OSTEOPOROSIS:
Weight bearing exercise and bone health
What is Osteoporosis?

Osteoporosis basically means porous 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 do not have the disease. Osteoporosis causes bones to become fragile and therefore they break easily. In fact, a simple sneeze can cause ribs to fracture (break) due to severe undiagnosed osteoporosis.

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 one or more of the following:

- A fragility fracture (low trauma fracture) e.g. a broken bone due to a trip and fall (which is not normal at any age as an adult)
- Sudden, severe episodes of upper, middle or low back pain
- Loss of height (over 2cm) which, if caused by osteoporosis, can be due to the vertebrae (bones in spine) collapsing.
- A hump develops on the upper back and / or a change in body shape and size occurs.

It is essential that the cause/s should be investigated and addressed. 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 can collapse within 6-12 months unless treatment is instigated. It is estimated that only 15% of people with osteoporosis are diagnosed.

What causes Osteoporosis?

There are many reasons as to why a person can develop osteoporosis. Below is a list of some of the risk factors. You will notice that some of these are diseases, some are treatments/medications used to treat other diseases, while some are secondary effects of a disease or lifestyle choice.
Family History
Research has shown that a family history of osteoporosis is a very strong risk factor for the disease. 80% of your bone is determined by genetics, therefore if a parent, grandparent or a close family member suffers / suffered from osteoporosis or had a sign or symptom, then you may be at a higher risk yourself.

Other Diseases/Illnesses
- **Rheumatoid Arthritis**: the disease itself and steroid treatments.
- **Eating Disorders**: People with a past or present eating disorder are at extremely high risk of developing osteopenia/osteoporosis. Vertebral fractures have occurred in people as young as 20 due to anorexia and bulimia which can affect their sex hormones, which in turn affects their bones, as well as other major organs.
- **Gastrointestinal Disorders** such as Coeliac, Crohn’s, Ulcerative Colitis or Primary Biliary Cirrhosis.
- **Endocrine Disorders**: such as high levels of cortisol, Cushing’s Syndrome, Thyroid Hormone problems
  - Asthmatics on steroids inhalers
  - Diabetics
  - Turner’s Syndrome
  - Klinefelter’s Syndrome
  - Haemochromatosis
  - Bone Marrow Disorders
  - Connective Tissue Disease
  - Multiple Sclerosis
  - 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 and be monitored AND treated preventively.
- **Aromatase inhibitors**: for cancer of the breast and prostate
- **GnRh Antalogues**: used in treatment of endometriosis, or cancer of the breast and prostate
- **Corticosteroids**: such as prednisolone, prednisone or cortisone
- **Some Anticonvulsants** for epilepsy
Post organ transplant therapy

Diuretics such as Lasix & Burinex

Chronic Heparin or Warfarin

Antipsychotic medications such as long term Lithium Therapy

**Lifestyle Factors**

- Excessive Physiological or Psychological stress
- Low body weight: If you are unsure whether you are underweight for your height, check with your doctor or dietician
- Elite athletes can develop osteoporosis due to amenorrhoea (loss of periods for more than 4 months, not due to pregnancy). This can be due to a variety of causes which include over training, inadequate nutrition and below normal weight for their height and eating disorders
- Lack of regular weight bearing exercise
- Low daily intake or poor absorption of calcium, vitamin D and protein
- Intolerance to dairy products
- Vegetarians/vegans who have excessive fibre in their diet and who do not take the daily recommended amount of calcium, vitamin D and protein
- Excessive fibre intake - over 40 grams daily
- Excessive caffeine intake
- 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-bound, bed-bound or who have impaired mobility for more than six weeks. e.g. people with Cerebral Palsy, amputees or those who have had a stroke
- Children who were bed-bound / wheelchair-bound or had impaired mobility in prepuberty and teenage years.
- Sudden, severe episodes of upper, middle or low back pain or loss of height (more than 2cm) should be investigated
Additional Risk factors for Women
The most common cause in women is oestrogen deficiency. This may be due to a variety of causes:

- First period after age 15
- Irregular or no periods for more than four months, not due to pregnancy
- All women who have gone through the Menopause, particularly those who have experienced a premature menopause (before 45 years)
- Surgical menopause i.e. - ovary/ovaries removed/ hysterectomy
- Endometriosis

Additional Risk factors for Men
The most common cause of osteoporosis 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 hips is the only test the Irish Osteoporosis Society recommends for the diagnosis of osteoporosis. At this time we do not recommend any type of heel scans for the diagnosis of osteoporosis. If you have one or more risk factors, 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 and reduce your risk of fracture.
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.

-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 fragility fracture

All individual T scores should be looked, not just the total. e.g. L1, L2, L3, L4 and both areas of the hip

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 their bones are more fragile.

