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# Osteoporosis: Weight bearing exercise and bone health

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## What is Osteoporosis?

Osteoporosis basically means porous (hollow) bones. Bone is a living tissue that is constantly being removed and replaced. Bones need normal sex hormones, calcium, vitamin D, proteins and weight bearing / strengthening exercise to keep them healthy. As we get older, more bone is naturally lost than is replaced, but people with Osteoporosis lose more bone than people who don't have the disease. This causes bones to become fragile and therefore, they break easily. In fact, a simple sneeze can cause ribs to fracture (break) due to undiagnosed Osteoporosis.



Osteoporosis can affect the whole skeleton, but the most common areas to break are the wrist, spine and hip. The disease affects all age groups and both sexes. One in 5 men and 1 in 3 women (1 in 2 over 65) will develop a fracture due to Osteoporosis in their lifetime. Even children can be affected by this silent disease. Research has found that every 30 seconds, someone in the EU has a fracture as a result of Osteoporosis. However, it can be prevented in most cases, and is a treatable disease in the majority of people.

**Osteopenia** is the early stages of Osteoporosis and this can develop into Osteoporosis unless prevention methods are put in place.

# Symptoms or signs of Osteoporosis

Osteoporosis is known as a silent disease because usually the first sign of it is a low trauma fracture e.g. a broken bone due to a trip and fall (which is not normal at any age). The other symptoms are:

- Sudden, severe episodes of upper, middle or low back pain
- Loss of height (4-16cm), which can be due to the vertebrae (bones in spine) collapsing.

If a hump develops and / or a change in body shape and size occurs, please speak to your GP, as the cause of a hump on a person's back should be investigated.

A broken bone due to Osteoporosis significantly increases your risk of a second broken bone. In addition, if one vertebrae collapses due to Osteoporosis, a second one is guaranteed to collapse within 6-12 months unless treatment is instigated. Despite this, 50% of Irish women with a collapsed vertebrae go undiagnosed.

## What causes Osteoporosis?

Osteoporosis has many different causes. Below is a list of some of the risk factors. You will notice that some of these are other diseases, some are treatments used to treat other diseases and some are secondary effects of a disease or lifestyle choices.

### **Family History**

Research has shown that a family history of osteoporosis is a very strong risk factor. If your parents or any family member suffers/ suffered from Osteoporosis, a broken hip, loss of height or if they developed a hump on their back, then you are at higher risk yourself.

## Other Diseases/ Illnesses

- Eating Disorders: People with a past or present eating disorder are at extremely high risk of developing Osteopenia / Osteoporosis as young as their teenage years and vertebral fractures in their 20's due to their bones and hormones being affected by lack of healthy eating.
- Gastrointestinal Disorders such as Coeliac, Crohn's, Ulcerative Colitis or Primary Biliary Cirrhosis.
- Endocrine Disorders such as High levels of prolactin, cortisol or PTH. Thyroid Hormone problems
- Asthmatics
- Diabetics
- Turner's Syndrome
- Klinefelter's Syndrome
- Haemochromatosis
- Bone Marrow Disorders
- Connective Tissue Disease
- Multiple Sclerosis
- Rheumatoid Arthritis
- Parkinson's disease
- Scoliosis

## Treatments for other illnesses

- Chemotherapy or Radiation: Any adult or child who has received or who will be receiving either treatment should have a DXA scan (see page 6).
- Corticosteroids such as prednisolone, prednisone or cortisone
- Anticonvulsants
- Post Organ Transplant Therapy
- Diuretics such as Lasix & Burinex
- Chronic Heparin or Warfarin
- Antipsychotic medications such as long term Lithium Therapy
- GnRh Antagonists.

## Lifestyle Factors

- Excessive Physiological or Psychological stress
- Low Body weight: If you are unsure if you are underweight for your height, check with GP or dietician
- Excessive athletic activity: Elite Athletes can develop

osteoporosis due to amenorrhoea (loss of periods for more than 4 months other than due to pregnancy) and due to having below-normal body weight for their height.

- Lack of regular exercise
- Diet: Low daily intake of Calcium and /or Vitamin D. Intolerance to dairy products or vegetarians / vegans who do not take Calcium, Vitamin D and protein supplements
- Smoking
- Alcohol: Women who regularly consume more than 14 units of alcohol per week and men who regularly consume more than 21 units of alcohol per week are at higher risk. 1 unit is equivalent to a half pint of beer, 1 small glass of wine or 1 measure of spirits.

### **Secondary Effects**

- Those who are wheelchair or bed bound or who have impaired mobility for more than six weeks e.g. Cerebral Palsy, amputees or those who have had a stroke (CVA)
- Sudden, severe episodes of upper, middle or low back pain or loss of height (4-16cm).

