoporotic fractures are:

- Spine
- Forearm
- Hip
- Other: including humerus, pelvis, tibia, ribs.

Patients with more severe fractures usually require hospitalisation and surgery. In Ireland, approximately 50% of people suffering an osteoporotic fracture require hospitalisation, almost 30% of whom are men. Hip fractures are the most recognisable because people usually cannot walk if their hip is broken, and they may be the most devastating and are associated with the highest cost to the patient, and the healthcare system. A 2015 report on hip fractures in Ireland showed they account for almost 1 in 3 hospitalised fractures but also account for almost two thirds of the cost and number of bed days for all fractures. The majority of serious fall related injuries are fractures where treatment costs the country more than half a billion Euros annually.



Fractures of the spine and hip have the most serious consequences. Studies show the cost and number of inpatient bed days (days spent in a hospital) for fractures today is greater than heart disease, stroke, cancer and diabetes in developed countries. Studies of older patients who suffer a hip or spine fracture show they have a higher mortality than similar aged people who do not fracture:

- 1 in 5 women and 1 in 3 men in Ireland are dead in the first year following a hip fracture, and only 40% regain full independence.
- In the USA, amongst people 65 years and older with spine fractures, only 50%, 30% and 10% of patients are still alive 3, 5 and 7 years respectively. These statistics are worse than many cancers, heart disease and strokes. The mortality figures are several fold higher than for similar people who do not have a spine fracture.
- 1 in 3 people are unable to return home and require long-term institutional care in nursing homes following a hip fracture.
- Only 1 in 5 patients with a spine fracture are diagnosed with, and treated for osteoporosis internationally. Numbers in Ireland are unknown.
- In Ireland only 10% of patients over 50 years admitted with a fragility fracture are diagnosed with osteoporosis over the past decade. This needs to change.
- Fracture liaison programmes such as ours show the majority of people are diagnosed and treated for their osteoporosis following fragility fractures.

Who is affected by Osteoporosis?

Women and Osteoporosis

One in three women over the age of 50 will experience an osteoporotic fracture. Women are more at risk of developing osteoporosis because bone loss becomes more rapid for several years after the menopause, when sex hormone levels decrease. Furthermore, women tend to have smaller bones than men and usually live longer. Therefore, loss of bone tissue continues for longer, making fragility fractures much more likely.

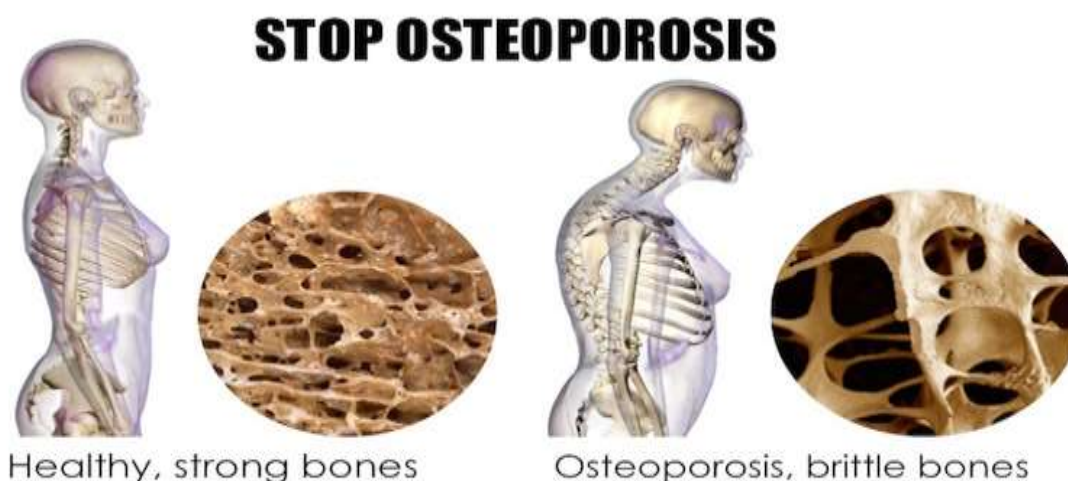
Men and Osteoporosis

Osteoporosis does not just affect women, although this is a common misconception. It's often regarded as a 'women's problem' but in fact, one in five men over the age of 50 will break a bone due to low bone strength. Approximately 30% of people hospitalised in Ireland with a fragility fracture are men. More importantly, men are less likely to be diagnosed or treated for osteoporosis, and they have a worse prognosis than women.

