

STRONG BONES MAKE STRONGER WOMEN



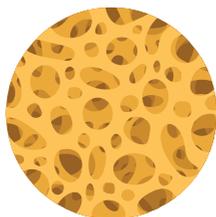
**Five essential strategies
for bone care after 50**



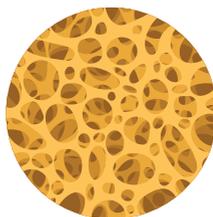
WHAT IS OSTEOPOROSIS?

Osteoporosis is a disease in which bones become fragile and weak, leading to an increased risk of fractures (broken bones). People with osteoporosis can experience a fracture even after a slight bump, or a fall from standing height, in the course of daily activities.

Osteoporosis has no signs or symptoms until a fracture occurs – this is why it is often called a 'silent disease'. Fractures due to osteoporosis occur most commonly at sites such as the wrist, upper arm, pelvis, hip and spine, and can result in severe pain, significant disability and even death.



NORMAL BONE



OSTEOPOROTIC BONE

A COMMON DISEASE

It is estimated that worldwide, an osteoporotic fracture occurs every three seconds. One in three women and one in five men from the age of 50 will suffer a fracture in their remaining lifetimes.

In women over 45 years of age, fractures due to osteoporosis result in more days spent in hospital than many other diseases, including diabetes, heart attack and breast cancer.

BONE HEALTH MATTERS TO WOMEN AND THEIR FAMILIES

In all countries and cultures, women play a vital role in the family and in society. Women over the age of 50 in particular face an increasing burden of responsibilities; as caregivers to the young and old, bread winners preparing for retirement and contributors to the welfare of the communities in which they live.

Fragility fractures exact a terrible toll on the quality of life of postmenopausal women worldwide. Everyone knows a family member or friend who has suffered an osteoporotic fracture; whether a 55-year-old sister who has broken her wrist or a 78-year-old grandmother who has broken her hip. All of these women's lives will be seriously affected by fractures.

Because osteoporosis is so common, every woman must come to recognize that bone health **really** matters to her and the welfare of her family.



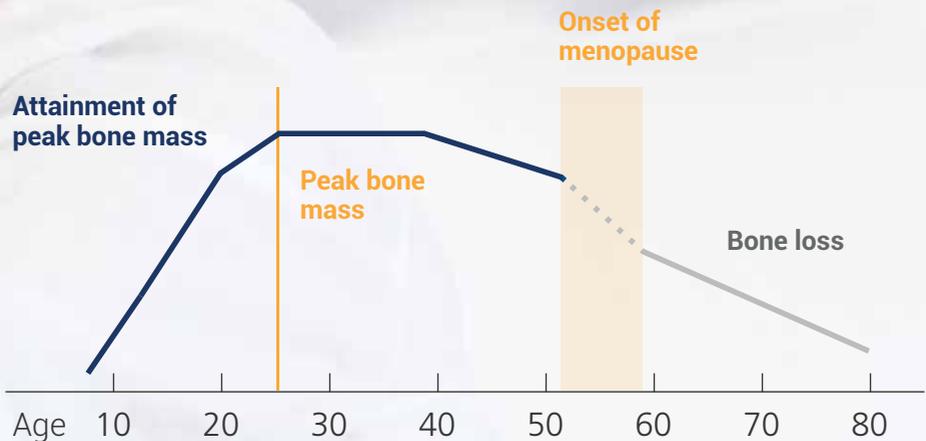


The vast majority of fractures occur amongst women aged over 65 years

POSTMENOPAUSAL WOMEN ARE AT GREATEST RISK

Postmenopausal women are at high risk of developing osteoporosis and suffering fractures on account of the rapid bone loss which occurs with the onset of menopause. Bone mass peaks in the mid-twenties and remains relatively stable until the beginning of menopause, which typically occurs between age 50 and 53 in women from Europe and North America, and as early as age 42 in Latin America and Asia.

