

Vitamin D Deficiency and Rickets: A Guide for Families

What is rickets?

Rickets is a condition of softening of the bones that occurs in growing children. It happens when the bones can not take up enough calcium and phosphorus to make hard, healthy bone. Although there are genetic and metabolic causes of rickets, the most common cause is a lack of vitamin D. This is also called nutritional rickets.

What is vitamin D?

Vitamin D is a substance that the body needs to help absorb calcium from the gut and regulate how much calcium and phosphorus gets stored in the bone and how much gets let out of the body in urine by the kidneys. Vitamin D can be obtained by eating certain types of fatty fish and fish oils, but it is also made in the skin in response to ultraviolet rays of sunlight. However, one must be exposed to the right wavelength of sunlight for a substantial period of time to make enough vitamin D for bone health. The use of sunscreen (which is, of course, important in preventing sunburn and skin cancer) does not allow the body to make much vitamin D in the skin. For this reason, in the United States and many industrialized nations, cow milk (and infant formula) is fortified with extra vitamin D. Human milk is often very low in vitamin D.

What are the symptoms of rickets?

The most classic symptom of rickets is bending or “bowing” of the bones of the legs. This happens because of the stress of walking on “soft” bones that do not have enough minerals. Infants who are crawling but not walking yet can get widening of the area just above the wrists for the same reason. In more severe cases, one can see swelling of the ends of the ribs as well. Sometimes the blood level of calcium can become so low that seizures can develop.

How is rickets diagnosed?

A physician can diagnose rickets from a combination of physical exam findings, x-rays (which show widening and “fraying” of the ends of certain long bones), and blood tests that can show low levels of phosphorus and normal or low calcium with an elevated level of an enzyme called alkaline phosphatase. Your doctor may also check the level of “25 hydroxy” vitamin D. On occasion, further blood testing is necessary to diagnose other forms of rickets.

Who is at risk for nutritional rickets?

Infants who are breastfed and who are not given extra vitamin D are at highest risk. The risk is even greater if the baby’s mother is also vitamin D deficient. Vitamin D deficiency among women of childbearing age is quite common. It occurs even more often in dark-skinned people and people who do not expose themselves to much sunlight.

How can rickets be prevented?

All breastfed infants should receive 400 international units of vitamin D daily. This can be obtained in a standard dose of infant vitamin drops (which usually contain vitamins A, D, and C). Nursing women should make sure that they take in at least 600 units of vitamin D daily. Many sources recommend 1500 to 2000 units daily.

How is nutritional rickets treated?

Treatment requires high doses of either ergocalciferol (vitamin D2) or cholecalciferol (vitamin D3) to build up the body stores of the vitamin. The standard regimen is about 2000 to 4000 units daily for several months. It can vary based on the size and age of the child being treated. Some physicians use other regimens.

It is helpful to note that some forms of vitamin D (especially the liquid) can be expensive when obtained through a pharmacy and not covered by insurance. These preparations are available on the Internet at a cheaper cost. However, please check with your physician before ordering on the Internet by yourself.

Supplemental calcium is also needed to keep the blood calcium level normal and heal the bones if the dietary intake of calcium is not sufficient.

If the treatment is adequate, the x-ray changes start to resolve and the blood alkaline phosphatase normalizes in about 6 to 8 weeks. If bowing of the legs has developed, it can take many months to straighten out, but it usually does improve.

Grace M. Tannin, MD

PES/AAP-SOEn Patient Education Committee

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PES PEDIATRIC ENDOCRINE SOCIETY