

STAYING HEALTHY

Osteoporosis Prevention Starts Early

As people age, their bones may become very weak and fragile — a condition called [osteoporosis](/en/diseases--conditions/osteoporosis/) (/en/diseases--conditions/osteoporosis/). It often develops unnoticed over many years, with no symptoms or discomfort until a bone breaks.

Fortunately, there are many things that people at all stages of life can do to build strong, healthy bones. Childhood and adolescence are especially important times for building bones and developing habits that support good bone health for life.

Healthy Bones Begin in Childhood

Bones grow in size during childhood, gaining mass and strength. The amount of bone mass you obtain while you are young determines your skeletal health for the rest of your life. The more bone mass you can build during adolescence, the more protection you have against losing bone mass later.

Calcium and Nutrition

Good nutrition is vital for normal growth. Like all tissues, bone needs a balanced diet, enough calories, and appropriate nutrients, such as calcium and Vitamin D. But not everyone's diet is best for bone health.

For example, the Institute of Medicine recommends:

- A calcium intake of 1,300 mg/day for children ages 9 to 18 years, and 1,000 mg/day for children ages 4 to 8 years.
- A Vitamin D intake of at least 400IU/day for children from birth to 1 years, and 600IU/day for children older than 1 year.

Many children, however, have diets that do not meet these recommendations.

[Calcium](#) is the most important nutrient for reaching peak bone mass. It prevents and treats osteoporosis. Calcium is not made in the body – it must be absorbed from the foods we eat. To effectively absorb calcium from food, our bodies need Vitamin D.

[Vitamin D](#) can come from diet or exposure to sunlight. Before the development of fortified milk, lack of dietary Vitamin D caused *rickets* – a softening of the bones. Although rare in Western societies today, some children still develop [rickets](#).

- Most infants and young children in the U.S. get enough Vitamin D from fortified milk.
- Infants who are breastfed must be supplemented with Vitamin D because breastmilk does not contain Vitamin D.
- Children and adolescents who do not consume dairy products may also need supplementation since few foods contain high enough levels of the vitamin.
- Exposure to sunlight can help our bodies make Vitamin D; however, it is not always a practical solution, especially in areas that experience a winter climate. (To reduce the risk for skin cancer, it is important for children to wear sunscreen when playing outdoors; research has shown that sunscreen does *not* lead to lower Vitamin D levels in the body.)
- Dieting and fasting can harm nutrition and bone health. As a result, many children – especially adolescents – may not get adequate levels of Vitamin D. For children and teens to safely get the Vitamin D their bodies need, it may be helpful to take Vitamin D supplements. Talk to your doctor about whether Vitamin D supplements are needed.

Exercise

Sports and exercise are healthy activities for people of all ages. Weightbearing exercise during the teen years is essential to reach maximum bone strength. Examples of weightbearing exercise include walking and running, as well as team sports like soccer and basketball.

Occasionally, female athletes who focus on being thin or lightweight may eat too little or exercise too much. Young women who exercise excessively can lose enough weight to cause hormonal changes that stop menstrual periods (amenorrhea). This loss of estrogen can cause bone loss at a time when young women should be adding to their peak bone mass. It is important to see a doctor if there have been any menstrual cycle changes or interruptions.

Risk Factors for Poor Bone Health

Several groups of children and adolescents are at greater risk for poor bone health, including:

- Premature infants and infants with low birth weight who have lower than expected bone mass in the first few months of life.
- Children who take long-standing medications, such as steroids and anti-seizure medications.
- Children who have cystic fibrosis, celiac disease, and inflammatory bowel disease. These conditions make it difficult for the body to absorb nutrients appropriately.
- Adolescent girls who have minimal, delayed, or irregular menstrual cycles because of strenuous athletic training, emotional stress, or low body weight. Learn more: [Female Athlete Triad: Problems Caused by Extreme Exercise and Dieting](/en/diseases--conditions/female-athlete-triad-problems-caused-by-extreme-exercise-and-dieting/)
- Children with [cerebral palsy](/en/diseases--conditions/cerebral-palsy/) and other conditions that place limits on physical activity.
- Children and adolescents who lead inactive, sedentary lifestyles.

Childhood obesity also plays a role in reducing bone density, but more research is needed to separate the roles of other factors including diet, race, ethnicity, lifestyle, and sun exposure.

Prevention

Research is currently being done on ways to maximize peak bone mass in children. But for now, parents and children alike can benefit from a healthy diet and lifestyle by following these suggestions:

- Make sure you get enough calcium and Vitamin D throughout your life.
- Exercise regularly and choose weightbearing activities like walking and running.
- Do not smoke. Cigarette smoking often starts in adolescence and has a harmful effect on reaching peak bone mass. Learn more: [Smoking and Musculoskeletal Health](/en/staying-healthy/smoking-and-musculoskeletal-health/)

References

Recommended Dietary Allowance for calcium from the Food and Nutrition Board (FNB) at the Institute of Medicine of the National Academies (formerly National Academy of Sciences).

Jaspreet Loyal, Annette Cameron; Vitamin D in Children: Can We Do Better? *Pediatrics* June 2020; 145(6): e20200504. 10.1542/peds.2020-0504

Minkowitz B, Sawyer A, Fung EB, Dvorzhinskiy A, Lane JM. The Answer is Vitamin D! From Pediatrics to Geriatrics in Orthopaedics. *Instr Course Lect.* 2018 Feb 15;67:529-541.

Neale RE, Khan SR, Lucas RM, Waterhouse M, Whiteman DC, Olsen CM. The effect of sunscreen on vitamin D: a review. *Br J Dermatol.* 2019 Nov;181(5):907-915. doi: 10.1111/bjd.17980. Epub 2019 Jul 9. PMID: 30945275.



POSNA
PEDIATRIC ORTHOPAEDIC SOCIETY
OF NORTH AMERICA

Reviewed by members of

[POSNA \(Pediatric Orthopaedic Society of North America\)\(https://posna.org/\)](https://posna.org/)

The Pediatric Orthopaedic Society of North America (POSNA) is a group of board eligible/board certified orthopaedic surgeons who have specialized training in the care of children's musculoskeletal health.



Learn more about pediatric musculoskeletal conditions and injuries at POSNA's [OrthoKids \(https://orthokids.org/\)](https://orthokids.org/) website.

Last Reviewed

March 2023

AAOS does not endorse any treatments, procedures, products, or physicians referenced herein. This information is provided as an educational service and is not intended to serve as medical advice. Anyone seeking specific orthopaedic advice or assistance should consult his or her orthopaedic surgeon, or locate one in your area through the AAOS [Find an Orthopaedist](#) program on this website.