Younger men and women and Osteoporosis

Younger men and women (before the menopause) can have low BMD, but they are usually at much lower risk of fracture than older adults with the same BMD. However, sometimes younger adults and children develop osteoporosis and fractures, usually related to an underlying disease or genetic trait. While everyone should be evaluated for causes of osteoporosis, this is particularly true of younger people. Sometimes a specific cause is not found, and people are diagnosed with "Idiopathic Osteoporosis". The medical word for this is 'idiopathic'. If you are a healthy, younger person who is frequently breaking bones, this can be particularly distressing. Diagnosing and treating osteoporosis in younger men, women and children is more complex and a referral to a specialist in osteoporosis is recommended.

**Children with osteoporosis are not the same as adults.
Specialist care is essential.**



DXA Scans and Other Tests

It may be recommended that you have a **bone mineral density (BMD) test or DXA scan.**

This is a painless test that uses very low-level X-rays (a similar amount of radiation to what you get every day in your own environment) to calculate your **BMD**, by measuring calcium and other minerals in a section of your bone, and which takes pictures of your bones. The recommended bones for scanning are the spine and hip. Occasionally a wrist, whole body, or other site may be recommended, particularly when it is not possible to scan your spine or your hips. These bones are chosen because they are often the site of fragility fractures, they provide the best information, and the largest and best research studies use these sites and can be monitored more easily.

The machine most often used to measure BMD is called a **DXA** (Dual-energy X-ray Absorptiometry) scanner. Sometimes ultrasound, CT scans and other devices can be used. DXA is the 'gold standard' test for measuring BMD in living people.



All World, European, and Irish national guidelines recommend all patients with, or at risk for fracture have access to quality DXA scanning in a reasonable time frame.

There are 3 main parts to a getting a DXA scan/test done:

- 1) Making sure you have an appropriate indication for the test, and no contra-indications.
- 2) Acquisition: this is the taking of the scan. International standards and best practice must apply in order for the scan to be useful, and training courses are offered in Ireland regularly. Ask your DXA technologist if they have training and certification, ideally by the International Society for Clinical Densitometry (ISCD). There are many reasons why a scan may be hard to perform, and only some are related to training of professionals. There are limitations to the technology and many patient factors too.

- 3) Interpretation: A bad scan will be hard to interpret. Interpreting scans is more complicated than simply looking at numbers on a page. International standards and training for clinicians is offered in Ireland regularly. Ask your reporting clinicians if they are ISCD trained and certified.

DXA calculates bone mineral density (**BMD**) using a computer algorithm. Your **BMD** is reported in 3 main forms:

- Grammes/centimetre squared (g/cm^2)
- A T-Score which compares your bone density with the average bone density of a young healthy white female population. (Only recommended for use in men aged 50 years and older and postmenopausal women).
- A Z-score which compares your bone density with the average bone density of a healthy population of a similar age, gender and ethnicity. (Recommended for children, men <50 years, and premenopausal women, and sometimes others).

A DXA diagnosis of osteoporosis can be made in post-menopausal women and men aged 50 years and older using T-scores. A value of <-2.5 at the spine or hip can be used to make a diagnosis by DXA criteria. A clinical correlation is strongly advised.

In younger adults and children a DXA diagnosis of “low bone mass for age” can be made using the most appropriate Z-score and a Z-score value of <-2.0. The International Society for Clinical Densitometry recommends that a diagnosis of osteoporosis in these patients should not be based on DXA results alone.

Modern DXA machines can also perform LVA scans which can be used to diagnose spine fractures, vascular calcification and other skeletal abnormalities.

They may have other software tools to assess your risk of fracture including Hip Axis Length, Trabecular Bone Score, FRAX score, body composition including fat and muscle, and more.

DXA can be used to:

- 1) Predict your risk of fracture
- 2) Diagnose osteoporosis or low bone mass
- 3) Assess your prognosis if you have already had a fracture
- 4) Monitor the results of any intervention or treatment over time

**** IMPORTANT: To monitor your BMD your centre MUST KNOW their LSC ****

Detailed information on DXA is available through the website of the International Society for Clinical Densitometry: www.iscd.org

Who should get a DXA?

