



PATIENT & CAREGIVER EDUCATION

Bone Health For Cancer Survivors

This information explains how you can improve your bone health after cancer treatment.

About Osteopenia and Osteoporosis

Osteopenia is a condition in which your bones are less dense than normal. Having osteopenia can lead to osteoporosis. Osteoporosis is a disease in which your bones become weak and more likely to fracture (break).

Osteoporosis is often called a silent disease because there are usually no symptoms in the early stages. However, once osteoporosis has caused bones to become weak and brittle, a person may experience symptoms such as:

- Back pain, often caused by a compression fracture or collapsed vertebra (bone in your back)
- Loss of height over time
- Stooped posture or curved upper back
- Broken bones that happens more easily than expected, such as after a minor injury

There are 2 kinds of osteoporosis:

- Primary osteoporosis, which can be caused by the normal process of aging, menopause, or both.
- Secondary osteoporosis, which can develop as a side effect of cancer treatment, such as taking certain medications. This kind of osteoporosis usually gets better once you stop taking the medication that causes it.

Risk factors for osteoporosis

Risk factors for people who have been treated for cancer include:

- Having ovarian failure because of the kind of chemotherapy that you got.
- Being treated with aromatase inhibitors for breast cancer.
- Receiving hormone therapy (androgen deprivation) for prostate cancer.
- Taking certain steroids (such as exemestane and prednisone).
- Getting radiation therapy.

General risk factors include:

- Lack of exercise.
- Eating a diet low in nutrients, especially calcium and vitamin D.
- Eating a diet high in sodium.
- Drinking too much alcohol (more than 2 drinks per day for women or 3 drinks per day for men).
- Consuming too much caffeine (more than 3 cups of coffee a day).
- Smoking.
- Having a small body frame or low body weight.
- Being over 65 years old.
- Being of Caucasian or Asian ethnicity.

Preventing and Managing Bone Loss and Osteoporosis

There are things you can do to decrease your chance of developing osteoporosis.

Screening for osteoporosis

If your doctor believes that you're at risk for osteopenia or osteoporosis, they will recommend that you have a bone density test. This test measures bone density in your wrist, spine, thigh, and hip. It's a painless test that's like an x-ray but uses much less radiation.

Lifestyle changes

You can make changes in your lifestyle in order to reduce your risk of osteoporosis and its effects.

- Don't smoke. If you need help quitting, contact the MSK Tobacco Treatment Program at 212-610-0507.
- Limit your intake of alcohol. Don't have more than 2 drinks a day if you're a woman and 3 drinks a day if you're a man.
- Exercise regularly. For more information, read the "Exercise for Strong Bones" section below.
- Make sure you have enough calcium and vitamin D in your diet.
 - Most adults need 1,000 to 1,200 milligrams (mg) of calcium every day. Your doctor or dietitian can tell you how much calcium is right for you. The best way to get calcium is through food (see the table "Foods Rich in Calcium" at the end of this resource).
 - If you don't get enough calcium from your diet, you may need to take a calcium supplement. Calcium supplements come in different forms, including calcium carbonate and calcium citrate.
 - You need vitamin D to absorb and use calcium. Most adults with osteopenia or osteoporosis need at least 800 international units (IU) of vitamin D daily, but how much vitamin D you need may be different. Your doctor or dietitian can tell you how much vitamin D is right for you. Although the main source of vitamin D is the sun, you can also get it from food (see the table "Foods Containing Vitamin D").
 - If you're not getting enough vitamin D, you may need to take a vitamin D supplement. You can buy vitamin D supplements at your pharmacy without a prescription.
 - If you have low levels of vitamin D, your doctor may recommend that you take prescription supplements with higher amounts of vitamin D. This can bring your levels up to normal.

Prescription medications

Talk with your doctor about prescription medications

- There are prescription medications available to prevent and treat osteoporosis. Your doctor at MSK may have prescribed them to you while you were still getting cancer treatment. Now that you've finished your treatment, speak with your primary care provider or other healthcare provider about osteoporosis medications.
- Medication to treat osteoporosis include:
 - Oral medications, such as risedronate (Actonel®) and alendronate (Fosamax®), that you take by mouth
 - Injectable medications, such as denosumab (Prolia®), that you get as a shot
 - Intravenous (IV) medication, such as zoledronic acid (Reclast®), that you get into your vein in your arm.

Exercise for Strong Bones

Exercise can help you maintain strong bones, It can also decrease the risk of falls and fractures.

Speak with your healthcare provider before starting any exercise program.

