



## Other Nutrients and Bone Health At A Glance

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Good nutrition is important to keep bones strong. We hear a lot about getting enough calcium and vitamin D. But research suggests that many other nutrients also are beneficial for bone health, while some nutrients and other components of our food have potentially adverse effects on bone health.

The table that follows was excerpted from *Bone Health and Osteoporosis: A Report of the Surgeon General*. This table provides an overview of a wide array of nutrients and other components in our diets, explaining how they impact our bone health and offering guidance concerning the recommended amounts and dietary sources of these nutrients.

The Surgeon General's report is a rich source of other information on bone health, osteoporosis, and related bone diseases as well. All the information is based on the best and most current research findings and expert opinions in the bone field. You can view the report and companion pieces including "What It Means to You" online at [www.surgeongeneral.gov](http://www.surgeongeneral.gov) and order copies of these materials either online or by calling 1-866-718-BONE.

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**National Institutes of Health  
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*The National Institutes of Health (NIH) is a component of the  
U.S. Department of Health and Human Services (DHHS).*

**Table 7-5. Other Nutrients and Bone Health at a Glance†**

<b>Other Nutrients Affecting Bone</b>	<b>What Is the Effect on Bone?</b>	<b>How Much Is Needed?*</b>	<b>What Are the Dietary Sources?</b>	<b>Special Considerations</b>
<b>Potentially Beneficial Effects on Bone</b>				
Boron	May enhance calcium absorption and estrogen metabolism.	Not applicable.	Raw avocado, nuts, peanut butter, bottled prune juice.	
Copper	Copper helps certain enzymes and local regulators function properly so that we can form the optimal bone matrix or structure for bone strength.	RDA is 0.9 mg for men and women over age 30. Daily intakes over 10 mg are not recommended.**	Organ meats, seafood, nuts, seeds, wheat bran, cereals, whole grain products, cocoa products.	Calcium supplementation may result in lower levels of copper.
Fluoride	Fluoride stimulates the formation of new bone. Necessary for skeletal and dental development.	RDA is 4 mg for men over age 30 and 3 mg for women over age 30. Daily intakes over 10 mg are not recommended.	Fluoridated water, teas, marine fish, fluoridated dental products.	
Iron	Iron helps certain enzymes and local regulators function properly so that we can form the optimal bone matrix or structure for bone strength.	RDA is 8 mg for men over age 19. The RDA for women is 18 mg between the ages of 19 and 50 and 8 mg over age 50. Daily intakes over 45 mg are not recommended.	<i>Non-heme sources</i> include fruits, vegetables and fortified bread and grain products such as cereal.  <i>Heme sources</i> include meat and poultry.	
Isoflavones	Isoflavones have been shown to have a protective effect on bone in animal studies. Evidence in humans, however, is conflicting.	Not applicable.	Primarily found in soybeans and soy products, chickpeas and other legumes.	Ipriflavone, a synthetic isoflavone, has been linked to a reduction in lymphocytes, a type of white blood cell that fights infection.

\*Recommended Dietary Allowance (RDA)  
Source: NIH ORBD~NRC 2004.

\*\* The RDA upper limit for copper is sometimes written as 10,000 µg. 10,000 µg equals 10 mg.

† Excerpted from U.S. Department of Health and Human Services. *Bone Health and Osteoporosis: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Office of the Surgeon General, 2004, pages 166-170.

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Magnesium	60% of the magnesium in our bodies is found in our bones in combination with calcium and phosphorus. Magnesium appears to enhance our bone quality. Studies suggest that it may improve bone mineral density, and not getting enough may interfere with our ability to process calcium.	RDA is 420 mg for men over 30 and 320 mg for women over 30. Daily intakes over 350 mg are not recommended	Good sources include green leafy vegetables such as spinach, potatoes, nuts, seeds, whole grains including bran, wheat, oats, and chocolate. Smaller amounts are found in many foods including bananas, broccoli, raisins and shrimp. Also found in magnesium-containing laxatives and antacids.	Magnesium deficiency is rare in US adults. Magnesium supplements are not recommended for most people.
Manganese	Manganese helps certain enzymes and local regulators function properly so that we can form the optimal bone matrix or structure for bone strength.	RDA is 2.3 mg for men over age 30 and 1.8 mg for women over age 30. Daily intakes over 11 mg are not recommended.	Nuts, legumes, tea, whole grains and drinking water.	Manganese supplements may not be a good choice for everyone, including people already consuming high levels of manganese from diets high in plant foods and people with liver disease who are especially susceptible to the adverse effects of excess manganese intake.

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Phosphorus	Phosphorus is a component of every cell in our bodies and supports building bone and other tissue during growth. About 85% of the phosphorus in our bodies is found in our bones. In fact, phosphate, a form of phosphorus, makes up more than half of our bone mineral mass.	RDA is 700 mg for men and women over age 30. Daily intakes over 4,000 mg for adults up to age 70 and over 3,000 mg after age 70 are not recommended.	Milk, yogurt, ice cream, cheese, peas, meat, eggs, some cereals, breads, cola soft drinks and many processed foods.	
Potassium		There is no RDA established for potassium. Scientists recommend a daily intake between 1,600 mg and 3,500 mg.	Milk, yogurt, chicken, turkey, fish, many fruits such as bananas, raisins and cantaloupe, and many vegetables such as celery, carrots, potatoes and tomatoes.	
Protein	Proteins are our bodies' building blocks. We use protein to build tissue during growth and to repair and replace tissue throughout life. We also need protein to help heal fractures and to make sure our immune system is functioning properly.	RDA is 56 g for adult men and 46 g for adult women. Nutritionists recommend that 10% to 35% of our calories come from protein. (The rest come primarily from carbohydrates and fats.)	<i>Complete protein comes from animal sources</i> including meat, poultry, fish, eggs, milk, cheese, yogurt.  <i>Incomplete protein comes from plant sources</i> including legumes, grains, nuts, seeds and vegetables.	Getting enough protein is particularly important for elderly people. Studies show that elderly people who have not been getting enough protein and who break their hip are more likely to suffer poor medical outcomes.