Oestrogen plays a vital role in regulating bone production and turnover throughout life. Every day, our skeletons undergo a process of formation and breakdown. However, as women become oestrogen deficient when periods cease, bone breakdown begins to exceed bone formation. In addition to oestrogen deficiency, reduced intestinal calcium absorption, increases in urinary calcium losses, and loss of bone protective hormones also have a negative effect on bone health. Menopause-induced bone loss can be most severe in women who have had their ovaries surgically removed or in cancer patients who have had aromatase inhibitor therapy.



FIVE ESSENTIALS STRATEGIES TO REDUCE OSTEOPOROSIS AND FRACTURE RISK

Your risk of developing osteoporosis and fragility fractures is determined by a number of factors, some of which can be changed (e.g. exercise, nutrition and smoking) while others cannot (e.g. family history, age at menopause and diseases such as rheumatoid arthritis).

While peak bone mass is partly genetically determined, after 65 years of age genetics play a diminishing role in bone loss and other factors, such as exercise and nutrition, play an increasingly important role.

Maintaining a healthy skeleton involves five essential strategies to reduce your risk of osteoporosis and fractures.

1

2

3

4

5



Exercise regularly

**Ensure a diet rich in
bone-healthy nutrients**

**Avoid negative lifestyle
habits and maintain a
healthy weight**

Identify your risk factors

Talk to your doctor:

- Get tested
- Get treated if required

STRATEGY 1:

EXERCISE REGULARLY

The saying *'move it or lose it'* is never more true than after the age of 50. At menopause, exercise becomes especially important for the maintenance of bone mass and muscle strength.

Besides maintaining bone strength, the main goal of exercise is to increase muscle mass in order to improve muscle function, and to maintain good balance and strength. Weak muscles and poor balance can contribute to falls and fractures.

The positive effect of exercise on bone is dependent upon both the type of exercise and the intensity. Resistance (or muscle-strengthening) exercises become even more important as one ages. While it is difficult to build bone mineral after adulthood, weight-bearing exercise has been shown to lead to modest increases in bone mineral density (BMD) of around 1-2%.

Exercise programmes should be tailored to your needs and capabilities, especially if you have osteoporosis, are highly prone to falling, or are frail.



Exercises for healthy postmenopausal women

Overall, you should aim to exercise for 30 to 40 minutes, three to four times each week, with some weight-bearing and resistance exercises in the programme. Some examples include:

WEIGHT-BEARING

- › Dancing
- › High-impact aerobics
- › Hiking
- › Jogging / running
- › Jumping rope
- › Stair climbing
- › Tennis

MUSCLE-STRENGTHENING

- › Lifting weights
- › Using elastic exercise bands
- › Using weight machines
- › Lifting your own body weight
- › Standing and rising on your toes

BALANCE, POSTURE AND FUNCTIONAL EXERCISES ALSO HAVE AN IMPORTANT ROLE TO PLAY

- › **Balance:** exercises which strengthen the legs and test your balance can reduce falls risk, e.g. Tai Chi
- › **Posture:** exercises to improve posture and reduce rounded shoulders may reduce fracture risk, particularly at the spine
- › **Functional exercises:** exercises which help with everyday activities

Exercise for women with osteoporosis

If you have osteoporosis, your exercise programme should specifically target posture, balance, gait, coordination, and hip and trunk stabilization rather than general aerobic fitness. An individually targeted exercise programme, with supervision if required, aids recovery of function, helps prevent further injurious falls, and improves quality of life.

The following should be avoided if you have osteoporosis:

- Sit-ups and excessive bending from the waist (can cause vertebral crush fractures)
- Twisting movements (such as a golf swing)
- Exercises that involve abrupt or explosive loading, or high-impact loading (such as jumps)
- Daily activities such as bending to pick up objects (can cause vertebral crush fractures)



STRATEGY 2:

ENSURE A BALANCED DIET RICH IN BONE HEALTHY-NUTRIENTS

A balanced diet that includes adequate calcium, vitamin D, protein, and other bone-healthy nutrients is an important ingredient for good bone health. Below is a list of the key nutrients which contribute to strong and healthy bones and muscles.