The I.S.C.D has set standard recommendations for who should get a DXA scan. Take the brief questionnaire below to see if you need a DXA scan:

All women aged 65 years and older:	Yes	No
All men aged 70 years and older:	Yes	No
Younger adults with a prior fragility fracture	Yes	No
Younger adults taking chronic steroid medication	Yes	No
Younger adults with a family history of osteoporosis	Yes	No
Younger adults taking medication known to cause bone loss	Yes	No
Younger adults with a condition known to cause bone loss	Yes	No
Younger adults with a condition associated with fractures	Yes	No
Children with diseases of the skeleton associated with fractures	Yes	No

Who should NOT get a scan:

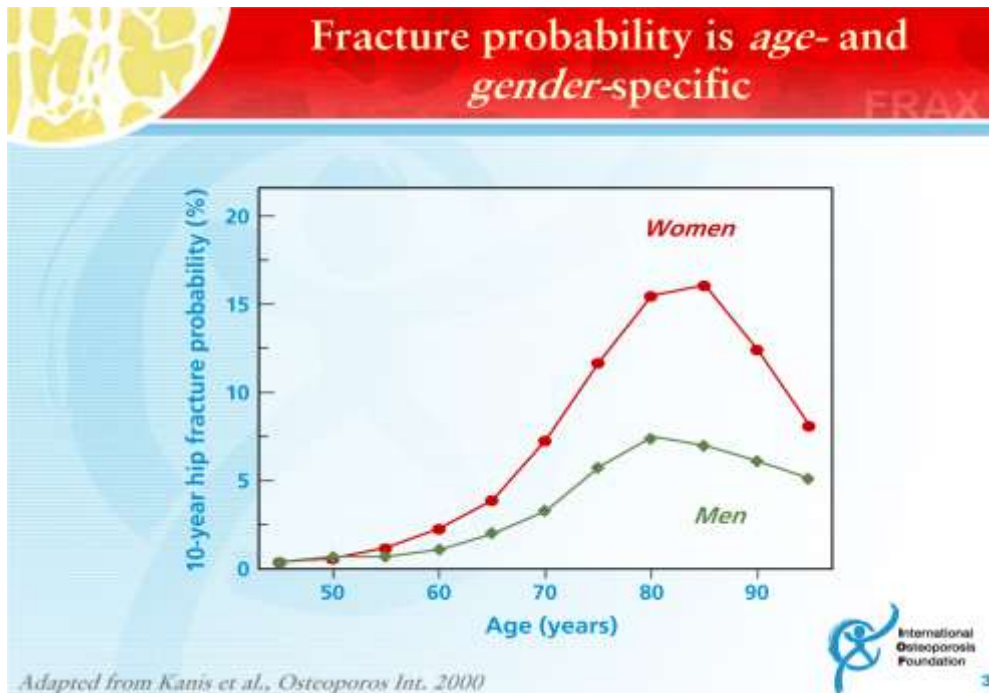
- Young healthy people who are “worried” about their bones.
- People with “bone pain” and “back pain”. They need X-rays or some other test.
- People who are not at risk for fracture.
- People who have had surgery at the recommended skeletal sites: hip replacements, spine surgery etc.
- People who have just undergone another radiology scan or test where dye was used: e.g. bone scan, CT scan, barium scan.

Enter your DXA scan details here:

Date	DXA Centre	Hip BMD	T-score or Z-score	Spine BMD	T-score or Z-score

FRACTURE RISK

DXA is just a test, and all tests are imperfect. However the test can help to calculate your risk of fracture. This is particularly important if you have not already had a fracture. The risk of fracture depends on many things, and you need to talk to your doctor or health professional about your risk, which is very individual and not a group average. For example risk differs for age and gender:



Can I calculate my fracture risk score?

Yes you can. Several tools are freely available on-line.

FRAX is the most highly cited and recommended:

<https://www.sheffield.ac.uk/FRAX/tool.aspx?country=48>

You can calculate your FRAX score with or without knowledge of your DXA scan results. The DXA result will however result in a more accurate risk score.

Example 1: Healthy 51 year old woman who has no fracture, no family history, takes no medication. Height 170cm. Weight 56 kg.

10 year risk of Major Osteoporotic Fracture: 2.9% Hip Fracture: 0.5%.

Example 2: 70 year old 70kg man with a previous spine and wrist fracture, taking corticosteroids for rheumatoid arthritis who has a DXA T-score of -2.0.

10 year risk of Major Osteoporotic Fracture: 34% Hip Fracture: 11%.

Knowing your risk factors is the first step in successfully fighting osteoporosis. Some risk factors may be modifiable through changes in lifestyle, others are non modifiable risk factors (such as age, family history etc) which can't be changed. Secondary risk factors include other diseases, and certain medications, that directly or indirectly affect bone health.

Am I at Risk?

