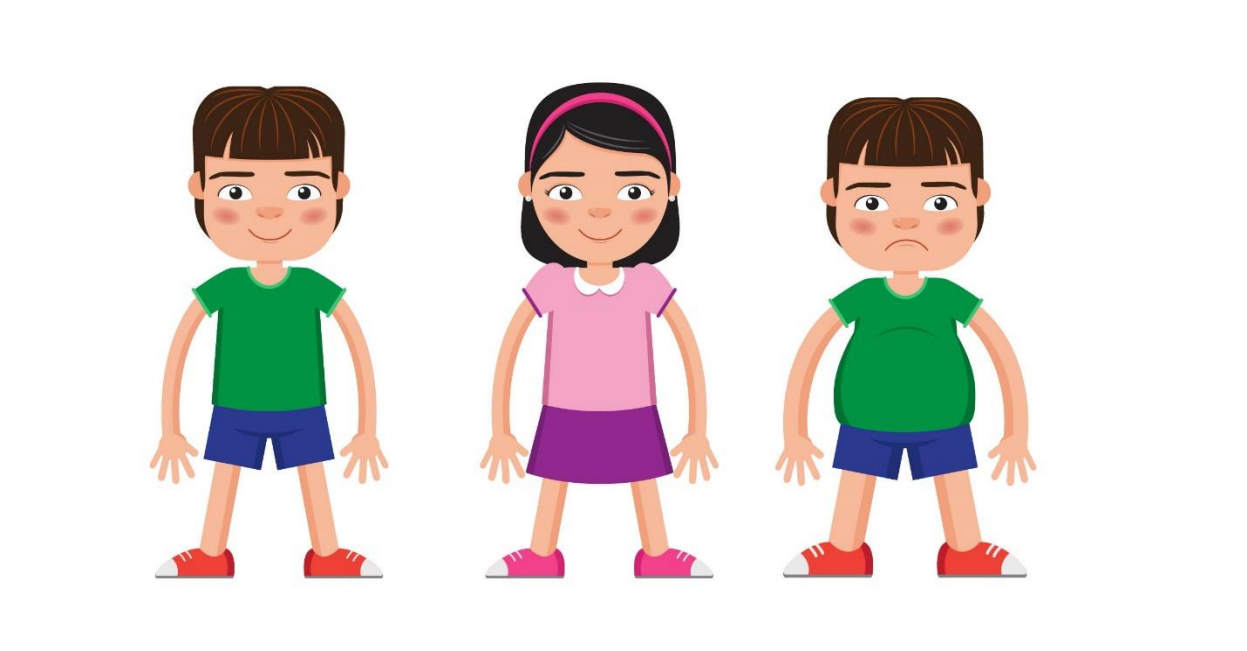
Bone disease in children



refers to conditions that affect bone strength, growth and overall health.

Bone disease in children can be caused by a number of conditions, including:

Vitamin D deficiency.
Vitamin D allows the body to absorb phosphorus and calcium from food. Phosphorus and calcium are the two minerals that work together to build healthy bones. A severe deficiency of vitamin D can lead to thin, brittle or misshapen bones.

Rickets.
Rickets is a condition in children where the bones are soft and weak. Most children develop rickets because of a long-term, severe case of vitamin D deficiency. A common symptom of rickets is bowed legs.

Parathyroid gland disorder.
The parathyroid glands produce parathyroid hormone which balances calcium and phosphorus levels in the body. Hyperparathyroidism occurs when the parathyroid glands produce too much parathyroid hormone. This is often caused by parathyroid glands that enlarge when benign tumors form in the glands. Symptoms of hyperparathyroidism may include kidney stones, joint aches, frequent urination and osteoporosis. Hypoparathyroidism occurs when the parathyroid glands produce too little parathyroid hormone. This can be caused by damage to the parathyroid glands during surgery, an autoimmune condition that causes the body to reject parathyroid tissue,

missing or faulty parathyroid glands, radiation treatment or low magnesium levels. Symptoms of hypoparathyroidism may include muscle cramps and tingling fingers, toes or lips. Pseudohypoparathyroidism occurs when the body produces parathyroid hormone normally but fails to respond to it, causing low blood calcium and high blood phosphate. It is a rare genetic condition. Symptoms may include cataracts, dental problems, numbness, seizures and body spasms.

