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Bone Health

The keys to understanding Osteoporosis

Osteoporosis or “porous bone” is a progressive reduction in normal bone mineral density, mass and strength resulting in bone thinning and an increased risk of bone fracture. Osteoporosis results when the rate of bone loss is greater than the rate of bone building. There are 2 types of cells which manage bone tissue: osteoblasts, which build bone up and osteoclasts, which break it down. It is very important for the body to continually break down and rebuild bone so that the bone tissue stays healthy and strong. Weak bone begins when this process is not happening at the right rate or when the new bone is not laid down in a structurally sound configuration.

Up until the age of 30 our bone building or mineralization exceeds our bone breakdown. After the age of 30, the rate of bone loss is related to diet, mineral intake, exercise patterns, hormone status, exposure to toxic substances, and diseases or medicines that speed up bone loss. The pattern of bone loss is accelerated when estrogen levels fall after menopause because one of estrogen’s roles is to suppress the tearing down of bone by osteoclasts. In order to improve bone density, we need to slow down the activity of the osteoclasts and speed up the activity of the osteoblasts. An alkaline diet, mineral-rich foods, supplements, and weight-bearing exercises are essential for this process.

Frequent Signs and Symptoms

The problem of our bones becoming brittle is not painful. The first time it affects your quality of life is when the bone cannot support itself against even the slightest trauma and then fractures. The bones most commonly affected are the spine and wrist but fractures can occur in any bone- even your jaw. There can be some symptoms that may prelude Osteoporosis that require investigation:

- Backache
- Loss of height
- Gum disease or excessive tooth decay
- Premature graying of hair (50% gray by age 40)
- Poor nail growth
- Leg cramps at night
- Arthritis
- Deformed spinal column with humps
- Hip fracture
- Fractures of the arm or wrist occurring with minor injury

Testing

Osteoporosis is usually detected though routine bone density tests which show the demineralization of the spine and pelvis. Another very useful test is called the Osteomark-NXT test. This is a urine test that measures the levels of a compound linked to bone breakdown (crosslinked N-telopeptide of type 1 collagen). This test can be used to monitor the rate of bone loss and thus confirm the success or failure of any current therapy.

Factors that Increase the Risk of Osteoporosis

There are many factors that affect the process of Osteoporosis. Studies show that after age 35, women naturally lose bone density at a rate of 1% per year. Bone loss is then accelerated with the hormonal changes at menopause. Without preventative measures, women may lose 2/3rds of their skeletal mass by age 65. There are nutritional influences and pharmaceutical influences that can contribute to even more accelerated loss. Other factors include:

- Family history
- Short stature or small bones
- Caucasian or Asian race
- Premature or Post menopause
- Not having given birth to a child
- Inactivity
- Dietary factors
- Frequent use of antacids
- Heavy alcohol use
- Smoking
- Hyperthyroidism
- Hyperparathyroidism
- Liver or Kidney disorders
- Long term use of corticosteroids or anti-convulsants

Factors that Contribute to the Development of Osteoporosis

Low Estrogen Levels

An estrogen deficiency makes the osteoclasts (cells that break bone down) more sensitive to the parathyroid hormone, resulting in increased bone breakdown, thereby raising blood calcium levels. This elevation in blood calcium levels leads to a decreased parathyroid hormone level, which then results in diminished levels of active Vitamin D and increased Calcium excretion. In addition, the drop in estrogen that occurs during menopause triggers the production of the inflammatory mediator

interleukin-6, which stimulates the growth of additional osteoclasts, thus increasing bone loss.

The Importance of Stomach Acid

The absorption of Calcium is dependent on its becoming neutralized in the stomach with the help of stomach acid. The need to neutralize the Calcium has been the major problem in using Calcium carbonate, the most widely used form of Calcium. In order for Calcium carbonate to be absorbed, there must be the presence of stomach acid. Studies have shown that nearly half of all postmenopausal women are severely deficient in stomach acid. Patients with insufficient stomach acid have shown to only absorb 4% of an oral dose of Calcium carbonate. Even with normal stomach acid, only 22% of the Calcium carbonate is absorbed. This makes it clear that a more absorbable form of Calcium is required. Other forms of Calcium such as MCHC and citrate-malate are much more absorbable as they are in a form which requires less stomach acid.