There are many risk factors for osteoporosis, and a growing list.
Do You Have:

Circle Yes/No

A Family History of Osteoporosis / Fracture	Yes	No
Older Age (>60 Years)	Yes	No
A previous fragility fracture?	Yes	No
For women, years since menopause	Number:	_____
Previous or ongoing Corticosteroid / “steroid” medication	Yes	No
Hormonal Therapy for Breast or Prostate Cancer	Yes	No
Inflammatory Arthritis (Rheumatoid, Ankylosing Spondylitis)	Yes	No
Diabetes Mellitus:	Yes	No
Coeliac Disease	Yes	No
Current Smoking/Tobacco Use	Yes	No
More than > 1 inch/2.5cm of height loss	Yes	No
Would you rate your overall health as poor?	Yes	No

Risk factors for fracture include those for osteoporosis, and Falls Risk:

Have you Fallen > 1 in the past year?	Yes	No
Do you suffer from weak muscles?	Yes	No
Do you suffer from poor balance or unsteadiness?	Yes	No
Do you have severe / ‘bad’ arthritis?	Yes	No
Do you need assistance to stand or walk (Stick, walker)?	Yes	No
Do you have trouble with your vision/wear glasses?	Yes	No
Do you have trouble with your hearing?	Yes	No
Other Condition, e.g. Stroke	Yes	No

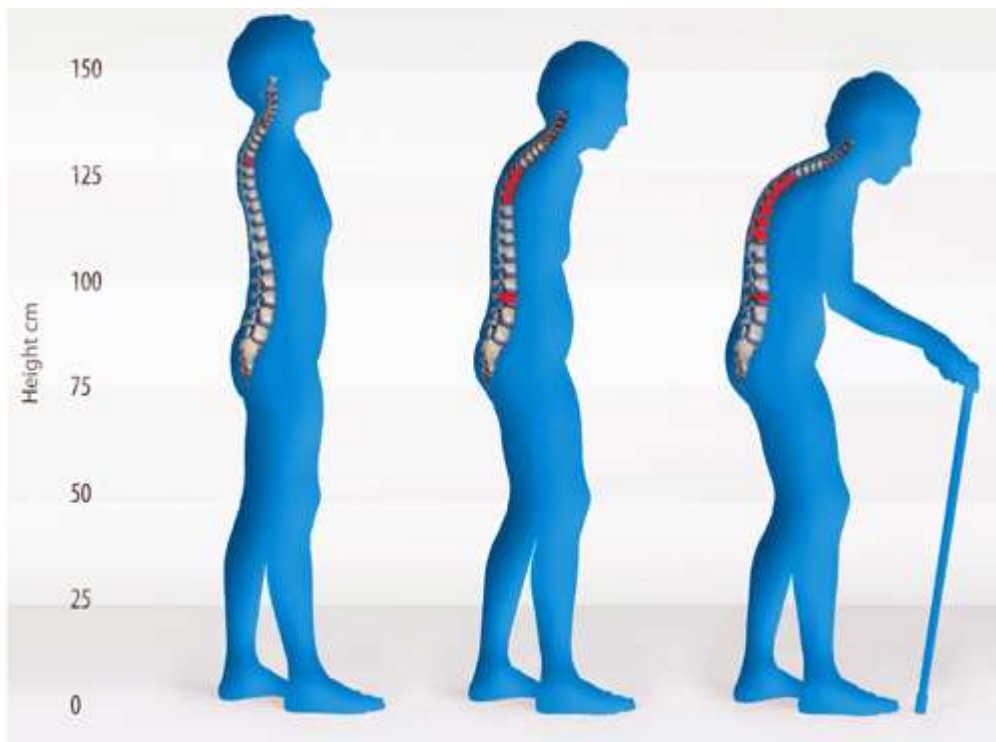
List: _____

How is Osteoporosis Diagnosed?

Today osteoporosis can be diagnosed in 1 of 3 ways:

- 1) A new fragility fracture of the spine or hip, and possibly other bones
- 2) A DXA (Dual-energy X-ray Absorptiometry) scan
- 3) A tetracycline labelled bone biopsy (rarely used today in practice, but remains the “gold standard” test especially in complex patients).

If you have had a fragility fracture and you are older than 50 years or have other medical conditions, then it is most likely you have osteoporosis. Talk to your doctor, nurse or other medical professionals about this and ask them what else you need to do.



Can osteoporosis and fractures be prevented?