High-impact weight-bearing exercises help build up your bones and keep them strong. Examples of high-impact weight-bearing exercises are:

- Fast dancing
- High-impact aerobics
- Hiking
- Jogging or running
- Jumping rope
- Climbing stairs
- Tennis

Low-impact weight-bearing exercises can also help keep bones strong. They can also be safer for people who can't do high-impact exercises. Examples of low-impact weight-bearing exercises are:

- Using elliptical training machines
- Walking
- Using a climbing machine, such as a StairMaster®
- Riding a bicycle
- Rowing
- Tai chi
- Yoga
- Pilates
- Swimming
- Water aerobics
- Golf
- Cross-country skiing
- Ballroom dancing

Foods Rich in Calcium

Food	Portion size	Calcium in portion (milligrams)	Calories in portion
Dairy foods			
Yogurt, plain, nonfat	1 cup (8 ounces)	265	150
Cheddar cheese	1½ ounces	307	171
Gruyere cheese	1½ ounces	430	176
Parmesan cheese	1½ ounces	503	167
Milk, low-fat	1 cup (8 ounces)	305	102
Milk, whole	1 cup (8 ounces)	276	149
Non-dairy alternatives			
Soy milk, plain, calcium-fortified	1 cup (8 ounces)	301	80

Rice milk, plain, calcium-fortified	1 cup (8 ounces)	283	113
Almond milk, vanilla, calcium-fortified	1 cup (8 ounces)	451	91
Seafood			
Sardines, canned in oil, with bones, drained	2 sardines	92	50
Salmon, sockeye, canned, drained	4 ounces	263	189
Ocean perch, Atlantic, cooked	4 ounces	39	109
Mussels, steamed	4 ounces	37	195
Fruits and vegetables			
Collards, cooked	1/2 cup	134	31
Turnip greens, cooked	1/2 cup	104	29
Kale, cooked	1/2 cup	47	18
Bok choy (Chinese cabbage), raw	1 cup	74	9
Brussels sprouts	1/2 cup	28	28
Figs, fresh	2 medium figs	35	74
Nuts, beans, and soy			
Almonds	1/4 cup	96	207
White beans, canned	1/2 cup	96	150
Edamame (soybeans), prepared	1/2 cup	49	95
Tofu, firm, prepared with calcium sulfate*	1/2 cup	253	88
Other foods and beverages			
Fortified, ready-to-eat cereals (various)**	3/4 cup to 1 cup	250-1,000	100-210
Orange juice, calcium fortified**	1 cup	500	117
Oatmeal, plain, instant, fortified**	1 packet prepared	98	101
Mineral water (e.g., San	1 cup (8	33	0

Pellegrino [®] , Perrier [®])	ounces)		
Basil, dried	1 teaspoon	31	3

*Calcium content is for tofu processed with a calcium salt. Tofu processed with other salts does not provide significant amounts of calcium.

**Check product labels, as amount of calcium varies.

Source: USDA National Nutrient Database for Standard Reference

Available at: <http://ndb.nal.usda.gov>

Foods Containing Vitamin D

Food	Portion size	Vitamin D in portion (IU)	Calories in portion
Cod liver oil	1 tablespoon	1,360	123
Salmon, sockeye, canned, drained	4 ounces	953	189
Ocean perch, Atlantic, cooked	4 ounces	66	109
Tuna fish, light, canned in water, drained	4 ounces	53	97
Sardines, canned in oil, drained	2 sardines	46	50
Orange juice fortified with vitamin D*	1 cup (8 ounces)	100	117
Milk, low-fat vitamin D-fortified	1 cup (8 ounces)	117	102
Egg, including yolk	1 large egg	44	78
Shiitake mushrooms, dried	4 mushrooms	23	44
Chanterelle mushrooms, raw	1/2 cup	114	21

*Check product labels, as amount of added vitamin D varies.

Source: USDA National Nutrient Database for Standard Reference

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Additional Resources

Memorial Sloan Kettering (MSK) video explaining calcium and vitamin D recommendations: www.mskcc.org/cancer-care/patient-education/nutrition-and-osteoporosis

MSK video demonstrating safe exercises for managing osteoporosis: www.mskcc.org/cancer-care/patient-education/osteoporosis-and-exercise

National Osteoporosis Foundation: www.nof.org

If you have any questions, contact a member of your healthcare team directly. If you're a patient at MSK and you need to reach a provider after 5:00 PM, during the weekend, or on a holiday, call 212-639-2000.

For more resources, visit www.mskcc.org/pe to search our virtual library.

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