



Children, Adolescents, and Bone Health

WHY IS BONE HEALTH IMPORTANT IN CHILDHOOD AND ADOLESCENCE?

Bone is a living tissue that changes throughout our lives, as the body breaks down old bone and forms new bone. The most important time for building a strong skeleton is during childhood and adolescence.

The greatest gains in bone size and strength occur in adolescence, when the hormones of puberty speed up bone growth. Bones not only get longer and wider, they also get denser (thicker). People reach their peak bone mass—their largest and densest bone—by their late teens or early twenties. As early as age 30, some bones begin to slowly lose mass as a normal part of aging.

The more bone mass we “bank” in childhood and adolescence, the better protected we are from the bone loss that can lead to osteoporosis (thin, fragile bones) and bone fractures later in life.

WHAT AFFECTS CHILDREN’S BONE HEALTH?

The genes we inherit, our hormones, and our lifestyle all affect our peak bone mass. Genetic factors have the greatest influence on peak bone mass. But to reach his or her full “genetic potential,” a child needs enough of certain hormones, along with healthy eating and exercise habits.

Growth hormone and the sex hormones estrogen and testosterone at puberty are essential for building bone mass in both boys and girls. Maintaining a healthy weight and getting enough vitamin D, calcium, protein, and physical activity are also important to bone health. Calcium is the main building block

of strong, healthy bones, and vitamin D helps the body absorb calcium. Weight-bearing exercise, such as running and jumping, helps build muscle and bone strength.

DID YOU KNOW?

Vitamin D is not really a vitamin at all, but a hormone. True vitamins, like A, B, and C, are not made by the body. They only come from food and supplements (like a vitamin pill). But most vitamin D is made by your own body.

Boys usually reach a higher peak bone mass than girls and are less likely to develop osteoporosis as they age. To build as much bone strength as they can, adolescent girls need to be careful in their approach to diet and exercise. Menstruation can stop in girls who exercise too much or are extremely underweight (as in anorexia). Girls who never start their periods or stop menstruating often have low estrogen levels, which can harm their bone health.

If necessary, your child’s bone mass can be evaluated by an X-ray exam called a DXA scan.

IS YOUR CHILD GETTING ENOUGH VITAMIN D AND CALCIUM?

Vitamin D. Most of our vitamin D is produced when our skin is exposed to sunlight. Children get vitamin D from playing outdoors in the sun, but only at certain times of the year and parts of the day when the sun is strongest. And sunscreens block the sun’s rays that cause our bodies to make vitamin D.

We also get some vitamin D from food, but very few foods naturally contain vitamin D. In the United States, most milk, infant formulas, and some cereals are fortified (meaning vitamin D is added).

Infants need at least 400 IU (international units) of vitamin D each day. Breast-fed babies should get vitamin D supplements since mother's milk is low in vitamin D. Children and adolescents need at least 600 IU of vitamin D daily.

Children and adolescents with dark skin, limited sun exposure, obesity, or certain chronic diseases are more likely to be deficient in vitamin D. These children may need more than 600 IU to reach a healthy vitamin D level. A simple blood test can check for vitamin D deficiency. This test is recommended only for children who have risk factors for poor bone health.

Calcium. The recommended daily calcium intake for children and adolescents varies by age:

0–6 months	210 milligrams (mg)
7–12 months	270 mg
1–3 years	500 mg
4–8 years	800 mg
9–18 years	1,300 mg

SOME FACTORS THAT INTERFERE WITH HEALTHY BONE DEVELOPMENT
Hormone-related disorders
<ul style="list-style-type: none">• Growth hormone deficiency• Testosterone or estrogen deficiency• Diabetes
Chronic diseases
<ul style="list-style-type: none">• Inflammatory diseases such as arthritis and bowel disease• Cancer• Diseases that lead to immobility (muscular dystrophy, cerebral palsy)
Medications
<ul style="list-style-type: none">• Corticosteroids (for rheumatoid arthritis, asthma)• Anticonvulsants (for epilepsy)• Drugs that suppress the immune system (for cancer)
Behaviors
<ul style="list-style-type: none">• Prolonged inactivity• Excessive exercise that stops menstrual cycles• Smoking
Nutritional disorders
<ul style="list-style-type: none">• Obesity• Malnutrition• Vitamin D deficiency

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The Hormone Health Network offers free, online resources based on the most advanced clinical and scientific knowledge from The Endocrine Society (www.endo-society.org). The Network's goal is to move patients from educated to engaged, from informed to active partners in their health care. This fact sheet is also available in Spanish at www.hormone.org/Spanish.

Children, Adolescents, and Bone Health Fact Sheet

WHAT CAN YOU DO TO HELP KEEP YOUR CHILD'S BONES STRONG?

You can set an example for your child by modeling good bone health habits. Keep calcium-rich foods on hand and encourage physical activity. Talk about your child's bone health whenever you consult your pediatrician.

Questions to ask your doctor

- How much calcium and vitamin D does my child need?
- How can I tell if my child is getting enough?
- Does my child need a blood test for vitamin D deficiency?
- Should my child take a calcium or vitamin D supplement? How much?
- If my child has a hormone disorder that's affecting her bones, should I see an endocrinologist for her care?
- What else can I do to help my child build strong bones?

RESOURCES

- Find-an-Endocrinologist: www.hormone.org or call 1-800-HORMONE (1-800-467-6663)
- Hormone Health Network osteoporosis and bone health information: www.hormone.org/osteoporosis
- Children's National Medical Center: www.childrensnational.org (search for bone health program)
- Nemours KidsHealth.org: kidshealth.org/kid/htbw/bones.html
- National Osteoporosis Foundation: www.nof.org
- Osteoporosis and Related Bone Diseases Resource Center (National Institutes of Health): www.niams.nih.gov/Health_Info/Bone/Bone_Health/Juvenile/default.asp or call 1-800-624-BONE



www.hormone.org