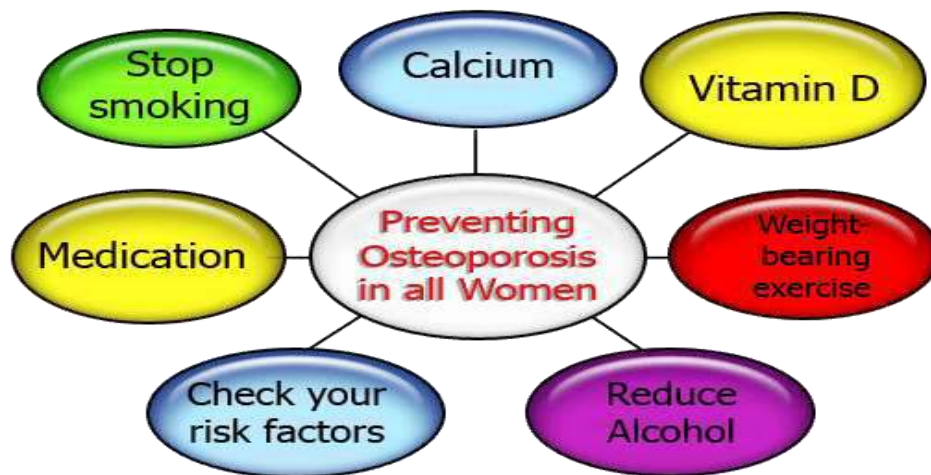
The answer is **YES DEFINITELY**

Early intervention works best.

Although bone loss can be accelerated by some conditions out of your control (such as family history), there are certain steps that you can take to help prevent bone loss, and this disease.

A first step, no matter what your age or the state of your bone health, is to ensure a bone-healthy lifestyle. That means taking regular weight-bearing and muscle strengthening exercise, eating a nutritious diet rich in calcium, protein, vitamin D, and other important nutrients, and avoiding unhealthy habits such as smoking or excessive alcohol intake.

However for people at high risk of fracture, a bone-healthy lifestyle alone may not be enough to prevent osteoporotic fractures. If you're at high risk, or you have the disease already you're likely to need osteoporosis medication in order to protect against future fractures.



Take Preventive Action

Lead a healthy lifestyle

Talk to your doctor, nurse, medical practitioner

Ask for Testing for bone health: DXA, Blood tests, Other

Exercise your muscles to prevent falls and to keep your bones strong

Stick to treatment if prescribed

Get more information

Be a CHAMPION: World Osteoporosis Day 20th October each year

THE GOOD NEWS!

Testing for osteoporosis is quick, easy and painless if you haven't had a fracture.

If you already have had a fragility fracture, then you may be diagnosed with osteoporosis too.

There are many things you can do to make your bones and muscles strong and healthy

There are many things you can do to reduce the risk of falling and injuring yourself

There are many excellent doctors, nurses, physiotherapists, occupational therapists and pharmacists trained and willing to help you.

Many treatments are available to reduce the risk of fracture by up to 70%.

Treatment reduces suffering, height loss and mortality.

You can be a champion for healthy bones!

How can you improve your bone health?

Osteoporosis is a preventable disease for some people. Lifestyle changes can have an enormous benefit. Here are steps that you can take to slow or stop the progress of the disease:

- 1. Stop smoking:** smoking cigarettes speeds up bone loss.
- 2. Don't drink too much alcohol:** Alcohol impairs balance and bone metabolism
- 3. Eat foods rich in calcium:** Calcium is an essential mineral found in many foods.
- 4. Ensure adequate Vitamin D:** Essential for body and bone calcium metabolism
- 5. Exercise:** Regular weight bearing exercise keeps bones and muscles strong
- 6. Fall Prevention:** Most fractures occur following a fall
- 7. Osteoporosis Medications:** They reduce the risk of fracture in those at high risk
- 9. Get assessed:** Fracture risk, and other medications and illnesses with your doctor.

Calcium and Vitamin D

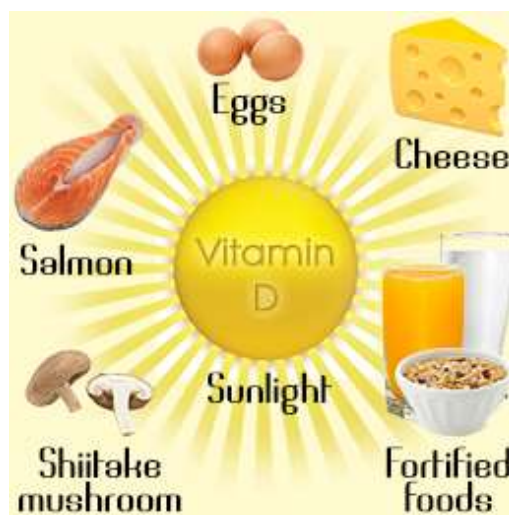
Eating foods that are rich in **calcium is essential for bone growth, and** can help slow bone loss and lower your risk of breaking a bone. Dietary calcium is always preferable to supplements and tablets.