Many people consider antacids such as Tums to be a significant source of Calcium. Unfortunately the Calcium in Tums is Calcium carbonate which requires sufficient stomach acid to be absorbed. Tums is an antacid which immediately decreases production of stomach acid, thus the Calcium carbonate cannot be absorbed in the stomach. It can however lead to an increase in the formation of kidney stones.

The Inability to Convert Vitamin D to its Active Form

The active form of Vitamin D which stimulates the absorption of Calcium is manufactured within the body through a process of reactions:

1. The sunlight changes a compound in the skin that the body manufactures from cholesterol (7-dehydrocholesterol) into Vitamin D_3
2. Vitamin D_3 is then transported to the liver where it is converted by an enzyme into a compound that is 5 times more potent than D_3
3. The compound is then sent to the kidneys where it is converted by another enzyme into a compound that is 10 times more potent than D_3

Many people with Osteoporosis fail to make these conversions due to problems with the required enzyme. These enzymes are affected by estrogen, magnesium and boron. A deficiency in any of these will inhibit the conversion process.

Preventative Measures

- Consume a nutrient dense, primarily vegetarian diet
- Regular weight-bearing exercise
- Don't smoke
- Limit alcohol consumption
- Don't consume soft drinks
- Limit coffee consumption to less than 2 cups per day
- Enjoy the sun

Drug Treatment

Fosamax is a bisphosphate drug that destroys osteoclasts, the cells that break down bone. These cells are needed in the process of bone building as they break down the bone in order for it to be re-built again by the osteoblasts. The result of Fosamax is a lessening of bone loss but the down fall is that the resulting bone may have more mass but it lacks strength and is more brittle. Fosamax must be taken exactly according to instructions or ulcerations of the esophagus may result.

Miacalcic is a synthetic version of calcitonin, the parathyroid hormone that inhibits the osteoclasts resorption of bone tissue. When Calcium levels in the blood are too high the parathyroid releases Calcitonin and the blood Calcium is deposited into the bone. When the blood Calcium levels are too low, parathyroid hormone is released and Calcium is leeched from the bone into the blood. By taking a synthetic form of Calcitonin, in theory Calcium in the blood should be continually deposited into the bone whether the levels are high or low. Unfortunately its ability to affect bone loss appears to be minimal and side effects may include nausea, vomiting, rashes and flushing sensations.

Move It or Lose It!

"It is wrong to think that exercise might halt the fall of the grains of sand in the hourglass. It is proposed, however, that the dimension of the aperture may be responsive to the toning influence of physical activity and consequently the sand may drain more slowly".

This quote is true on so many levels. Of course exercise is going to keep your heart and lungs healthier. Regarding osteoporosis, it also plays a large factor. The more resistant and weight bearing exercise we do the more force that is put through the bone by the contracting muscles and gravity. The more this happens in a safe and controlled way, the more efficiently the whole turnover of bone happens. Then bone you're left with is new, strong, healthy and ready to stand up to the test of more traumatic situations such as falling.

The Natural Approach to Osteoporosis

Most people think of Osteoporosis as a Calcium deficiency. There has been a huge push to increase dietary Calcium intake to prevent Osteopososis. While this appears to be sound medical advice for many, Osteoporosis represents much more than a lack of dietary Calcium. It is a complex condition involving hormonal, lifestyle and nutritional factors. A comprehensive plan that addresses these factors offers the greatest protection against developing Osteoporosis.

The primary goals in the treatment and in the prevention of Osteoporosis include:

1. Address the Hormonal Connection
2. Bone Building Nutrient Therapy
3. Improve Nutrition
4. Restore Balance

Addressing the Hormonal Connection

Progesterone stimulates the osteoblasts which are the cells that pull Calcium, Magnesium and Phosphorus from the blood to build bone mass. Supplementation with transdermal (topical skin cream) has been shown to result in osteoblasts-mediated new bone formation of up to 15% increase in bone mineral density within a 3-year period.

