BRIGHAM AND WOMEN'S HOSPITAL

Healthy Bones for Life

Prevention, Diagnosis and Treatment for Osteoporosis©

To prepare for a healthy future, it is especially important for you, as a woman, to take care of your bones.

About one out of every two women will suffer from osteoporosis, or "bone-thinning" disease, compared to one in every eight men. The disease, which is preventable and has no visible symptoms, causes brittle bones and can result in hip, spine, or wrist fractures. These kinds of major breaks may seriously limit mobility and physical ability, and cause significant disability.

Unfortunately, many women are unaware that they are experiencing bone loss until they are diagnosed with osteoporosis by bone density testing - or suffer a fracture and are diagnosed with osteoporosis.

This guide is intended to provide you with the information you need to help prevent osteoporosis and improve overall bone health.

The information in this guide is based on the Brigham and Women's Hospital physician guideline *Osteoporosis: Guide to Prevention, Diagnosis and Treatment* (LeBoff M, Solomon C, Johnson P, Bermas B, Fairchild D, Ginsburg E, Gharib SD). Special thanks to Ellen W. Seely, MD, for her careful review.

Osteoporosis - a major health risk

Physicians, realizing some degree of osteoporosis will eventually affect all of us, are now taking measures to help prevent or reverse this process through early detection and treatment.

The statistics on osteoporosis show that it is a major health problem, especially as we continue to live longer. This condition will affect more Americans in the future and may cause other health-related concerns.

- 44 million women in the United States have a low bone mass, or osteoporosis.
- Nearly half of all women will experience an osteoporotic fracture at some point in their lifetime.
- A woman's risk of hip fracture is equal to her combined risk of breast, ovarian, and uterine cancer.
- More than half of the women admitted to Brigham and Women's Hospital with a hip fracture have vitamin D deficiency.
- Osteoporosis is under-diagnosed and under-treated.

Assessing your risk

After the onset of menopause, women are at higher risk than men are for developing osteoporosis because of the decrease in estrogen that helps protect bones. Bone loss usually begins around the age of 35 and, after menopause, increases rapidly.

Risk factors for osteoporosis

Major risk factors

If you can answer "yes" to any of the following questions, you are at risk for developing osteoporosis. You should talk with your doctor about bone density testing and evaluation of your overall bone health.

- Have other women in your family had osteoporosis or major fractures (hip, spine)?
- Do you smoke cigarettes?
- Are you thin and small-boned?
- Have you fractured a bone as an adult? (especially without a history of significant trauma)

Other risk factors

If you can answer "yes" to any of the following questions, you may be at increased risk for osteoporosis. You should talk with your doctor about bone health and what you can do to decrease your risk of developing the disease.

- Are you Caucasian or Asian?
- Do you have rheumatoid arthritis, a history of an overactive thyroid, anorexia nervosa, or liver disease?
- Have you ever had absence of menstrual periods for a year?
- Do you do very little physical activity?
- Have you reached menopause?
- Did you reach menopause before age 40?
- Do you have more than two alcoholic drinks per day?
- Is your diet lacking in dairy products, calcium supplements, and vitamin D?
- Do you exercise sporadically or not at all?
- Are you on steroid medication?

A lifetime of prevention

To reduce your chance of developing osteoporosis, it is important to understand what you can do throughout your lifetime to prevent the disease.

Childhood to menopause

Throughout your life, nutritional and lifestyle factors affect the health of your bones. Simple adjustments can make all the difference later on in life. Bone mass in women increases dramatically during the teenage years, between approximately 16 to 30 years of age. This is why it is especially important that girls and young women get adequate calcium and vitamin D (which helps the body absorb calcium) in their diets. Calcium and vitamin D should be an essential part of your diet now and throughout your life. Weight-bearing exercise should become part of your routine. Smoking and excessive alcohol consumption also contribute to bone loss and should be avoided (for this reason as well as multiple other reasons.)

Menopause to age 64

During this life stage you need to assess your risk for developing osteoporosis. You should seek the assistance of your doctor who can help determine if you are at risk or have developed the disease. Lifestyle, nutrition, and any treatment changes can be made based on what your doctor recommends. If you have at least one major risk factor for osteoporosis (see page 4), you should have a bone density test. If you have a history of fracture as an adult, whether you are on estrogen or not, you should also be tested. Your doctor may also recommend a bone density test in other circumstances.

Age 65 and older

If you are 65 or older, you should have a baseline bone density test to determine the condition of your bones and to see if you have osteoporosis. Lifestyle and nutritional approaches, as described above, continue to be important.

Reduce your risk of osteoporosis

There are steps you can take to reduce your risk of osteoporosis or slow down the process of bone loss.

If you smoke or drink excessive amounts of alcohol, you should stop because both habits contribute to bone loss. Also, when you quit smoking and decrease alcohol intake, your overall quality of health will improve.