Many foods contain high amounts of calcium or **vitamin D**, some of which are shown below:

Calcium



Vitamin D



The recommended amount of daily calcium is:

- 700mg/day: For toddlers (<3 years of age)
- 1,000mg: 4-8 years, 19-50 years, men aged 50-70 years.
- ≥ 1200 mg for 9-18 year olds, 51-70 year old women, everyone >70 years.

Your body may have trouble absorbing calcium in certain circumstances: e.g. coeliac disease, use of stomach medication, prior stomach or bowel surgery, vitamin D deficiency. Speak to a nutritionist or your doctor to learn what you need to do. If you are not able to get enough calcium from your diet alone, your doctor may recommend you take calcium supplements.

Adequate Vitamin D is essential because it helps your body better absorb calcium and regulates the way your body uses calcium to ensure your bones, muscles and teeth remain strong.

Vitamin D is made by your skin when it is exposed to the summer sun's rays. This is your body's main source of vitamin D. All you need is 15-20 minutes per day of outside exposure without sun-block. Remember too much sun exposure is dangerous. Some people are particularly at risk for vitamin D deficiency including those in long-term care who do not get outside, frail elderly people, people with certain skin, kidney and liver disorders, and darker skinned people with restricted diets. Supplements may be recommended if needed.

The recommended amount of daily vitamin D is:

- 600 International Units: For everyone except >70yrs
- 800 International Units for everyone >70 years.

Where can I get more information?:

Institute of Medicine 2010 Report: www.nationalacademies.org

National Institute for Health and Diseases: www.bones.nih.gov/health-info/bone

My Calcium Intake Questionnaire

In an average day or week how many portions of the following foods do you eat?
You can, and should, check the labelling on the foods you eat:

Food and Portion Size	mg of Calcium	No per week	<i>Calcium</i>
1 Egg (hen)	30		
Glasses whole/Skim milk	300		
1 cup calcium fortified cereals	300		
Glasses fortified Soy milk	300		
Glasses Rice milk	300		
Glasses of fortified Orange Juice	300		
Flavoured yogurts	350		
Plain yogurts	400		
1oz (30g) portion of Cheese	200		
½ cup soft/cottage cheese	60		
bowl of Ice-cream (2 scoops)	150		
3.5 oz (100g) portion Milk Chocolate	250		
1 can of boned salmon (3oz/85g)	150		
1 can of sardines (3oz/85g)	350		
4oz/1/2 cup Tofu with calcium	200		
1 cup soybeans	250		
½ head of cabbage	300		
1 cup of broccoli/bok choy/kale	150		
1 cup collards, turnip greens	300		
Cup of pasta/Rice (cooked)	20		
1 slice wholemeal bread	30		
1 slice white bread	10		
1 cup beans (lima, navy, kidney) dates, raisins	100		
1 oz (30g) Almonds	70		
=====	=====	=====	=====
TOTAL WEEKLY CALCIUM			
TOTAL DAILY CALCIUM		÷ 7	
<i>Incidentals not included above</i>		+250	
DAILY CALCIUM SUPPLEMENTS			
TOTAL DAILY CALCIUM INTAKE			

My Vitamin D intake:

Food / Source	Amount per serving	Servings per day	Daily total
Milk Products (includes non-dairy)			
Yogurts			
Cheeses			
Fortified Cereals			
Other fortified Food			
Supplements			
Total			

**** Remember too much of anything is bad for you. Taking excessive calcium, vitamin D or other supplements can be dangerous and is not recommended. Calcium and vitamin D tablets/supplements are only recommended for those who have inadequate intake ****

Exercise

It is important to stay physically active throughout your life.

Exercise can:

- Make your bones stronger
- Make your muscles stronger and more flexible
- Improve your coordination and balance
- Improve your posture
- Reduce your risk of falls
- Reduce your risk of fracture
- Reduce your pain and improve your function

Weight-bearing exercises is important for strength, balance and fitness

Weight-bearing exercises encourage you to use your muscles to work against gravity to stay standing up. Examples: dancing, jogging, walking, stepping, gym machines, aerobic training, Yoga, Tai Chi and cycling.

Muscle-strengthening exercises encourage you to use your muscles to push or pull against an object. Examples: Squatting, stepping, cycling, gym machines and weights, and thermaband (giant elastic bands) exercises.

Balance and posture training exercises will improve your balance and posture, and reduce your risk of back pain, fall and fracture, and increases your lung capacity. e.g. Chair programme, Yoga, Tai Chi.

WARNING: Always consult your doctor or physiotherapist before you start any new exercises. Your exercise plan needs to be carefully tailored to your needs so that you do not hurt yourself. Ask which exercises you can perform safely and which you should avoid. Also, ask how often you should do each exercise and how hard you should push yourself

You may be referred to specific exercise class or assessment with a trained physiotherapist or exercise therapist by your doctor.