A person who has been diagnosed with osteopenia or osteoporosis when possible should be re-scanned every two years, preferably on the same machine to monitor their response to treatment.

**Treatment of Osteoporosis**

The cause/s of osteoporosis must firstly be investigated and addressed. A treatment plan should be based on a person’s risk of fracture, age, medical history, DXA results of spine and hips and the risk factors involved. Calcium, Vitamin D, adequate calories, proteins and normal levels of sex hormones 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 when possible 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 sit-ups, high impact aerobics 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. This is how you support the weight of your own body.

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 risk of fracture, your age, your medical history and your DXA scan results.

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. High impact exercise is not recommended for those with osteopenia / osteoporosis. 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 dancing, tennis, hockey, football, basketball, running, jogging, team sports. Walking
is a weight-bearing exercise, however it is important to change your pace intermittently and do not walk the exact same route every time.

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 hips but should only be done by those who are steady on their feet and handrails (banisters) should always be used. Ten times up and down an average flight of stairs (10-12 steps) is a third of your daily weight-bearing requirements, it is equivalent to ten minutes of exercise.

Intermittent jogging is great for people who find running or jogging too strenuous. Walk for a few minutes and than jog for 30-60 seconds. This helps to increase bone density (strength) in the spine and hips but you should be medically cleared by your doctor.

Advice regarding Exercise for Adults with Osteopenia

Speak to your doctor 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 preferably 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, its beneficial effects gradually wear off. Muscles adapt to extra use within weeks but bones take several months.

**NOTE:** Your exercise programme should be reassessed at regular intervals.

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**Advice regarding Exercise for Adults with Osteoporosis**

Have an assessment when possible, with a chartered physiotherapist with a special interest in bone health, who will work with you to design an individualized 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 exercises 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 problem 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 should all differ. For best results everyone should be assessed individually when ever possible.

**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 open back or poorly supported slippers. Removing throw rugs from your home and getting regular eye exams can also help.

**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 Osteopenia and/or 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:

Irish Society of Chartered Physiotherapists,
Royal College of Surgeons,
St. Stephen’s Green,
Dublin 2.

Tel: +353 1 402 2148.
Fax: +353 1 402 2160.
E-mail: info@iscp.ie
Website: www.iscp.ie

If you would like more information on Osteoporosis for yourself or a family member please contact:

The Irish Osteoporosis Society
12 Burlington Road,
Garden Level, Ballsbridge
Dublin 4.

Tel: 01 637 5050
Email: info@irishosteoporosis.ie
www.irishosteoporosis.ie

Osteoporosis Helpline:
(Lo-call) 1890 252 751
Aims of the Irish Osteoporosis Society

- To prevent the alarming increase of Osteoporosis in Ireland by increasing awareness of the risk factors for this silent disease.
- To provide support, advice and information for people at risk or 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
- Osteoporosis Awareness groups
- Lectures
- Public meetings
- Awareness campaigns
- Health Promotions

Additional information available

- Calcium and Vitamin D3 Leaflet
- Fall Prevention Leaflet
- Nutrition Leaflet
- Unlamented Fall prevention Poster: For senior citizens to make their homes safer.
- Laminated Fall Prevention Poster: For GP and PT depts, pharmacies and community centers.
- Usual suspects poster: For GP and PT depts, pharmacies and community centers.
- Educational Osteoporosis package: 12-18 years: DVD and 140 power point
- Brent Pope book “Bones” for 7-12 years of age
**Membership and Donation Form E**

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- I wish to join the society
- I wish to renew my membership

**I enclose the following subscription:**

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In addition, I would like to make a donation to the Irish Osteoporosis Society in the amount of:

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**Payment Details**
Payment: please make cheques/PO payable to: **The Irish Osteoporosis Society** and crossed ‘Account payee only’.

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**Thank you for your support!**
Please send this form and payment to:

The Irish Osteoporosis Society,
12 Burlington Road,
Garden Level,
Ballsbridge,
Dublin 4.

Tel:    Lo-call 1890 252751
Tel:    01 637 5050
Fax:    01 668 0098
Email: info@irishosteoporosis.ie.
Web:    www.irishosteoporosis.ie

Would you be interested in helping us to increase awareness about osteoporosis?
I would be interested in:

- Receiving more information about the Irish Osteoporosis Society
- Volunteering time for the Irish Osteoporosis Society
- Attend a 1-evening information class on Osteoporosis
- Promoting osteoporosis awareness by distributing information leaflets to GPs/community centers, pharmacies etc
- Helping to arrange an osteoporosis information talk in my area
- Information on Legacies

Name:

Address:

Telephone No: Email:
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