Calcium abnormalities.
Calcium abnormalities include hypocalcemia and hypercalcemia.

Osteogenesis imperfecta.
Also called brittle bone disease, osteogenesis imperfecta is a genetic disorder that is present from birth. Brittle bone disease is characterized by bones that break easily.

Juvenile osteoporosis.
Osteoporosis is a condition where the bones become weak, brittle and prone to fracture. When it occurs in children, there is typically an underlying cause, such as osteogenesis imperfecta, **Type 1 diabetes**, **Type 2 diabetes**, **hyperthyroidism** or calcium and vitamin D deficiency. Symptoms of osteoporosis in children may include joint pain, physical deformity like curving of the spine, a sunken chest or a limp.

Infantile osteopetrosis.
Infantile osteopetrosis is a rare genetic condition that appears at birth. In this condition, the bones do not form normally causing them to be too thick yet weak and easy to break. This condition may lead to short stature, hearing and vision loss, frequent fractures and frequent infections. Children with this condition often have low levels of blood calcium and parathyroid hormone.

Diagnosis of Bone Disease

Doctors at Riley at IU Health diagnose bone disease with the following exams and tests:

- **Physical exam.** Your child's doctor will perform a physical exam and evaluate your child's medical history to narrow down what might be causing his or her symptoms.
- **Blood test.** If your child's doctor suspects a bone disease, he or she may perform a blood test to learn the levels of vitamin D, calcium, phosphorus and parathyroid hormone in your child's blood. High or low levels of these substances in the blood may indicate bone disease.
- **Urinalysis.** A urine sample may be tested for high or low levels of calcium. Too much calcium in the urine may indicate hyperparathyroidism and too little calcium may indicate hypoparathyroidism.
- **X-ray.** X-ray imaging may be used to find abnormalities in your child's bones, including bones that are too thin, too thick or misshapen.
- **Bone density scan.** A bone density scan—also called dual-energy X-ray absorptiometry (DXA or DEXA)—measures the density of the bones. A bone density scan is often used to diagnose osteoporosis. It can also show if your child is at risk for developing fractures.

Treatments

Your child's treatment plan will depend on the underlying condition causing bone disease. Treatments for bone disease include:

- **Vitamin D and calcium supplements.** Vitamin D and calcium supplements may be prescribed if your child is diagnosed with bone disease that is caused by vitamin D deficiency, rickets, hypocalcemia, hypoparathyroidism, pseudohypoparathyroidism, osteogenesis imperfecta or juvenile osteoporosis.
- **Low-phosphorus diet.** If your child is diagnosed with bone disease caused by hypoparathyroidism or pseudohypoparathyroidism, a diet rich in calcium and low in phosphorus may be prescribed.
- **Medicine:** depends on the case, consult your doctor.
- **Surgery.** Severe forms of hyperparathyroidism are treated by removing the parathyroid glands.
- **Physical therapy and orthopedic care.** Children with bone disease—especially bone disease caused by infantile osteopetrosis—may need regular physical therapy to improve strength and bone density. Orthopedic care may be needed to repair fractures. Occupational therapy may also be prescribed.
- **Bone marrow transplant.** Children with infantile osteopetrosis may require a bone marrow transplant, which replaces damaged bone marrow (substance in the bones where blood cells are made) with healthy marrow.
- **Close monitoring.** If your child has a mild form of hypercalcemia or hyperparathyroidism, the doctor may choose to simply monitor the condition, watching closely for signs of complications.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