Further Information is available on the Canadian “Too Fit to Fracture” Website.



Falls

You are much more likely to break a bone if you fall. So one great way to avoid fractures is fall prevention. You can do this by exercising as noted above, but falls are more complex than just muscle power. Some medications and disorders increase fall risk. A comprehensive falls assessment is essential if you have osteoporosis or are at risk of fracture.

- If you have a medical condition that makes you feel weak, unsteady or dizzy, talk to your doctor. Getting treatments for these will make you safer.
- Some medications can cause unsteadiness (anti-depressants), make you dizzy (blood pressure), cause you to rush (diuretics or ‘water’ tablets) or weak (steroids). If you are taking a number of different tablets ask your doctor or pharmacist to review them.
- Many fractures occur at home. Think about your home, and what you can do. A home safety assessment can be arranged, usually with an Occupational Therapist.



**WHAT MAKES YOU THINK I
NEED MY EYESIGHT TESTED?**

IMPORTANT: If you have been falling, talk to your doctor or nurse to get assessed, and there may even be a dedicated specialist falls service in your local hospital or area. Simple measures can help to reduce the risk of this happening:

- Fit handrails on the stairs and next to the toilet and by the bath.
- Move any mats so that you can't trip over them.
- Ensure stair carpets are not loose or frayed. Use non-slip mats and rugs.
- Fit a cage over your letterbox to avoid having to pick up letters from the floor.
- Use high watt light bulbs so areas are well-lit. Get help changing them.
- Avoid loose wires, climbing ladders, chairs and stools, and slippery stairs and floors.

Preventing Falls at Home Checklist

Floors

- Use nonskid rugs.
- Coil or tape extension cords or wires.
- Keep pathways clear of excessive furniture.
- Keep floors clear of things that can trip seniors, like shoes.

Stairs

- Fix loose or uneven steps.
- Install handrails on both sides, and lights.
- Attach nonslip rubber tread to steps.

Bedroom

- Ensure lamps are easy to reach.
- Plug in night lights.
- Install phone on the floor in case of emergency.

Kitchen

- Keep often-used items in easy-to-reach places.
- Never use a chair as a step stool.

Bathroom

- Install grab bars next to toilets and inside showers.
- Use nonslip mats.
- Consider a shower chair.

Source: Ohio Department of Health

Osteoporosis Medications

In addition to recommending diet, exercise, and lifestyle changes, doctors may prescribe osteoporosis medications as part of your treatment plan. All approved osteoporosis medications have been shown to reduce the risk of fracture in women with osteoporosis. This is one of the main requirements for these medications to get approval. However:

- ⇒ not all medications are the same,
- ⇒ not all medications have been approved for all indications,
- ⇒ not all medications have been shown to reduce the risk of hip or non-spine fractures, or the risk of fractures in men.

No approved medications have been shown to definitely reduce the risk of fracture in premenopausal women, younger men (<50 years) or children. However, like any treatment, there is not a study of every possibility, and definite data are not always available.

Generally all osteoporosis medications are very safe. Like all medications they can have side effects. Patients with other bone or mineral diseases may have real contra-indications to medication or they may need these other conditions addressed first, for example:

Osteomalacia (low Vitamin D).

If you have inadequate calcium, vitamin D or other minerals you may experience severe consequences from osteoporosis medications. If these levels are not corrected first, complications can arise, such as low calcium which in turn can result in, tetany and breathing problems;

Kidney failure: Osteoporosis medications are contra-indicated in patients on dialysis.

Today there are a number of effective treatment options available that have been shown to act quickly (within one year), to maintain bone density and to reduce the risk of having fractures. It is important that the choice of treatment be tailored to a patient's specific medical needs, concerns, other conditions and medications, and lifestyle.

Remember medications don't work if you don't take them!!! This is the commonest reason they don't work in practice. If you are at high risk for fracture or have osteoporosis the benefits clearly outweigh the risks of treatment, unless you have contra-indications.

Talk to your doctor, nurse or pharmacist if you have concerns about your medication. At least let them know if you are taking them or not. There may be better or alternative options.

Who should get Medications?

Your doctor is best placed to decide this with you.

Not everyone at risk of fracture needs medication, and some should definitely not take them.

The American National Osteoporosis Foundation recommend considering medication for postmenopausal women and men aged older than 50 years with:

- A fragility fracture of spine or hip
- A DXA diagnosis of Osteoporosis (T-score <-2.5)
- Other fragility fractures and low BMD (T-score <-1.0)
- Others with low BMD and high risk of fracture, e.g. steroid use.