Calcium

Calcium is a major building block of our skeleton. The calcium in our bones also acts as a reservoir for maintaining calcium levels in the blood, which is essential for nerve and muscle function. As the body's ability to absorb calcium declines with advancing age, a woman's requirements will increase. Recommended calcium intake varies country to country, but all health authorities recognize the increased **need for calcium in postmenopausal women and older adults.**

RECOMMENDED CALCIUM INTAKE FOR SEVERAL COUNTRIES

Country	Age range	Calcium intake (mg)	Organization
Australia	51-70 years	1300 (RDI)	National Health and Medical Research Council
	> 70 years	1300 (RDI)	
Canada	≥ 50 years	1200	Osteoporosis Canada
Korea	≥ 50 years	800-1000 mg	Korean Bone & Mineral Society
UK	≥ 50 years	700	Department of Health
USA	51-70 years	1200 (RDI)	National Academy of Medicine
	≥ 71 years	1200 (RDI)	
WHO/FAO	postmenopausal women	1300	WHO/FAO 2002

RDI Recommended Dietary Intake **DRI** Dietary Reference Intake



To supplement or not to supplement?

Over the last few years researchers have been debating how individuals can best ensure adequate intake of calcium to support a healthy skeleton. The debate was triggered by recent reports that calcium supplements may increase risk of myocardial infarction and kidney stones. A clear message from this debate is that dietary calcium (i.e. from food sources) is the preferred source of calcium. Nevertheless, for people who cannot get enough calcium through their diet, calcium, or calcium with vitamin D, supplements may be beneficial for general health as well as reducing fracture risk. Calcium supplements should however be limited to 500–600 mg per day.

CALCIUM-RICH OPTIONS ACROSS A RANGE OF FOOD GROUPS

Food	Serving size (average)	Calcium (mg)
Milk, semi-skimmed	Glass, 200ml	240
Yogurt, low-fat, plain	Pot, 150g	243
Cheese, edam	Portion, 40g	318
Curly kale	Serving, 95g	143
Sesame seeds	1 tablespoon	80
Rice pudding, canned	Average portion, 200g	176
Whitebait, fried	Portion, 80g	688
Pasta, plain, cooked	Portion, 230g	85
Figs, ready to eat	4 fruit, 220g	506
Tofu, soy bean, steamed	100g	510

Vitamin D

Vitamin D, which is made in the skin after sun exposure, plays a crucial role in bone and muscle health. It assists the body in absorbing calcium, regulates parathyroid hormone levels, ensures correct renewal and mineralization of bone and helps improve muscle strength and balance - thereby reducing falls risk.

Low levels of vitamin D in the population are a cause of concern around the world, even in regions with abundant sunshine. Although healthy younger people can generally obtain their vitamin D requirements through around 15 minutes of daily sun exposure, sunlight is not always a reliable source of vitamin D. The season and latitude; the use of sunscreen; city smog; a person's age; as well as many other factors, will affect how much vitamin D is actually obtained through sunlight.

There are dietary sources of vitamin D, although these are limited. Foods that contain vitamin D include fatty fish such as salmon, cod liver oil, mushrooms, and eggs. In some countries foods fortified with vitamin D, such as butter, milk or cereals, may be available.

Although screening is not necessary for the average healthy woman, your doctor may test to measure your vitamin D levels if you have had a minimal trauma fracture, have a dark skin tone, are obese, are taking anti-epileptic drugs, have a malabsorption disorder, cover most of your body for cultural or religious reasons, or have a medical condition that prevents you from going out into the sun without protection.

Protein

Body composition changes after middle age, including increases in fat mass and decreases in muscle mass. Protein intake can make a difference. Studies have found that participants with the highest protein intake lost 40% less lean mass than those with the lowest protein intake. Lower protein intake is associated with loss of BMD at the hip and spine. Adequate calcium intake is necessary in order for the beneficial effect of protein on BMD to be realised.

