

## Osteoporosis... Facts & Instructions

### What is bone made of?

Bones are proteins, minerals and vitamins that make up cells that build together integral dynamic living bone tissue and have the ability to grow and repair themselves.

### What is osteoporosis?

Osteoporosis is a disease in which the density and quality of bone decreases. Bones become more porous, brittle and fragile due to loss of calcium. This causes fractures that occur most commonly in the hip, spine and wrist.

### Signs and Symptoms:

Usually no symptoms appear in the early stages of osteoporosis, but as the disease progresses, they begin to manifest, including:

- Back pain, caused by a fractured or slipped vertebra.
- Loss of height.
- Stooped posture.
- Easily broken bones.

### Risk Factors for Osteoporosis:

Some risk factors for osteoporosis are uncontrollable, including:

- Women are at higher risk to develop osteoporosis than men.
- **Age:** The risk of osteoporosis increases with age.
- **Family history:** Having a parent or sibling with osteoporosis puts you at higher risk, especially if you also have a family history of hip fractures.
- Small body frames may increase the risk of osteoporosis.
- Menopause/Hysterectomy:  
Hysterectomy, if accompanied by oophorectomy, may also increase the risk of osteoporosis due to loss of estrogen.



- **Rheumatoid arthritis:**  
Rheumatoid arthritis and endocrine diseases, such as hyperthyroidism, have direct effects on bone density.
- **Hormone deficiencies:**  
Estrogen deficiency in women and androgen deficiency in men increase the risk of fractures.

#### **Secondary Nonadjustable Risk Factors:**

These are less common but can have a significant impact on bone health.

- **Other diseases that directly or indirectly affect bones, including:**
  - Asthma.
  - Malnutrition or digestive problems.
  - Blood-related disorders.
  - Any type of disability.

#### **Drugs that affect bone health:**

Some drugs may have side effects and directly weaken bones or increase the risk of fractures due to falls or trauma. These include:

- Oral or inhaled steroids.
- Some Immunosuppressants.
- Thyroid hormone medication.
- Some steroids.
- Aromatase inhibitors.
- Some antipsychotics.
- Certain antibiotics.
- Some antiepileptic drugs.
- Antacids.
- Proton pump inhibitors.

### **Adjustable or Controllable Risk Factors:**

Most risk factors have direct effects on bone formation and lead to decreased bone mineral density, but some also indirectly increase the risk of fractures, including:

- **Alcohol consumption:**

The risk of osteoporosis in alcohol consumers is higher compared to those who do not drink alcohol due to direct negative effects on the hormone that regulates calcium metabolism accompanied by poor nutrition (calcium, protein and vitamin D deficiency). Alcohol may also interfere with calcium absorption and bone formation.

- **Smoking:**

Smokers are at higher risk of osteoporosis compared to non-smokers.

- **Malnutrition:**

When calcium absorption from dietary sources is insufficient, the body produces higher levels of the thyroid hormone in order to promote bone remodeling and increase osteoclasts to facilitate the release of calcium from bones and supply the muscles and nerves with the minerals they need.

- **Low body mass index (BMI):**

Weight loss is associated with more bone loss and a higher risk of fractures, especially when the BMI is below 20 regardless of age and gender.

- **Vitamin D deficiency:**

Vitamin D is essential because it helps absorb calcium from the intestines into the blood. Vitamin D is made in the skin when exposed to the sun's ultraviolet rays. Most people are exposed to sun at least 15 minutes a day, which is usually enough. However, in the elderly and people who can not get out and during winter months, getting vitamin D from food or supplementary sources may be an alternative.



- **Eating disorders:**  
Osteoporosis can also increase due to eating disorders such as anorexia nervosa and bulimia.
- **Estrogen deficiency:**  
Estrogen deficiency in women contributes to bone loss in a manner similar to that occurring in postmenopausal women. Such conditions reduce bone formation and strength.
- **Physical inactivity:**  
Inactive people are at higher risk of hip fractures than those who are more active. Women who sit more than nine hours a day are more likely to develop a hip fracture than those who sit for less than six hours a day.
- **Frequent falls:**  
Causes include visual impairments, muscle weakness, postural instability, use of certain drugs that cause dizziness and drowsiness, indoor and outdoor risks, loss of balance, neuromuscular dysfunction, dementia and use of sleeping pills. All of these are very common in the elderly and increase the risk of falls and fractures.
- **Diagnosis:**  
There are no obvious symptoms of osteoporosis and bone mass continues to decline without any signs until a fracture occurs. Therefore, early screening is very important.
- **Appearance:**  
A curved back and a decreasing height is the only sign of osteoporosis and may indicate a spinal fracture.
- **Bone mineral density measurement:**  
Bone density can be assessed by a device that uses low levels of X-rays to measure the amounts of minerals in bones. This test usually examines the hip, wrist and spine in case of having some risk factors.

