PATIENT & CAREGIVER EDUCATION

Improving Your Bone Health

This information explains what osteopenia and osteoporosis are and how you can improve your bone health.

About Osteopenia and Osteoporosis

Bone conditions, such as osteopenia and osteoporosis, affect the health of your bones by making them weaker.

Bone mineral density is a measure of how dense your bones are. Bone density tells us how strong your bones are. Osteopenia is a condition in which your bone mineral density is lower than normal. Some people with osteopenia can protect their bone health by changing their lifestyle habits, following a healthy diet, and sometimes taking medications, if needed. Having osteopenia can sometimes 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 signs or symptoms in the early stages. If osteoporosis causes your bones to become weaker, you may have symptoms such as:
• Back pain, which is often caused by a compression fracture or collapsed vertebra (bone in your back)
• Loss of your height over time
• Bent-over posture or a curved upper back
• Broken bones that happen more easily than expected, such as after a minor injury, or when doing everyday activities. These fractures usually happen in the spine, hip, ribs, and wrist.

There are 2 kinds of osteoporosis:

• Primary osteoporosis, which can be caused by the normal process of aging, menopause (permanent end of menstrual cycles), or both.
• Secondary osteoporosis can develop as a side effect of some cancer treatments, such as taking certain medications. This kind of osteoporosis may get better once you stop taking the medication that causes it.

Causes and Risk Factors of Osteopenia and Osteoporosis

Your body is constantly making new bone and getting rid of old bone. Osteoporosis develops when the amount of bone that your body makes is less than the amount of bone that it gets rid of.

Lifestyle factors that can increase the risk of osteoporosis can 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)
• Having too much caffeine (such as more than 3 cups of coffee a day)
• Smoking

Other things that can lead to bone loss include:

• Cancer and some cancer treatments
• Bone marrow or connective tissue disorders
• Diseases that affect levels of hormones, such as estrogen and testosterone
• Thyroid disorders
• Parathyroid disorders
• Conditions that create trouble absorbing food and nutrients, such as graft versus host disease in your digestive tract, Crohn’s disease, or ulcerative colitis
• Certain medications, such as corticosteroids, heparin, some anticonvulsants, and methotrexate
- Hormonal therapy for prostate (androgen deprivation therapy) and breast cancers (aromatase inhibitors)
- Going through menopause or taking medications like leuprolide (Lupron®) or goserelin (Zoladex®), which stop your ovaries from making estrogen, or stop your testicles from making testosterone.
- Radiation therapy
- Being on long-term bed rest and not being active
- Being over 65 years old
- Having a small frame or low body weight
- Being of Caucasian or Asian ethnicity

**Diagnosing Osteopenia or 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, and hip. It’s a painless test that’s like an x-ray but uses much less radiation.

**Preventing and Managing Osteopenia or Osteoporosis**

There are things you can do to lower your risk of osteoporosis and reduce your risk for fractures.

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

- If you smoke or use tobacco products, try to quit. If you need help quitting, contact the Memorial Sloan Kettering (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 in this resource.
  - Your doctor may recommend exercises to strengthen your bones and muscles. These may be weight-bearing exercises that help increase bone density, such as walking, jogging, running.
  - Strengthening exercises such as lifting small weights, or strengthening the muscles in your lower back and abdomen (belly) can also be helpful.
  - Balance exercises, such as yoga or Pilates, can also improve your strength and flexibility.
  - Always talk with your doctor before starting a new exercise routine. If you have trouble establishing an exercise routine, talk with your doctor about whether physical therapy (PT) is right for you.
- Make sure you have enough calcium and vitamin D in your
Most adults need 1,300 milligrams (mg) of calcium every day. Your doctor or clinical dietitian nutritionist 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”).

- 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.

- Your body also needs 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 clinical dietitian nutritionist 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”). Your healthcare provider can check your vitamin D levels with a simple blood test.

- 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.

- Talk with your doctor about medications and hormone therapy treatments.
  
  - There are prescription medications available to help prevent and treat osteoporosis. Your doctor will discuss your options with you and prescribe the one that best meets your needs. They will go over any specific instructions for taking your medication.
  
  - Medications and hormones that treat osteoporosis include:
    
    - Oral medications, such as risedronate (Actonel®) and alendronate (Fosamax®), that you take by mouth.
    
    - Injectable medications, such as denosumab (Prolia®) or romozosomab (Evenity™), that you get as a shot.
    
    - Intravenous (IV) medication, such as zoledronic acid (Reclast®), that you get into your vein in your arm.
    
    - Hormone therapies, including calcitonin, parathyroid hormone type injections (such as Forteo® and Tymlos®), and estrogen replacement therapy.

- Prevent falls.
  
  - Make your home safe to prevent falls. Here are some things you can do:
    
    - Remove throw rugs or attach them to the floor.
■ Install safety rails on stairs and grab bars in your shower or tub.

■ Apply nonskid tape or decals to your shower or tub floor.

■ Make sure the rooms in your house or apartment are well lit.

■ Wear sturdy shoes.

■ Stand up slowly after sitting or lying down, so that your body can adjust to the new position.

■ Use a cane or walker to improve your balance.

■ When you bend over, bend at your knees, not at your waist.

○ For more information about preventing falls, read the resource What You Can Do to Avoid Falling (www.mskcc.org/pe/avoid_falling).

Exercise for Strong Bones

Exercise can help you maintain strong bones. It can also lower your risk of falls and fractures.