### **Additional Risk factors for Women**

The most common cause in women is Oestrogen Deficiency. Other hormonal risks include:

- First period after age 15
- Irregular or no periods for more than four months outside of pregnancy
- All women who have gone through the Menopause, particularly those who have experienced premature menopause
- Natural or Surgical menopause i.e. – ovary/ovaries removed/ hysterectomy
- Endometriosis

### **Additional Risk factors for Men**

The most common cause in men is testosterone deficiency (Hypogonadism). Symptoms of this include loss of sex drive, loss of erections, depression, and/or fatigue.

# Diagnosis of Osteoporosis

A DXA scan of the spine and hip is the only test the Irish Osteoporosis Society recommends for the diagnosis of osteoporosis. We do not recommend heel scans for diagnosis. If you have one risk factor (see page 3 - 5), we recommend that you speak to your Doctor about your risk of fracture and the possibility of getting a DXA scan.

You can then help prevent the development of osteoporosis or if you already have it, you can prevent further deterioration, reduce your risk of fracture and increase your bone strength.

## T-score

The result of a DXA scan for adults over 21 years of age is known as a T-score. A positive score means that you have healthy bones. Other diagnoses based on your T-score are:

-1 to -1.49	=	Mild Osteopenia
-1.5 to -1.99	=	Moderate Osteopenia
-2 to -2.49	=	Marked Osteopenia
-2.5 or higher	=	Osteoporosis or a low trauma fracture

Research shows that most fractures occur within a T-score range of -1.5 to -2.5. However, people with Osteoporosis are at an even higher risk of fracture as the bones are more fragile.

A person who has been diagnosed with Osteopenia and/or Osteoporosis should be re-scanned every two years preferably on the same machine to monitor the person's response to treatment.

## Treatment of Osteoporosis

The cause of Osteoporosis must firstly be investigated and addressed. A treatment plan should be based on age, medical history, DXA results, the risk factors involved and the person's risk of fracture. Calcium, Vitamin D and adequate calories and proteins are essential for healthy bones and help prevent and treat Osteopenia/Osteoporosis. Appropriate weight bearing/strength training exercises also help to prevent Osteoporosis and to treat the condition in conjunction with a suitable Osteoporosis medication.

## Exercise and Bone Health

Exercise can play an important part in helping to reduce your risk of Osteopenia/ Osteoporosis and it is also an important aspect of treatment.

If you have been diagnosed with either, we recommend that you be assessed by a chartered physiotherapist with a special interest in bone health. A physiotherapist can assess what exercises are safe and appropriate for you to do at home and what ones you should avoid, such as regular sit-ups, kickboxing or any stretch that puts additional stress on your vertebrae. If you are participating in a class or attending a gym, a physiotherapist can also advise you in this regard.

Bone is scaffolding which supports the body against the force of gravity. Bones resist the pull of our muscles to allow movement. As bone is a living tissue, it reacts to appropriate weight bearing exercise by growing stronger.

The safe and sensible way to begin an exercise programme is to take your time and listen to your body. The type of exercise you do depends on your age, your medical history, your DXA scan results and your risk of fracture.

Please remember that over-exercising is very harmful for your bones. In general, we recommend 30 minutes weight-bearing exercise a day, both for your bones and overall health. This can be broken up into 3-5 minutes at a time, 3 sets of 10 minutes or 30 minutes continuously. Children should be encouraged to do 60 minutes of moderate-high impact exercise daily (30 minutes weight-bearing and 30 minutes for overall general health). This is especially important prior to puberty as bone strength can be significantly increased to reduce the risk of osteoporosis in later life.

Examples of weight bearing activities include tennis, hockey, football, basketball, running, jogging, team sports and dancing. Walking is also a weight-bearing exercise. However, it is important to change your pace intermittently.

Some activities can be done in many places, and can be included in a busy daily routine. Stair climbing is good for your spine and hip but should only be done by those who are steady on their feet and using a rail. Ten times up and down an average flight of stairs (10-12 steps) is a third of your daily weight-bearing requirements.



Intermittent jogging is great for people who find running or jogging too strenuous. Walk for a few minutes and then jog for 30-60 seconds. This helps to increase bone density (strength) in the spine and hip.

# Advice regarding Exercise for Adults with Osteopenia

Speak to your GP and a chartered physiotherapist to find out what activities are appropriate for you. A chartered physiotherapist with a special interest in bone health, will take into account your DXA scan results, your medical history, your risk of fracture and the areas most affected before prescribing an appropriate exercise programme.