Ipriflavone is a semi synthetic flavonoid similar in structure to soy isoflavonoids. Ipriflavone is approved in Japan, Hungary and Germany for the treatment and prevention of Osteoporosis.

Ipriflavone enhances the action of calcitonin on Calcium metabolism. Calcitonin, the hormone secreted by the thyroid when Calcium levels in the blood rise, shuts down the activity of osteoclasts which are the cells responsible for breaking down old bone and thus releasing Calcium into the bloodstream.

Ipriflavone has been the subject of over 150 clinical studies with impressive results:

- 200mg 3 times per day increased bone density measurements by 2% after 6 months and 5.8% after 12 months in 100 menopausal women with Osteoporosis
- 600mg of Ipriflavone produced a 6% increase in bone density while a placebo group lost 0.3% in bone density.

Bone Building Nutrient Therapy

All Calcium Is Not Created Equally

Many health-conscious people believe that conventional Calcium supplements can put an end to bone loss. This is not true. As multiple studies have documented, conventional Calcium supplements such as Calcium gluconate, citrate, carbonate, and citrate- malate- slow but do not halt or reverse menopausal bone loss. You cannot force the bones to take in more Calcium and build more bones by taking more Calcium. Calcium itself can only support your existing bone mass or the building of bone induced by the other factors in your skeletal health program.

Fortunately there is one exception to this rule. Ossein microcrystalline hydroxyapatite complex (MCHC) consistently halts or even reverses bone loss in controlled scientific studies. MCHC is a nutrient complex derived from bovine bone, complete with Calcium, phosphorus, oxygen, hydrogen, zinc, silicon, iron, amino acids and mucopolysaccharides. MCHC's bone building powers do not lie in the Calcium itself. True MCHC is not just a form of Calcium but it is a Calcium-based crystalline nutrient complex which is how the mineral is actually stored in your bones. When the Calcium form that is present in MCHC is given in isolation from this nutrient matrix, the unique effects of MCHC on bone health vanish. Thus, the unique support of MCHC is due to combination of its intact crystalline structure and the blends of nutrients which all contribute to its amazing ability to reverse bone loss. This certainly sets it apart from all other Calcium supplements.

Unfortunately, of course, vegetarians cannot consume MCHC because it is an animal product. For vegetarians, the best choice for Calcium is a blend of Calcium citrate-malate which will be more absorbable than the others.

How Much Is Enough?

Current recommendations suggest an intake of 1000mg of Calcium for younger adults and 1200mg for people over the age of 50. Some evidence suggests that a still higher intake of 1300-1600mg of Calcium is more effective for lowering fracture risk in the elderly. Keep in mind that these are your total Calcium needs. The more you get from your diet, the less you will need from your supplements. Too much Calcium can inhibit the absorption and utilization of other important nutrients like zinc and copper.

Vitamin D

Aside from improving Calcium absorption, Vitamin D is needed for proper muscle function. Vitamin D may also play a role in protecting against fractures by reducing

falls, by strengthening muscle function. For optimal bone health, controlled studies show that Vitamin D, together with Calcium, help to reduce the risk of fractures at a dose of 800 IU per day.

Marvellous Magnesium

Magnesium is critical to various aspects of bone metabolism and borderline Magnesium deficiency is surprisingly common. In fact women with Osteoporosis have been found to have lower bone Magnesium content and other indicators of Magnesium deficiency than women without Osteoporosis. Magnesium also mediates the secretion of the parathyroid hormone and calcitonin which are the two hormones that maintain proper Calcium concentrations in the blood.