Protein is found in meat, fish, dairy products, and eggs. Good vegetarian sources of protein are beans, lentils and legumes, soy products, nuts, quinoa and other whole grains.

Importance of a balanced diet

New research indicates that an acidic environment has negative effects on preservation of bone. Acidosis can occur when the intake of acid-producing foods, such as cereal grains and protein, is not balanced by enough alkali-producing fruits and vegetables. Diets rich in fruit and vegetables are associated with higher BMD and/or lower propensity for bone loss. To balance the need for protein, your dietary acid load can be lowered by decreasing your intake of cereal grains while increasing your intake of fruits and vegetables, which also contain **micronutrients** such as vitamin K, magnesium, zinc and carotenoids.





***IOF vitamin D
recommendations
are 800 to 1,000 IU
per day for fall and
fracture prevention
in adults aged 60
and older***

STRATEGY 3:

AVOID NEGATIVE LIFESTYLE HABITS AND MAINTAIN A HEALTHY WEIGHT

The negative habits that affect your general health also have a negative impact on your bone health, and raise your risk of osteoporosis and fractures.

Smoking

Current smokers and those who have smoked in the past are at increased risk of any fracture, compared to non-smokers.

Excessive alcohol intake

Alcohol taken in moderation – e.g. up to two glasses (2 x 120 ml) of wine per day – does not negatively impact on bone health. However, long-term heavy alcohol use has been shown to increase fracture risk in both women and men in that it affects bone forming cells and hormones, increases risk of falls, and is associated with poor nutrition with respect to calcium, vitamin D or protein.

Maintaining a healthy weight

Being underweight is associated with greater bone loss and increased risk of fracture. People with a BMI of 20 kg/m² have a two-fold increased risk of fracture compared to people with a BMI of 25 kg/m². Ensure your meals offer enough caloric intake and the nutrients you need to maintain healthy bones and muscles.



STRATEGY 4:

IDENTIFY YOUR RISK FACTORS

To enable you and your doctor to identify whether you may be at high risk of suffering osteoporotic fractures, you should be aware of the following 'nonmodifiable' risk factors:

Previous fragility fractures

Anyone over age 50 who has had a prior fracture is at double the risk of a future fracture compared to someone who has not fractured. In fact, half of patients who suffer hip fractures have previously broken another bone before breaking their hip. If you've already suffered a fragility fracture, it is vitally important that you discuss how to prevent future fractures with your doctor.

Family history of osteoporosis and fractures

Genetics will partly determine your peak attainable bone mass and the rate of bone loss in the early years after menopause. A parental history of fracture is associated with an increased risk of fracture that is independent of bone mineral density. If your parents have suffered hip fractures or been diagnosed with osteoporosis you are at higher risk.

Medications which negatively affect bone health

Some medications may have side effects that directly weaken bone or increase the risk of fracture due to fall or trauma. If you are taking any of the following medications you should consult your doctor about the increased risk to your bone health:

- **Glucocorticoids (e.g. prednisolone, cortisone)**
- **Certain immunosuppressants (calmodulin/calcineurine phosphatase inhibitors)**
- **Thyroid hormone treatment (L-Thyroxine) in excess dosage**
- **Aromatase inhibitors (used in breast cancer)**
- **Certain antipsychotics**
- **Certain anticonvulsants**
- **Certain antiepileptic drugs**

Glucocorticoid (GC) treatment is the most common cause of drug-induced osteoporosis, and a significant proportion of bone loss occurs in the first 6 months of treatment. GCs effects are dose related so it is important that patients take the lowest effective dose for the shortest possible length of time. Various osteoporosis medications have been demonstrated to prevent GC-induced bone loss and fragility fractures. Adequate calcium and vitamin D are also essential to assist effective treatment.