A diet rich in calcium is important for bone health. Universal recommendations on bone health suggest that women, from the onset of menarche through age 18, should have 1,300 mg of calcium a day. From age 19 to menopause, 1,000 mg of calcium a day is recommended. After menopause, women should have 1,200 mg of calcium a day. Adults should also have 800 to 1,000 units of vitamin D daily, according to recent studies. (See Appendix)

Screening for osteoporosis

If you are concerned about bone loss, or want to start on a course of prevention today, your doctor can help assess your risk of osteoporosis and give you more information on prevention. You can start by asking your doctor the following questions.

- How high is my risk of osteoporosis?
- How can I prevent bone loss?
- Should I have a bone density test?
- What medications are available to help prevent and treat osteoporosis?

Testing for osteoporosis

Fortunately, there is a quick and easy test available to assess the health of your bones.

Dual energy x-ray absorptiometry, or DXA, is a very useful and accurate test. DXA can assess the health of your bones by measuring their mass with dual x-ray using a very low level of radiation (much less than a routine x-ray).

Two other tests – ultrasound, which measures heel density, and single x-ray absorbtiometry (SXA), which measures the density of the bones in your fingers – are also available. Ultrasound testing is helpful because it tells you the condition of your bones, but neither of these tests are useful in monitoring the response to treatment.

Many health insurance plans now cover FDA-approved bone density testing, depending on your age and doctor's recommendation.

Keep your bones healthy

Estrogen (e.g. Premarin,® Prempo,® Premphase,® or Estrace®), alendronate (Fosamax®), risedronate (Actonel®), zoledronic acid (Reclast®), ibandronate (Boniva™), raloxifene (Evista®), and parathyroid hormone (Forteo®) are medications that have been shown to increase bone density and decrease the risk of fracture.

Estrogen

A recent study by the Women's Health Initiative (WHI), that was conducted at Brigham and Women's Hospital and 16 other centers in the United States, demonstrated that women taking estrogen in combination with progesterone, or hormone replacement therapy (HRT), had lower rates of spine, hip and other fractures, but were at slightly increased risk for breast cancer, blood clots, stroke, and heart attacks. Currently, HRT is recommended only for short-term use to treat troubling postmenopausal symptoms, such as hot flashes. During treatment, estrogen and progesterone increase bone mass. However, HRT should be used for only a short period

of time. After discontinuation, another medication may be necessary to prevent bone loss or treat osteoporosis. New data from the WHI revealed that – even for women at a higher risk for fracture – the risks from estrogen and progesterone are greater than the benefit.

Alendronate and Risedronate

Alendronate (Fosamax®) and risedronate (Actonel®) are medications from the same family, called "bisphosphonates." These drugs increase bone density and decrease fracture rates. Both medications should be taken on an empty stomach with a full glass of water. For 30 minutes after taking the medication, you should not have anything to eat or drink and you should avoid lying down. Both medications are now available in a once-a-week dose. Alendronate is available combined with vitamin D. Risedronate is also available for dosing as one tablet for two days once a month.

Ibandronate

Ibandronate (Boniva™) is a once-monthly oral bisphosphonate that decreases spine, but not non-spine, fractures (such as hip, wrist). This medication should be taken with a full glass of water 60 minutes before eating, drinking or taking other oral medications.

Zoledronic acid

Zoledronic acid (Reclast®) is an intavenous medication that reduces the incidence of spine, hip, and non-spine fractures. This medication is approved for use as once year 15-minute infusion for the treatment of osteoporosis. Women may develop flu-like symptoms following this medicine, which disappears spontaneously over the next few days.

Talk with your doctor to determine which of these medications is appropriate for your condition. Doctors may advise women with a history of stomach problems or heartburn to avoid taking an oral bisphosphonate; such women will be eligible for intravenous osteoporosis medication. Women with severe kidney disease should also not take these medications.

Raloxifene

Raloxifene (Evista®) is part of an exciting class of drugs that act like estrogen in some tissues of your body, and as an anti-estrogen in other tissues. Raloxifene acts like estrogen in that it increases bone density and decreases spine fractures, but not non-spine fractures. It also lowers total cholesterol levels in the blood. An additional advantage is that it may act as an anti-estrogen at the breast and decreases the risk of invasive breast cancer (FDA-approved for this indication).

Like estrogen, however, raloxifene increases the risk of blood clots and should be avoided in women who have had blood clots in the past. Raloxifene does not prevent urinary tract symptoms nor reduce hot flashes, and in some cases, may even make a woman's hot flashes worse.

Parathyroid Hormone

FDA-approved treatment for osteoporosis is daily injections (self-administered) of parathyroid hormone (Forteo™), or PTH. A recent study showed that postmenopausal women who injected PTH daily for almost two years had lower rates of vertebral and other non-spine fractures. The main side effects include nausea, headaches, and occasionally, small rises in the blood calcium level. PTH is usually used in women with osteoporosis or those who did not respond to the medications listed above.

For those who have osteoporosis

If you have osteoporosis, there are treatment options that will help strengthen your bones. Even if you already have been diagnosed with osteoporosis, medications such as alendronate (Fosamax®), risedronate (Actonel®), zoledronic acid (Reclast®), calcitonin (Micalcin®), and raloxifene (Evista®), or parathyroid hormone (Forteo™), can still help strengthen your bones.

