



Osteoporosis

What it is and how we diagnose and treat it

Osteoporosis is nothing more than an abnormal loss of calcium from your bones that can lead to pathological fractures, chronic pain, deformity, and a decreased level of functioning. The causes of osteoporosis are many. Most think that menopause is the only reason for osteoporosis, yet men also suffer with it. The key is anything, an endocrine problem, a disease, or a drug side effect, which can potentially reduce the amount of calcium in your bones may cause osteoporosis.

First, let's review what is bone and how it is dealt with in your body. Bone is nothing more than the endoskeleton, which consists of a protein matrix that has calcium crystals in mass. Bone is living tissue and is constantly reforming and reshaping. Your body uses your bones as a storage depot for calcium that is used for cellular functioning. Muscles and nerves use calcium for proper functioning. For example, if you have low calcium levels in your muscles, your muscles will have a tendency to go into a spasm that cannot relax (hypocalcemic tetany).

There are two types of cells in your bones that help shape and model bone. These are the *osteoblasts* and the *osteoclasts*. Osteoblasts are cells that lay down a protein matrix and then have calcium become deposited in crystalline form. Therefore, osteoblasts build bone. Conversely, osteoclasts are cells that will dissolve the calcium crystals and return the calcium back into the blood stream. So they destroy bone. These two types of cells are in a delicate balance for most of your life. In fact, it has been said that we make a whole new skeleton every three years. Which means that none of your bone is actually older than three years, since the older bone was dissolved while new bone was being laid down. The best example of how this works is when you suffer a fractured bone. The bone edges are broken and are no longer fused together. The osteoclasts come in and get rid of the bone edges, while the osteoblasts come in and lay down new bone to repair over the fracture site. This in fact normally leaves a small bump (called a callus) of excess calcium where the repair took place. Exercise places stress on bones and this actually stimulates the formation of even more bone, so the bones become denser. This is why exercise is so important in women.

The overall loss of bone begins when more bone is destroyed than laid down. This can occur for many

reasons but the most common cause is menopause. The loss of estrogens in a woman's body causes the osteoblasts to no longer be as stimulated to lay down new bone and therefore there is a net loss. Certain diseases, e.g., hyperparathyroidism, will cause a loss of bone because of the incorrect messages that are sent to the bones for catabolism. A high level of parathyroid hormone in the blood stimulates the osteoclasts to dissolve more calcium and put it into the serum. This will then cause a high serum level of calcium, i.e., hypercalcemia.

Before there is osteoporosis, there is osteopenia. The loss of bone is not an "all or nothing" problem but instead is a continuous spectrum from no loss of bone to severe loss of bone. Osteopenia is when there is significant bone loss but not enough to qualify as osteoporosis. Pathological fractures can occur but not to as significant degree.

Osteoporosis is diagnosed by using a specialized X-ray machine, known as a DEXA scanner. Utilizing a pencil-beam X-ray, this measures the density of your bones in major joints in your body. Fresno Family Practice Center offers bone density testing using the Norland XR-46 DEXA scanner. This state-of-the-art device not only accurately measures the density of bone, it will also measure overall body fat. The amount of radiation that you are exposed to is very small, being less than a chest X-ray. It is safe enough that the operator for the device does not need to leave the room and is actually sitting next to you.

So who should be screened for osteoporosis? First, all women over the age of 65 years old should be given a bone density test at least every two years. Any woman who is now in menopause before the age of 65 years should have their bone density measured every two years to ensure that there is not any excess loss. Any asthmatic who is on high dose inhaled steroids, e.g., **Advair 500/50[®]**, or anyone on chronic oral steroids for any reason should also be screened. Any woman who was on hormone replacement therapy and who has now stopped needs to have a bone density test to measure the density at the time of therapy cessation, even if the person had had a bone density test less than two years before.

Finally, the most overlooked category of people who need bone density exams is men over the age of 65 who have lost height or have a low testosterone. If you are not sure if you qualify for a bone density test, please speak to either Dr. Work or Ae Lee about it.

How is it treated?

Basically, the calcium must be replaced. The premise is simple and the options are multitudinous. The following things will treat osteopenia or osteoporosis:

- **Calcium supplements** ranging from 1200 to 1500 mg a day. **Avoid the use of coral calcium or oyster shell.** These are forms of calcium carbonate and are therefore ionically bound and are less bio-available. The chelated forms of calcium, *e.g.*, calcium citrate, maleate, ascorbate, etc., are covalently bonded and are therefore more bio-available.
- **Hormone therapy** – this ranges from testosterone replacement therapy for men¹ to estrogens and testosterone replacement therapy for women. Testosterone works as well if not better to strengthen bone and women benefit from replacement in more ways than just fixing osteoporosis. The best way of delivering the hormones for women is transdermally using bio-identical hormones that are compounded in a special pharmacy. Speak to either Dr. Work or Ae Lee about this very important option. All women are encouraged to use this unless it is directly contraindicated. In addition, **Trans-D Tropin®** will also aid with the treatment of osteoporosis by stimulating new bone growth.
- **Calcium replacement medications** – these act like estrogens but do not affect the body the same way as estrogens do. These medications include **Fosamax®**, **Actonel®** and **Evista®**. These can also be taken with the hormones (except for **Evista®**) to augment the hormones. **Evista®** should be used when a postmenopausal woman chooses to not be on hormones. **Evista®** is unique in that it stimulates the osteoblasts like estrogen but it does not stimulate any estrogen receptors in the breasts or the uterus, so a woman with a history of breast cancer can take it.
- **Exercise with weight resistance** – as I mentioned earlier, stress on the bones will cause the body to want to increase bone density. Therefore, walking, jogging and weight lifting all put stress on the joints and will aid with the formation of new bone when it is combined with calcium supplementation and any of the other therapies noted above.

This is a short synopsis of how osteoporosis/osteopenia is treated. One of the best treatments for this, however, is often overlooked and underutilized by people...prevention. Calcium supplementation should begin when a woman is in her early 20s and continue for the rest of her life. The calcium can be in the form of yogurt, cheeses, and supplements mentioned above. When this is combined with a good exercise program, the density of her bones will be great enough that when menopause comes around and the woman does not treat for bone loss, she will still have enough left over for her health. This simple concept is part of anti-aging medicine.

¹ Amory, JK et al. Exogenous Testosterone or Testosterone with Finasteride Increases Bone Mineral Density in Older Men with Low Serum Testosterone. *J Clin Endocrinol Metab* 2004;89,2:503-510.