Diseases of malabsorption

Low bone mass is common amongst sufferers of Crohn's and celiac disease. The major causes of osteoporosis amongst sufferers of malabsorption are malnutrition of calcium, vitamin D, protein and other nutrients, and the accompanying weight loss. Guidelines on osteoporosis prevention and management in inflammatory bowel disease and celiac disease have been published in many countries.

Early menopause

Premature menopause (before age 40) and early menopause (between ages 40 and 45) are associated with osteoporosis. The earlier the menopause occurs, the lower the bone density will be later in life. Women who undergo surgical removal of the ovaries before age 45 are at increased risk of developing osteoporosis. If you have experienced premature or early menopause you should consider having a BMD scan conducted within 10 years of menopause.

Rheumatoid arthritis

Sufferers of rheumatoid arthritis have lower BMD and are at increased risk of fracture, depending on the severity of the disease.

Tendency to fall

Do you fall frequently (i.e. more than once in the last year)? Falls, especially in women with low bone density, are very often the cause of fractures. If you have poor vision, poor muscle strength and balance, or take medications that affect balance, you need to take special precautions. Make sure your home is 'fall proof': beware of rugs or objects which can cause you to trip, ensure slip-free floor surfaces, use handrails, and wear sturdy, slip-free shoes both inside and outside the home.



STRATEGY 5:

TALK TO YOUR DOCTOR: Get tested & treated if required

Menopause is definitely the time to take action for a break free future – and that means talking to your doctor about bone health. If you have any risk factors, it is especially important that you ask your doctor for a clinical examination. This will likely include an assessment of future fracture risk and a bone density measurement with Dual-energy X-ray Absorptiometry (DXA) – it only takes a few minutes, is painless and non-invasive. If you're at risk of falls, you should also discuss fall-prevention strategies.

Depending on the results of your clinical assessment, the doctor may make specific recommendations for calcium and vitamin D supplementation, other supplements, exercise, and possibly pharmacologic intervention and follow-up.

Regardless of your risk and whether treatment is prescribed, good nutrition and an active lifestyle are essential to optimizing both your general health and musculoskeletal health – and this is more important at menopause than ever before!

Assessing future fracture risk

As part of your clinical assessment your doctor may refer to the Fracture Risk Calculator (FRAX®), one of the most widely used computer-based tools to calculate the 10-year probability of fracture.

FRAX® calculators can be accessed online at www.shef.ac.uk/FRAX



Questions to ask your doctor at your check-up:

- **What are lifestyle changes I can implement at menopause to optimize bone health?**
- **What are recommendations for calcium, vitamin D, and exercise?**
- **My mother had a hip fracture/or had a hump/what is my risk for fractures?**
- **Should I have a bone density test and how often should it be repeated?**

Treatment options

For patients at high risk, drug therapies are needed to effectively reduce the risk of fracture. Today there is a wider variety of treatment options than ever before. The type of treatment selected will depend on your individual risk profile. This includes the risk for a specific type of fracture (spine versus hip), other medical conditions, or medications you may take. Finally, cost and cost-effectiveness considerations, insurance plans and reimbursement policies will undoubtedly also influence your doctor's recommendations of therapeutic options.

Medically approved drug therapies for the treatment of osteoporosis and prevention of fractures include bisphosphonates, raloxifene, bazedoxifene, denosumab, teriparatide, abaloparatide and romosozumab. Not all of these drugs are available in all countries.

Menopausal Hormone Therapy (MHT) is not a primary treatment for osteoporosis, but has been shown to increase BMD and lower fracture risk in postmenopausal women. However, MHT is associated with a higher risk of cardiovascular, cerebrovascular disorders, and breast cancer in older postmenopausal women. MHT is only recommended for younger postmenopausal women for the treatment of menopausal symptoms, with no contra-indications to its use, and for a limited period of time.

Side effects of treatment

Overall, the common medically approved therapies have been shown to be safe and effective. However, there are potential side effects with any medication and patients should be aware of these. While it is important to be aware of possible adverse effects, patients and doctors should keep in perspective the risk of stopping treatment versus the rare occurrence of serious side effects.