Calcium, Magnesium and Vitamin D are very well-known nutrients which all play a significant role in bone health. There are a host of other nutrients important to bone health which are all too often neglected in putting together a total lifestyle program. These would most prominently include manganese, zinc, copper, silicon, boron, Vitamin C, Vitamin B12 and folic acid. Making sure that these nutrients are included in your bone health program will ensure that all the requirements are met for building and restoring bone health.

Strontium

Bone loss accelerates suddenly in menopausal women because of the drop in estrogen levels which causes an increase in the resorption (teardown) or existing bone. But resorption is only half of the story. Age-related bone loss is also caused by a decrease in the formation of new bone tissue.

Most treatments for Osteoporosis currently work only to reduce the bone resorption or teardown but they do not support the formation of new bone. Instead they increase the mineralization of bone but they do not help to grow new bone tissue.

Strontium is a mineral found along with Calcium in most foods. Research has long suggested that it may be an essential nutrient required for the normal development, structure, function and health of the skeletal system.

The most recent study revealed the following findings:

- Strontium both decreased bone teardown and increased the formation of new bone tissue
- Strontium causes “baby” osteoblasts (bone building cells) to multiply more quickly

- Bone cultures exposed to Strontium synthesized more bone matrix and new bone collagen

Keys to Supplementing With Strontium

1. Adequate Calcium levels are required for Strontium to be effective; in fact, Strontium is not effective and may even be counterproductive if your Calcium levels are not adequate.
2. Calcium and Strontium use the same pathways for absorption in the intestinal tract. Therefore, they need to be taken at separate times. The best protocol is to take Strontium 3 hours after your last meal of the day, or one hour before breakfast in the morning, or both. Studies suggest that one last dose of Calcium just before retiring can help prevent excessive resorption on bone overnight. It may be best to take Strontium before breakfast, leaving you free to take your Calcium before bed.

Improve Nutrition

- **Limit foods that promote Calcium excretion**:

Salt

- ✓ High salt intake has been shown to increase the kidney's excretion of Calcium.

Sugar

- ✓ High intake of refined sugar increases the excretion of urinary Calcium

Animal protein

- ✓ Consuming a high protein diet produces an acidic body. Calcium is an alkaline mineral which is pulled from the bones to restore the alkaline balance in the presence of acidity.

Soft drinks

- ✓ Regular consumption of soft drinks, which are high in phosphates, causes Calcium to be leeched from the bones and excreted through the urine.

Alcohol

- ✓ Alcohol suppresses the bone-forming activity of the osteoblasts
- ✓ Alcohol disrupts liver function required to convert Vitamin D into its active form
- ✓ Alcohol leads to many nutritional deficiencies which contribute to bone loss

Coffee

- ✓ Consuming more than 2 cups of coffee per day increases the loss of calcium through the urine and acidifies the body.

- **Follow a whole food diet rich in**:

  - ✓ Whole, unprocessed foods
  - ✓ Beans
  - ✓ Nuts and seeds
  - ✓ Whole grains
  - ✓ Cold-water fish
  - ✓ Green leafy vegetables (kale, collard greens, parsley, wild greens)
  - ✓ Foods rich in Vitamin K (broccoli, lettuce, cabbage, spinach, asparagus, oats, green peas and whole wheat)
  - ✓ Vitamin K1 is the form of Vitamin K that is found in plants. A function of Vitamin K which is often overlooked is its role in converting inactive osteocalcin to its active form. Osteocalcin's role is to anchor Calcium molecules and hold them in place within the bone. A deficiency of Vitamin K leads to impaired mineralization of bone due to inadequate Osteocalcin levels.
  - ✓ Calcium rich foods (kelp, bok-choy, spinach, greens, nuts and seeds, garbanzo beans, soy beans, tofu and cabbage).
  - ✓ Magnesium rich foods (kelp, wheat bran, wheat germ, almonds, cashews, blackstrap molasses, Brewer's yeast, buckwheat, rye, tofu, beet greens, soybeans, spinach, brown rice).

Restoring Balance

When the body is in an acidic state, Calcium, which is an alkaline mineral, is pulled out of the bones in order to bring the balance back. This contributes to the destruction of the bones. Eating an "alkaline-ash" diet will ensure this does not happen.