All adult women should have between 800 and 1,000 IUs of vitamin D a day. (See Appendix)

Also, talk to your doctor about a safe exercise program and activities that will help strengthen your bones without increasing the risk of a fracture.

You should also get as much exercise as possible - preferably 45 minutes of combined weight-bearing activity and strength training two to three times a week. You can break up the time into 20-minute intervals. Weight-bearing exercises include walking, tennis, and aerobics.

Medications you take for other health conditions (particularly steroids) can contribute to bone loss. If you take a medication for a chronic health condition, ask your doctor if it could affect your bones and, if so, what actions can be taken to protect your bones.

Osteoporosis is preventable and treatable. At Brigham and Women's Hospital, we are committed to helping you keep your bones healthy.

Appendix

Meeting your needs for calcium and vitamin D

Every day you should incorporate three to four servings (300 mg calcium) of calcium into your diet. Remember you need 1,000 mg if you are premenopausal and 1,200 mg if you are postmenopausal.

Dairy products:	Serving Size	Calcium (mg)
American cheese	1 oz.	174
Blue cheese	1 oz.	150
Buttermilk (<1% fat)	1 cup	657
Cheddar cheese	1 oz.	204
Cottage cheese	1 cup	126
Frozen yogurt	1 cup	200
Ice cream	1 cup	176
Milk	1 cup	300
Parmesan cheese	1 oz.	390
Soy milk (calcium-fortified)	1 cup	200-300
Soy milk (not calcium-fortified)	1 cup	10
Yogurt (non-fat)	8 oz.	294

Fruits:	Serving Size	Calcium (mg)
Cantaloupe	1 cup	18
Dried figs	10	269
Orange juice (calcium-fortified)	1 cup	300
Orange (medium)	1	52
Raisins	1/2 cup	35

Vegetables:	Serving Size	Calcium (mg)
Asparagus (cooked)	1 cup	43
Broccoli (cooked)	1 cup	70
Carrots (cooked)	1 cup	48
Chickpeas (cooked)	1 cup	80
Collard greens (cooked)	1 cup	148
Green beans (cooked)	1 cup	58
Kidney beans (cooked)	1 cup	74
Lima beans (cooked)	1 cup	55
Potatoes (mashed w/milk)	1 cup	292
Soybeans (cooked)	1 cup	131
Spinach (cooked)	1 cup	245

Grains:	Serving Size	Calcium (mg)
Cereals (calcium-fortified)	1 cup	300
Total® cereal	1 cup	1000
Oatmeal (cooked)	1 cup	300
Rice (cooked)	1 cup	21
Wheat bread (enriched)	1 slice	32

Others:	Serving Size	Calcium (mg)
Almonds	1/2 cup	150
Salmon	4 oz.	300

Calcium Supplements

Since the average American diet contains only 800 mg of calcium daily, most women should take a calcium supplement. Supplements containing calcium citrate or calcium carbonate are best. Calcium citrate is the most absorbable form of calcium and can be taken on an empty stomach. Calcium carbonate offers more calcium per pill but does not absorb as well and needs to be taken with meals. You should talk to your doctor or dietitian to decide which calcium supplement is right for you.

Calcium carbonate:	Elemental Calcium per tablet (mg)	Vitamin D (IU)
Caltrate 600+D®	600	400
Caltrate 600+D® plus minerals	600	400
Nature Made 600+D®	600	200
Os-Cal 500+D®	500	200
Os-Cal Ultra®	600	200
Os-Cal Extra D®	600	400
TUMS Regular Strength®	200	0
TUMS E-X Extra Strength®	300	0
TUMS Ultra®	400	0
TUMS 500®	500	0

Calcium citrate:	Calcium per tablet (mg)	Vitamin D (IU)
Citracal 250+D®	250	200
Citracal+D®	315	200
Citracal Petite®	200	200

Soft Chew tablets:	Calcium per tablet (mg)	Vitamin D (IU)
Nature Made Cal burst +D®	500	200
Viactiv®	500	100
Citracal Creamy Bites®	500	200
Posture® D Chewable	600	125
Caltrate 600+D® Chewables	600	400

Vitamin D

Vitamin D is essential to normal bone growth and plays an important role in helping your body absorb calcium. Recent data indicate that 800-1,000 units of vitamin D daily is safe and necessary to achieve vitamin D levels that are associated with reduced fractures.

We recommend a multivitamin with vitamin D^3 (cholecalciferol) rather than vitamin D^2 (ergocalciferol). Cholecalciferol results in a preferred steady-state vitamin D level.

Milk is fortified with vitamin D – one cup provides 100 IUs of the vitamin. Be aware that other milk products, such as cheeses and yogurts, are not made from vitamin D-fortified milk. Salmon, herring, mackerel, and sardines also contribute substantial amounts of vitamin D.

Many vitamin supplements and calcium supplements contain vitamin D. It is important to read the labels to ensure you get appropriate vitamin D amounts and the preferred vitamin D^3 preparation.

For more information on physicians and services at Brigham and Women's Hospital, call our Physician Referral Service at ***1-800-BWH-9999***, Monday-Friday, 8:30 a.m. to 5 p.m. or visit our website at **www.brighamandwomens.org**

Notes

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