### Prevention and Treatment:

Osteoporosis is now a highly treatable condition and many fractures can be avoided.

Some drugs can be used to treat osteoporosis, including:

- Alendronate (Fosamax, Binosto)
- Risedronate (Actenol, Atelia)  
Ibandronate
- Zoledronic acid (Reclast, Zometa)

### Side effects of these drugs include:

Nausea, abdominal pain, difficulty swallowing, esophagitis and esophageal ulcer. The likelihood of developing side effects can be reduced by taking the drugs correctly.

### Supporting drugs:

Your doctor may prescribe calcium and vitamin D to support the treatment of osteoporosis.

### Prevention:

- Get enough Vitamin D.
- Get exposed to sunlight for at least 20 minutes a day.
- Avoid strenuous physical exertion.
- Improve lifestyle:

Middle-aged and older people should follow a healthy lifestyle by avoiding smoking and alcohol, assessing the risk of osteoporosis and taking drugs and supplements to help maintain bone mass and reduce the risk of fractures.

- **Maintain a healthy weight:**  
Maintaining a healthy body weight helps in preventing osteoporosis.
- **Maintain a good diet:**  
A well-balanced diet in each stage of the human life enhances bone strength and health. A good diet includes nutritious and varied meals

with enough calories from proteins, fats and carbohydrates as well as vitamins and minerals, especially vitamin D and calcium during childhood and adolescence. This helps to build and maintain bone mass and reduce later risk of osteoporosis, especially in adults.

### **Sources of calcium:**

Milk and other dairy products are the richest dietary sources of calcium. Dairy products are also good sources of protein and other micronutrients (besides calcium). Good dietary sources of calcium include vegetables, such as cauliflower and broccoli, in addition to canned fish with edible bones, such as sardine and salmon.

Other sources include nuts and walnuts, especially Brazilian almonds, and some fruits such as oranges, apricots and dried figs. There are calcium-fortified foods, such as: fortified breads, cereals, fruit juices, soy drinks and commercial mineral water that contains large amounts of calcium. These foods provide a suitable alternative for people who cannot tolerate lactose as well as vegetarians, but do not substitute for milk. Therefore, calcium supplements should also be taken.

### **Factors that inhibit calcium absorption:**

Some leafy vegetables, such as rhubarb and spinach contain oxalate, a compound that inhibits the absorption of calcium from these vegetables. However, it does not interfere with the absorption of calcium from other calcium-containing foods eaten at the same time. The same goes for (phytic acid) in dried beans, grain husks and seeds.

Caffeine and salt cause the loss of calcium from the body and should not be taken in excessive amounts. Intake of soft drinks should also be reduced, especially with the tendency to be used as a replacement of milk in children and adolescents' diet.

**Exercise is important:**

There is a strong relationship between physical activity and bone health in all ages to build and maintain strong bones and prevent muscle atrophy.

**Benefits of exercise on bones:**

- Patients with diseases requiring prolonged bed rest, such as spinal cord injuries lose their bone density, develop muscle damage and become at higher risk of fractures within a few weeks.
- Exercise during childhood and adolescence helps to develop and strengthen bones, and thus reduces the risk of fractures in later stages of life.
- Several studies have shown a positive relationship between physical activity in later age and maintaining bone mineral density as well as a reducing the risk of hip, arm, and spinal fractures in old age.
- Studies have shown that bone density in athletes is significantly higher than those who do not exercise regularly. Exceptions are high intensity but not weight-bearing exercises, such as swimming.
- Studies have shown that exercise before the age of 40 reduces the risk of falls in older people.
- Regular long-term physical activity maintains bone health, helps children build strong bones and adults maintain theirs and prevent osteoporosis and falls in the elderly.
- **People with fractures:** Exercises, especially under medical supervision, can be used to improve muscle strength and muscle function in order to increase mobility and improve the quality of life.
- Exercise is especially important in older women who have the highest rates of bone tissue loss after menopause. Exercises build muscles and improve balance and thus prevents falls, which are the main cause of fractures. This is particularly important for the elderly.
- There is no age limit for exercising and it is not too late to start for those who have never exercised.



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### Conclusion:

The following three steps should be followed:

- Practice sports and exercise regularly.
- Get enough Vitamin D.
- Ensure a healthy well-balanced diet.

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