Importance of sticking with your treatment

Like all medication, osteoporosis treatments can work only if they are taken properly. As reported for other chronic diseases, up to half of osteoporosis sufferers stop their treatment after only one year.

If you have been prescribed osteoporosis medication, you should keep in mind that by adhering to your treatment, you can benefit from larger increases in BMD, lose less bone mass, and reduce your fracture risk.



OSTEOPOROSIS.RISK.CHECK

1. Are you aged 60 or older?

- Yes No

2. Have you broken a bone after the age of 50?

- Yes No

3. Are you underweight?

- Yes No

To calculate your BMI in case you do not know it	BMI value	Meaning
<p style="text-align: center;">Metric units</p> $\text{BMI} = \frac{\text{weight in kilograms}}{\text{height in meters}^2}$	Below 19.0 19.1 to 24.9 25.0 to 29.9 Above 30.0	Underweight Normal/Healthy Overweight Obese

If you have ticked yes to 2 or more of the above questions, your replies suggest that you may have major risk factors for osteoporosis and fractures. We encourage you to ask for assessment and to discuss strategies to reduce your risk for osteoporosis-related fractures with your doctor.

4. After the age of 40, have you lost more than 4 cm in height (ca. 1.5 inches)?

- Yes No I do not know

5. Have either of your parents had a hip fracture?

- Yes No

6. Do you have any of the following disorders?

- Rheumatoid arthritis
- Digestive tract diseases (inflammatory bowel disease (IBD), coeliac disease)
- Prostate or breast cancer
- Diabetes
- Chronic kidney disease
- Thyroid or parathyroid gland disorders (hyperthyroidism, hyperparathyroidism)
- Lung disorder (chronic obstructive pulmonary disease (COPD))
- Low testosterone (hypogonadism)
- Early menopause, periods stopped, ovaries removed (low oestrogen due to hypogonadism)
- Prolonged immobility, for example unable to walk unaided
- HIV
- I do not know, but I will ask my doctor
- None of the above

7. Have you been treated with any of the following medications?

- Glucocorticoids, or "steroids", used to treat inflammation (e.g. prednisolone tablets for 3 months or longer)
- Aromatase inhibitors used to treat breast cancer
- Androgen deprivation therapy used to treat prostate cancer
- Thiazolidinediones used to treat diabetes (e.g. pioglitazone)
- Immunosuppressants used after transplantation surgeries (e.g. calcmodulin/calcineurin phosphatase inhibitors)
- Antidepressants used to treat depression, obsessive compulsive disorder etc. (e.g. selective serotonin reuptake inhibitors (SSRI))
- Anticonvulsant or antiepileptic drugs used to treat seizures (e.g. phenobarbital, carbamazepine and phenytoin)
- I do not know, but I will ask my doctor
- None of the above

8. Do you drink excessive amounts of alcohol (> 3 units a day) and/or smoke?

- Yes
- No



If any risk factors apply to you, it does not mean that you have osteoporosis, just that you may have a greater chance of developing this condition. In this case, be sure to discuss bone health with your doctor, who may advise a bone health assessment. If you have not identified any risk factors, we encourage you to lead a bone healthy lifestyle and keep monitoring your risks in the future.

Find out which resources are available to help you and your family and friends stay bone-healthy.

- **Contact your local osteoporosis society.** A list is available at www.osteoporosis.foundation
- **Reach out and join a patient-support group in your community**
- **Visit the IOF website** www.osteoporosis.foundation to learn more about osteoporosis

SHOW YOUR SUPPORT FOR GLOBAL OSTEOPOROSIS PREVENTION

- **Take part in World Osteoporosis Day on October 20** each year www.worldosteoporosisday.org
- **Sign the IOF Global Patient Charter** to show your support for patient rights at www.globalpatientcharter.iofbonehealth.org/
- **Join or donate to your local osteoporosis society**

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