

OSTEOPOROSIS

WHAT WE SHOULD KNOW FOR SELF, OUR FAMILY AND PATIENTS:

Osteoporosis is a condition in which bone is more porous than average and is prone to fracture. During childhood and adolescence, bone is built up by cells called osteoblasts and broken down by cells called osteoclasts. Both groups of cells work in unison to promote an increase in bone density and size as a result, bones are at their strongest during the late twenties and early thirties. This effect balances out to allow the same amount of bone to be replaced as is broken down by late thirties. Following this, Bone density begins to be gradually lost due to the osteoclasts cells breaking down more bone than is replaced leading to Osteoporosis.

In India the number of osteoporosis patients is approximately 26 million (2003 figures) with the numbers projected to increase to 36 million by 2013. It is because of increase in life expectancy (1947- 37 yrs to 2006 67yrs) and populations. Another reason is that the peak incidence of osteoporosis in India is 50-60 years, as compared to 70-80 years in the West.

The seriousness of the problem can be judged by the facts that Osteoporotic fractures are four times more common than strokes. 50 years old women have equal chance of dying from of complication of osteoporosis as from breast cancer. The lifetime risk of experiencing an osteoporotic fracture in men over the age of 50 is 30% (similar to prostate cancer) or the combined lifetime risk for hip, forearm and vertebral fractures coming to clinical attention is around 40%, equivalent to the risk for cardiovascular disease. The overall mortality is about 20% in the first year after hip fracture (higher in men than women).

The process of demineralization leading to osteoporosis speeds up in women in the 10 years after the menopause. This is because the ovaries stop producing the female sex hormone- oestrogen, which is one of the substances that helps, keep bones strong. Men suffer less from osteoporosis, because their bones are stronger and they do not go through the menopause.

All of us are at risk of developing osteoporosis, muscle weakness and imbalance as we get older, which is why elderly people are more likely to break bones when they fall. But there are some people who are at higher risk of osteoporosis than others. These factors are

Steroids prednisolone intake over a long period of time, leads to osteoporosis.

Oestrogen deficiency Women who have had an early menopause (before the age of 45), or a hysterectomy with ovariectomy Or ovariectomy alone are at greater risk.

- Lack of exercise Moderate exercise keeps the bones strong during childhood and throughout adulthood. Anyone who does not exercise, or has an illness or disability, which makes exercise difficult, will be more prone to losing calcium from the bones and so more likely to develop osteoporosis and muscle weakness. Exercise is therefore very important in preventing osteoporosis. (30 mts exercise five times a week with weight training)
- Poor diet A diet which does not include enough calcium or vitamin D can make Osteoporosis more likely.

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- Smoking Tobacco lowers the estrogen level in women and cause early menopause and osteoporosis. In men, smoking lowers testosterone activity and this weaken the bones.
 - Heavy drinking A high alcohol intake reduces the ability of osteoblasts
- Family history Osteoporosis does run in families. This is probably because there are some inherited factors, which affect the development of bone.

There is a great deal, which can be done at different stages in your life to prevent osteoporosis.

- Healthy diet- Children and adults need a diet, which contains the right amount of calcium. The best sources of this are milk, cheese and yogurt, fish (which are eaten with the bones). Skimmed or semi-skimmed milk (it contains more calcium than full-fat milk). A daily intake of calcium of 1000 (mg) or 1500 mg for people above 60yrs. A pint of milk a day, together with a reasonable amount of other foods, which contain calcium, should be sufficient. If adequate amount of calcium is deposited in bones in childhood it delays development of osteoporosis in old age. Vitamin D is needed for the body to absorb calcium. Vitamin D is produced by the body when sunlight falls on the skin, and it can be obtained from the diet (especially from oily fish) or vitamin supplements. For people over 60 yrs. it may be helpful to take a supplement of vitamin D.

- Exercise-Children should actively take part in sports or other types of exercise to help strengthen their bones. For the same reason, adults should keep physically active all the way into retirement. Weight-bearing' exercises (walking or running) which are of more benefit for bone strength than non-weight-bearing exercises (swimming and cycling). Weight training is also important to prevent osteoporosis and to maintain good muscle strength, which is the best method to prevent fall. The environment should be uncluttered and support by way of walking aid or railing should be available.

- Smoking-Smoking must be avoid.
- Drinking Avoid drinking.. The maximum recommended daily for a woman is 2-3 units, for a man it is 3-4 units. A unit is a single measure of 25 ml of spirits (40% alcohol by volume, or abv), or half a pint (0.3 litre) of normal-strength beer, lager or cider (3.5% abv), or a very small glass (no more than 85 ml) of wine (12% abv).

There are no obvious, physical signs of osteoporosis, because no one can see the bones getting 'thinner'. Osteoporosis can go unnoticed for years without causing any symptoms. Quite often the first indication that someone has a problem is when s/he breaks a bone in what would normally have been a minor accident. Relatively minor fractures of the spinal bones cause round-shoulders and loss height. These minor fractures may be painless but can cause back pain in some people.