Start slowly and gradually build up the amount and the intensity until you have reached the target prescribed by your physiotherapist. Never increase the speed and intensity at the same time, and add only one new exercise in each session. This way if you experience a problem with an exercise you can identify which one it is.

Some exercises can specifically benefit your area of bone loss, e.g. the spine or hip. Exercises to promote good posture and balance are also recommended. Pilates and Tai Chi may be beneficial, ideally in small classes and run by a chartered physiotherapist.

STOP your exercise programme if you experience pain and have the area of pain reassessed. If pain persists, it could be a sign of an over-use injury, which means you should stop exercising until the injury heals. If you are feeling unwell, exercise is not recommended.

If you experience stiffness after exercising, this is your body saying that you have done too much, too soon. A slow walk could help to loosen up your muscles.

Exercise must be taken regularly to have any benefit. Little and often is the best strategy. Regular exercise must be a permanent lifestyle decision because if you stop, it's beneficial effects gradually wear off. Muscles adapt to extra use within weeks but bones take several months.

Note that your exercise programme should be reassessed at intervals.

# Advice regarding Exercise for Adults with Osteoporosis

Have an assessment with a chartered physiotherapist with a special interest in bone health, who will work with you to design an individualised programme of weight-bearing and muscle-strengthening exercises specifically for your needs.

Although it is important to avoid stresses that may cause fractures, avoiding all exercise and activities will only serve to diminish your bone health.

In general, avoid the following:

- Excessive forward bending of your back e.g. regular sit-ups and touching your toes with your legs straight
- Exercises that involve bending and twisting of your spine at the same time.
- High impact exercise as this increases your risk of developing or aggravating a back, hip, knee or ankle injury as well as the osteoporosis itself.

Remember that osteoporosis affects people of all ages. An exercise programme for a 20, 45 and 70 year old will all differ.

## **Fall Prevention**

If you have sustained a fracture as a result of a fall, then advice may be given by your physiotherapist on how to reduce your risk of further falls. A large amount of falls can be prevented, e.g. by wearing good walking shoes in your home instead of slippers.

# Basic Rules for Exercising

**Clothes:** Wear runners and comfortable clothing.

**Environment:** Make sure you have enough space to move and that you will not get too hot or too cold.

**Warm Up:** Start slowly, doing gentle exercise like marching on the spot. Do safe stretching exercises before you begin your main exercise and cool down and stretch after the activity to reduce your risk of injury. Always stretch slowly and never bounce as this can cause an injury. Ideally, you should hold the stretch for 30 seconds.



**Type of Exercise:** Try to pick an activity that you know you like, so you will not dread having to do it. Varying your activities reduces your risk of getting bored and will stimulate more bone growth.

**Progression of your activity:** Gradually build up the intensity and the amount of time.

## Weight training for women and men

Resistance training using weights and gym machines has been shown to promote bone health by increasing your muscle strength and bone density. This consists of lifting heavy (but we recommend moderate if you have osteoporosis) weights in a slow, controlled manner.

You should always warm up first and alternately work the arms and legs. Begin with two leg exercises followed by one upper body exercise. Begin lifting the weights slowly and take ten seconds in between each lift. Breathe in as you lift and breathe out as you lower the weight.

To avoid an injury, begin with weights that are 25% of the maximum you can lift. As you slowly and steadily progress, increase the weights to 85% of your maximum; this should be done over 3-4 months. In young healthy individuals, begin with 50% of your maximum, increasing to 85% over 3-4 months.

If you weight train regularly, it is best to take a days rest in between training days.

Getting advice from a chartered physiotherapist with an interest in bone health should help you avoid an injury. You need to be especially careful with weight training if you have back pain combined with osteoporosis risk factors.

Remember that strenuous weight training can cause a serious injury if you have undiagnosed osteoporosis.



For a Chartered Physiotherapist in your area, contact the Irish Society of Chartered Physiotherapists, Royal College of Surgeons, St.

Stephen's Green, Dublin 2. Tel: +353 1 4022148.

Fax: +353 1 4022160. E-mail: [info@iscp.ie](mailto:info@iscp.ie)

Website: [www.iscp.ie](http://www.iscp.ie)

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I wish to make a one off donation of:

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## Aims of the Irish Osteoporosis Society

- To prevent the alarming increase of Osteoporosis in Ireland by increasing awareness of the risk factors for it.
- To provide support, advice and information for people suffering from Osteoporosis.
- To distribute up-to-date information to doctors and health care workers on current methods of prevention and treatment.
- To encourage research into this area in Ireland.

## Services available to IOS members

- Helpline • Website • Newsletter • Support groups • Lectures • Public meetings • Awareness campaigns