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Vitamin C	Vitamin C helps certain enzymes and local regulators function properly so that we can form the optimal bone matrix or structure for bone strength.	RDA is 90 mg for men over age 30 and 75 mg for women over age 30. Daily intakes over 2,000 mg are not recommended.	Citrus fruits, tomatoes and tomato juice, potatoes, Brussels sprouts, cauliflower, broccoli, strawberries, cabbage and spinach.	People who smoke need 35 mg more vitamin C than the RDA. People who are regularly exposed to second-hand smoke also may need extra vitamin C.
Vitamin K	Vitamin K helps certain enzymes and local regulators function properly so that we can form the optimal bone matrix or structure for bone strength.	RDA is 120 units for men over age 30 and 90 units for women over age 30. No maximum safe intake has been established for vitamin K.	Green vegetables including collards, spinach, salad greens and broccoli, Brussels sprouts, cabbage, plant oils and margarine.	Patients on anticoagulant medication should monitor their vitamin K intake.
Zinc	Zinc helps certain enzymes and local regulators function properly which in turn helps our bodies form the optimal bone matrix or structure for bone strength.	RDA is 11 mg for boys and men over age 19 and 8 mg for girls and women over age 19. Daily intakes over 40 mg are not recommended.	Red meat, poultry, fortified breakfast cereal, some seafood, whole grains, dry beans and nuts.	Nutritionists recommend that vegetarians double the RDA for themselves, because zinc is harder to absorb on a vegetarian diet. Calcium supplementation may reduce the absorption of zinc.

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Caffeine	Studies suggest that caffeine may interfere with calcium absorption. However, this effect can be neutralized in the presence of adequate dietary calcium.	Not applicable	Coffee, tea, some soft drinks, some over the counter medications.	
Fiber	Fiber has a minor negative impact on calcium absorption.	Men ages 31 to 50 need 38 g per day and after 50 need 30 g per day. Women ages 31-50 need 25 g per day and after 50 need 21 g per day.	Includes dietary fiber naturally present in grains (oats, wheat or unmilled rice) and functional fiber from plants and animals shown to be of benefit to health.	
Oxalates	When oxalates and calcium are found in the same food, oxalates combine with the calcium, preventing us from absorbing the calcium.	Not applicable	Spinach. Other oxalate-rich foods include rhubarb and sweet potatoes, but since these foods do not contain calcium, the oxalates have no effect on calcium absorption.	Oxalates do not interfere with the absorption of calcium in <i>other</i> foods eaten with the oxalate-containing foods.

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Phosphorus	Phosphorus is necessary for healthy bones (see above), but some people are concerned that there may be too much in our diet, especially since phosphorus is a component of cola beverages and many processed foods. Some studies suggest that excess amounts of phosphorus may interfere with calcium absorption. The good news is that we can offset the loss by getting adequate amounts of calcium in our diet.	RDA is 700 mg for men and women over age 30. Daily intakes over 4,000 mg for adults up to age 70 and over 3,000 mg after age 70 are not recommended.	Milk, yogurt, ice cream, cheese, peas, meat, eggs, some cereals, breads, cola soft drinks and many processed foods.	Possible negative effects of soft drinks on bone may be due primarily to the replacement of calcium-rich milk with soft drinks, especially by children and teenagers at a time when they need extra calcium to optimize their peak bone mass.
Protein	Protein is essential for good health (see above). However, when we get too much protein, our bodies convert the extra protein into calories for energy, producing a chemical called sulfate in the process. Sulfate causes us to lose some calcium, but these are relatively small losses that we can offset by getting adequate amounts of calcium in our diet.	RDA is 56 g for adult men and 46 g for adult women. It is recommended that 10% to 35% of calories come from protein. (The rest come primarily from carbohydrates and fats.)	<i>Complete protein comes from animal sources</i> including meat, poultry, fish, eggs, milk, cheese, yogurt.  <i>Incomplete protein comes from plant sources</i> including legumes, grains, nuts, seeds and vegetables.	

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Sodium	Sodium affects the balance of calcium in our bodies by increasing the amount we excrete in urine and perspiration. The loss of calcium can be significant, but we can replace the lost calcium by making sure we get adequate amounts of calcium in our diet.	The NIH recommends restricting daily sodium intake to less than 2,400 mg (equal to about 1 teaspoon of table salt).	Sodium combined with chloride is common table salt. Many processed foods are high in salt.	
Vitamin A	Vitamin A plays an important role in bone growth but excessive amounts of the retinol form of vitamin A may increase the breakdown of our bones and interfere with vitamin D, which we need to help us absorb calcium. The beta carotene form of vitamin A does not appear to cause these problems.	RDAs are 3,000 IU for men and 2,330 IU for women. Daily intakes over 10,000 IU of the retinol form of vitamin A are not recommended.	<p><i>Retinol sources</i> include animal-source foods such as liver, egg yolks, cheese, milk. Dietary supplements and some acne preparations also contain retinol.</p> <p><i>Beta carotene sources</i> include plant-source foods, such as dark orange and green vegetables including carrots, sweet potatoes, and spinach as well as cantaloupe and kale.</p>	

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