Dual energy x-ray absorptiometry (DEXA) is the gold standard to diagnose Osteoporosis and can be used to monitor response of the treatment. The dose of x-rays is same as spending a day out in the sun. T score of higher than -1 standard deviation is found in young healthy population. Osteopenia is diagnosed when A T score is between -1 and -2.5 . T score lower than -2.5 is diagnostic of Osteoporosis. A patient with T score lower than 2.5 along with one or more fracture is seen in severe osteoporosis.

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World over D.E.X.A. (Dual Energy X-ray Absorbometry) is the "Gold Standard" for precise assessment of bone density and recognized by World Health Organization WHO, American National Osteoporosis Foundation, British National Osteoporosis Society. Other methods like Ultrasound and scanning of x-ray films do not measure the bone density at Neck of Femur, vertebral or forearm which are the commonest sites for osteoporosis instead examine only heel or midmetacarpal. These methods do not measure bone mineral density but like in ultrasound, measure the speed of sound only or the color content of an x-ray film.

People with osteoporosis are more likely to fracture a bone after a minor accident specially hip, spine or wrist. People who have previously had a fracture after a minor fall are at greater risk of further fractures.

Spinal problems occur if the bones in the spine (vertebrae) become weak and crush together. If several vertebrae are crushed, the spine will start to curve. This cause back pain and loss of height and because there is then less space under the ribs, some people may have difficulty breathing and constipation. People who have this type of spinal problem also have an increased risk of fractures.

Apart from the preventative measures already described there are other treatments available for osteoporosis. These may slow down the loss of bone or reduce the risk of fractures.

- Calcium and vitamin D 1500 mg of calcium along with 200 iu Vitamin D per day. Calcitriol is used in cases of renal or hepatic dysfunction.

Bisphosphonates have anti-resorptive activity and little effect on other organ systems.

They act on bone by binding to hydroxyapatite and by inhibiting activation of osteoclasts; in many people, an increase in bone density can be measured over 5 years of treatment the plasma half life of bisphosphonates is very short, but the half-life of bisphosphonates deposited in bone is probably up to 10 years. Alendronate and risedronate reduced vertebral and non-vertebral fractures by 30-50% in 3-4 years. It is most efficient at reducing fracture in people at highest risk of fracture, that is, women with at least one prevalent vertebral fracture or with a osteoporosis.). These drugs cannot be taken with food, and should be taken after 5-6 hrs of overnight fasting with a glass of water and one should not consume any thing and remain upright for one hour to avoid oesophagitis. They are available either as daily-dose tablets or weekly-dose tablets. Ibandronic Acid Tablets(150mg) are newer Bisphosphonates to be taken once a month. They are contraindicated in patients with hypocalcemia, known hypersensitivity to any component of this product, or inability to stand or sit upright for at least 30 minutes. Or patients with severe renal impairment (creatinine clearance

- Hormone replacement therapy (HRT) with an increase in the risk of heart disease, breast cancer and venous thrombosis it is not practiced routinely. The potential risks and benefits long-term HRT use must be weighted.

- Selective estrogen receptor modulators (SERMs) such as raloxifene, block conformational changes of the estrogen receptor. In postmenopausal women treated with raloxifene, the incidence of vertebral fractures was reduced by 30% over three years, but no effect was seen on the incidence of non vertebral fractures. In addition, other beneficial effects have been seen: a significant decrease in new cases of breast cancer and a significant reduction in the incidence of cardiovascular events in women who had increased cardiovascular risk. Who ever there is an increased risk of venous thrombosis.

- Calcitonin is a substance, which the body produces naturally and which helps keep the bones healthy. It acts as an endogenous inhibitor of bone resorption by decreasing osteoclasts formation. It is available for delivery as a subcutaneous injection or nasal spray; both formulations are developed from salmon calcitonin, which is about 10 times more potent than naturally produced human calcitonin. New vertebral fractures were reduced by 33% in postmenopausal women after salmon calcitonin was given at a dose of 200 IU daily. As a desirable additional effect, calcitonin has been noted to reduce the pain of clinical vertebral fractures. Possible side effects include hot flushes, nausea, an unpleasant taste in the mouth, tingling in the hands and, rarely, an allergic reaction. The nasal spray may also cause a blocked or runny nose, sneezing and headaches.

- Teriparatide (is a portion of human parathyroid hormone (PTH), which is the primary

regulator of calcium and phosphate metabolism in bones. Daily injections of teriparatide stimulate new bone formation leading to increased bone mineral density and thus reduces the incidence of fractures. It is the first treatment to renew the skeleton by stimulating osteoblasts (cells which form new bone) 20 mcg of teriparatide per day, along with calcium and vitamin D supplementation, significantly increases bone mineral density (BMD) at the spine and hip. Teriparatide reduced the risk of vertebral and non-vertebral fractures in postmenopausal women. It is used for up to 18 months, during which time the bones are strengthened. At present it is used mainly for people who have had fractures despite using other treatments, or who have had side effects from other treatments. Side effects of teriparatide include nausea, limb pain, headaches and dizziness.

Leading an active healthy life and maintaining a diet with sufficient calcium is the best way of preventing osteoporosis. If you have the condition already, there are a number of treatments, which can be effective.