In general we don't recommend treating people <60 years without a prior fracture unless there are very compelling reasons, as there is not adequate data in younger individuals and the risk is lower in younger people.

As outlined earlier younger adults with osteoporosis, especially children, should be referred for specialist assessment prior to treatment.

The following classes of medications/drugs are used to treat or prevent osteoporosis:

Bisphosphonates:

These are the most widely used family of drugs used to treat people with osteoporosis. There are several different kinds. Some are taken by mouth: Alendronate (Fosamax®), Risedronate (Actonel®), Ibandronate (Bonviva®)

While others are given by intravenous injection: Zoledronate (Aclasta®), Ibandronate). Rare reported side effects may include atypical fractures of the femur, humerus and osteonecrosis of the jaw. However, there is a lack of strong evidence regarding this.

Biologic Medications:

These are drugs that must be given by injection. They cannot be taken in tablet form. The 2 main ones in regular use in Ireland today are:

- 1) **Teriparatide (Forsteo®):** is a synthetic partial version of human parathyroid hormone, and the only approved anabolic agent (stimulates growth, builds bone) with good fracture reduction efficacy in Ireland. This medication requires refrigeration and must be administered as a daily injection for up to two years.
- 2) **Denosumab (Prolia®):** This is a treatment called a monoclonal antibody. It works by blocking a protein involved in bone breakdown. This increases bone strength and reduces the risk of fracture. It is given by injection twice a year.

SERMs (Selective Oestrogen Receptor Modulators):

These medications copy the action of the hormone oestrogen on certain tissues in the body. Raloxifene (Evista®) reduces the risk of spine fracture and breast cancer. It increases the risk of leg cramps, hot flushes and blood clots. Bazedoxifene (Conbriza®) is similar, but the evidence for breast cancer reduction is not available.

- A) **Oestrogens:** There are many, but they are no longer recommended as a primary treatment for osteoporosis because of the risks of cancer and cardiovascular disease.
- B) **Strontium ranelate (Protelos®):** is no longer recommended as a treatment for osteoporosis because of competing risk of cardiovascular disease.

Getting the most out of your drug treatment

Taking your osteoporosis drugs as prescribed and following the instructions carefully will ensure you get the most from your medication. Understanding why the instructions are important can be helpful.

Get enough of the medicine to make a difference.

Continue to take your medication unless recommended by your doctor. Missing an occasional dose will probably have little impact on your bone health in the long run but if this happens regularly the medicine will have little effect, or possibly none at all.

If you continually forget or struggle to take your medication, it would be sensible to speak to your doctor about other treatment options that you may find easier to take.

Reduce the risk of side effects by taking your drug treatment correctly.



My Osteoporosis Treatments

Medication	Start date	Finish date

Other Treatments

Sometimes surgery is required to treat broken bones. This can be very frightening for patients, particularly if they have many other medical problems. Surgery is usually required for hip fractures and bones that are out of place. Sterile metal screws, wires and plates are used, and sometimes rods or joint replacement techniques. For some people with severe painful spine fractures minimally invasive spine techniques like kyphoplasty may be important. We are fortunate in Ireland to have expert surgeons in these techniques. Braces are generally not recommended for spine fractures. Casts, braces and walking aids may be required for patients until their fracture heals. Usual healing times can be up to several weeks.

Bone Health Checklist

Speak to your doctor about your bone health

It is important to talk to your doctor about any concerns you may have about your bone health. Here are some questions you may want to ask at your next appointment:

- Do I have risk factors for osteoporosis?
- Should I be assessed to figure out the likelihood that I will break a bone?
- Do I need a DXA scan? Do I need blood tests or other investigations?
- Am I getting enough calcium and vitamin D?
- Should I take calcium and vitamin D supplements?
- What types of exercises should I be doing?
- Do I have a health problem that can cause bone loss?
- Do any of the medications I take cause bone loss?



Additional Resources:

International Society for Clinical Densitometry: www.iscd.org

International Osteoporosis Foundation: www.osteofound.org

Irish Osteoporosis Society: www.irishosteoporosis.ie

National Institutes for Health, USA: www.nia.nih.gov/health/osteoporosis

National Osteoporosis Foundation: <https://www.nof.org/patients/what-is-osteoporosis/>

National Osteoporosis Society: <https://nos.org.uk>

“The Osteoporosis Book” available through amazon

<https://osteoporosis.ca/health-care-professionals/clinical-practice-guidelines/exercise-recommendations/>

FRAX Calculator for Ireland: <https://www.sheffield.ac.uk/FRAX/tool.aspx?country=48>