Talk 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’re also 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**

Be sure to check the product labels, because the amount of calcium can vary.

<table>
<thead>
<tr>
<th>Food</th>
<th>Portion size</th>
<th>Calcium in portion (milligrams)</th>
<th>Calories in portion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dairy foods</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yogurt, plain, nonfat</td>
<td>1 cup (8 ounces)</td>
<td>265</td>
<td>150</td>
</tr>
<tr>
<td>Cheddar cheese</td>
<td>1½ ounces</td>
<td>307</td>
<td>171</td>
</tr>
<tr>
<td>Gruyere cheese</td>
<td>1½ ounces</td>
<td>430</td>
<td>176</td>
</tr>
<tr>
<td>Parmesan cheese</td>
<td>1½ ounces</td>
<td>503</td>
<td>167</td>
</tr>
<tr>
<td>Milk, low-fat</td>
<td>1 cup (8 ounces)</td>
<td>305</td>
<td>102</td>
</tr>
<tr>
<td>Milk, whole</td>
<td>1 cup (8 ounces)</td>
<td>276</td>
<td>149</td>
</tr>
<tr>
<td><strong>Non-dairy alternatives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soy milk, plain, calcium-fortified</td>
<td>1 cup (8 ounces)</td>
<td>301</td>
<td>80</td>
</tr>
<tr>
<td>Rice milk, plain, calcium-fortified</td>
<td>1 cup</td>
<td>283</td>
<td>113</td>
</tr>
<tr>
<td><strong>fortified</strong></td>
<td><strong>(8 ounces)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Almond milk, vanilla, calcium-fortified</td>
<td>1 cup (8 ounces)</td>
<td>451</td>
<td>91</td>
</tr>
</tbody>
</table>

**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** | ½ cup | 134 | 31 |
| **Turnip greens, cooked** | ½ cup | 104 | 29 |
| **Kale, cooked** | ½ cup | 47 | 18 |
| **Bok choy (Chinese cabbage), raw** | 1 cup | 74 | 9 |
| **Brussels sprouts** | ½ cup | 28 | 28 |
| **Figs, fresh** | 2 medium figs | 35 | 74 |

**Nuts, beans, and soy**

<p>| <strong>Almonds</strong> | ¼ cup | 96 | 207 |
| <strong>White beans, canned</strong> | ½ cup | 96 | 150 |
| <strong>Edamame (soybeans), prepared</strong> | ½ cup | 49 | 95 |</p>
<table>
<thead>
<tr>
<th>Food</th>
<th>Portion</th>
<th>Vitamin D</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tofu, firm, prepared with calcium sulfate*</td>
<td>½ cup</td>
<td>253</td>
<td>88</td>
</tr>
<tr>
<td><strong>Other foods and beverages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortified, ready-to-eat cereals (various)</td>
<td>¾ cup to 1 cup</td>
<td>250-1,000</td>
<td>100-210</td>
</tr>
<tr>
<td>Orange juice, calcium fortified</td>
<td>1 cup</td>
<td>500</td>
<td>117</td>
</tr>
<tr>
<td>Oatmeal, plain, instant, fortified</td>
<td>1 packet prepared</td>
<td>98</td>
<td>101</td>
</tr>
<tr>
<td>Mineral water (e.g., San Pellegrino®, Perrier®)</td>
<td>1 cup (8 ounces)</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Basil, dried</td>
<td>1 teaspoon</td>
<td>31</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Source: USDA National Nutrient Database for Standard Reference

Available at: [http://ndb.nal.usda.gov](http://ndb.nal.usda.gov)

**Foods Containing Vitamin D**

Be sure to check the product labels, because the amount of Vitamin D can vary.
<table>
<thead>
<tr>
<th>Food Item</th>
<th>size</th>
<th>in portion (IU)</th>
<th>in portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod liver oil</td>
<td>1 tablespoon</td>
<td>1,360</td>
<td>123</td>
</tr>
<tr>
<td>Salmon, sockeye, canned, drained</td>
<td>4 ounces</td>
<td>953</td>
<td>189</td>
</tr>
<tr>
<td>Ocean perch, Atlantic, cooked</td>
<td>4 ounces</td>
<td>66</td>
<td>109</td>
</tr>
<tr>
<td>Tuna fish, light, canned in water, drained</td>
<td>4 ounces</td>
<td>53</td>
<td>97</td>
</tr>
<tr>
<td>Sardines, canned in oil, drained</td>
<td>2 sardines</td>
<td>46</td>
<td>50</td>
</tr>
<tr>
<td>Orange juice fortified with vitamin D</td>
<td>1 cup (8 ounces)</td>
<td>100</td>
<td>117</td>
</tr>
<tr>
<td>Milk, low-fat vitamin D fortified</td>
<td>1 cup (8 ounces)</td>
<td>117</td>
<td>102</td>
</tr>
<tr>
<td>Egg, including yolk</td>
<td>1 large egg</td>
<td>44</td>
<td>78</td>
</tr>
<tr>
<td>Shitake mushrooms, dried</td>
<td>4 mushrooms</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>Chanterelle mushrooms, raw</td>
<td>½ cup</td>
<td>114</td>
<td>21</td>
</tr>
</tbody>
</table>

Source: USDA National Nutrient Database for Standard Reference

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**Additional Resources**

- Memorial Sloan Kettering (MSK) video explaining calcium and


**National Osteoporosis Foundation**
www.nof.org

Provides resources and information on osteoporosis and improving bone health.

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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