Foods rich in certain minerals which help to decrease acidity are called "alkaline-ash". The most important foods are vegetables and fruits. The wide-spread belief that whole grains and fish are alkaline-ash foods is merely a myth. These foods are actually acid-ash foods- that is, they contain molecules which lower the pH, causing the body to be more acidic. Many grains are actually as acidic as meat proteins. The more acid-ash foods you consume, the more important it is that you consume

alkaline-ash foods to balance it out. The “alkalinity” of fruits and vegetables is probably a big part of the reason that people who eat diets high in these foods have better bone health and metabolism.

If dietary measures alone fail to reduce acidity, the level of pH in the body can be monitored through the urine or saliva and using an alkaline powder is also effective. An alkaline powder is comprised of sodium bicarbonate, calcium carbonate, potassium bicarbonate and magnesium carbonate.

Alkaline and Acid Values of some Common Foods

Average values for a class of food are given after the class name which is in bold. Exceptional specific foods are also listed beneath the category name. Foods assigned more “negative” values are more alkaline; those with higher “positive” values are more acidic. Values are per 100g of food.

Fats and Oils: 0

Fish: +7.91

- ✓ Trout: +10.8

Fruit: -3.1

- ✓ Raisins: -2.1
- ✓ Currants: -6.5

Nuts: +4.1

- ✓ Peanuts: +8.3
- ✓ Hazelnuts: -2.8

Grains: +5.7

- ✓ Whole wheat: +1.8
- ✓ Flour: +7.0

Meat: +9.5

Dairy: +8.7

- ✓ Cheddar Cheese: +26.4
- ✓ Cottage cheese: +8.7
- ✓ Yogurt: +1.5

Vegetables:-2.8

- ✓ Spinach:-14

- ✓ Carrots: -4.9

Chiropractic Care

There are physical aspects to restoring balance as well. To ensure even forces are put through the joints as you exercise and go about your day to day activities, it is important to make sure that the stresses through the joints are uniform and symmetrical. Chiropractic care can identify areas that have been awkwardly stressed or torqued due to these asymmetrical forces and, for the most part, correct them. This allows even stresses through the bones and uniform bone re-growth. Chiropractic treatment can also help unsteadiness which, once one has osteoporosis, is a piece of the puzzle in preventing those falls which can turn life threatening. We want to keep the musculoskeletal system working as well as we can.

Chiropractic care is often very successful in treating musculoskeletal issues that create acute or chronic pain. By ensuring that all of the spine's joints are moving in a healthy way and not creating stress on the muscles, a once dysfunctional area can become more mechanically sound and thus lessen the pain. Once the pain is less, people feel like they want to get out there and move. This creates a positive feedback cycle. Many people wonder if chiropractic adjustments are safe- especially if you already have some bone loss. The adjustments used take into consideration the extent of the osteopenia. There are great tools to help fine tune the treatment and ensure that it's safe and effective.

Conclusion

Osteoporosis is a preventable disease if appropriate dietary and lifestyle measures are followed. Women of all ages should be making bone health a lifelong priority. This involves avoiding dietary and lifestyle choices that leech Calcium from the bones and choosing dietary and lifestyle factors that promote bone health. Strong bones require much more than just a good Calcium supplement. Many nutrients are crucial to bone health and the prevention and treatment of Osteoporosis. Bone is a dynamic, living tissue that requires a constant supply of high-quality nutrients and regular stimulation through exercise.

In a way, osteoporosis is quite an exciting disease. There are few conditions we can take so much control of by avoiding and correcting. The other wonderful thing is that by making these life changes, we not only affect the rate of bone loss or gain

but become truly healthier. In life and medicine, there are many opinions. We find truth when what we do affects our life in so many positive ways. There is not one person who, after modifying their life to prevent or treat osteoporosis, can't say that they don't feel more well, alive and vibrant. This is how we are meant to live. This is the healthiest state of being when we can be the most, give the most and live the most.