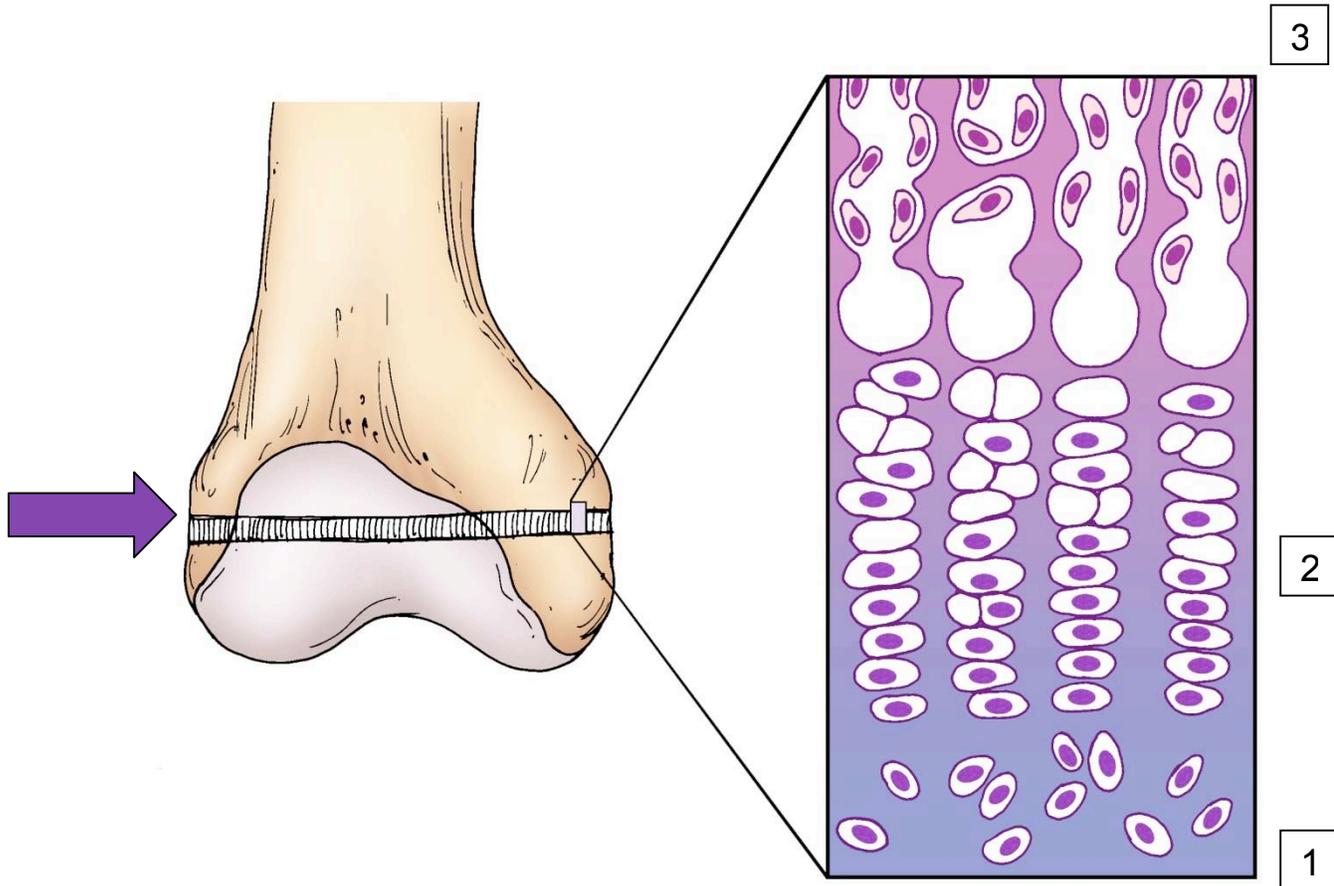


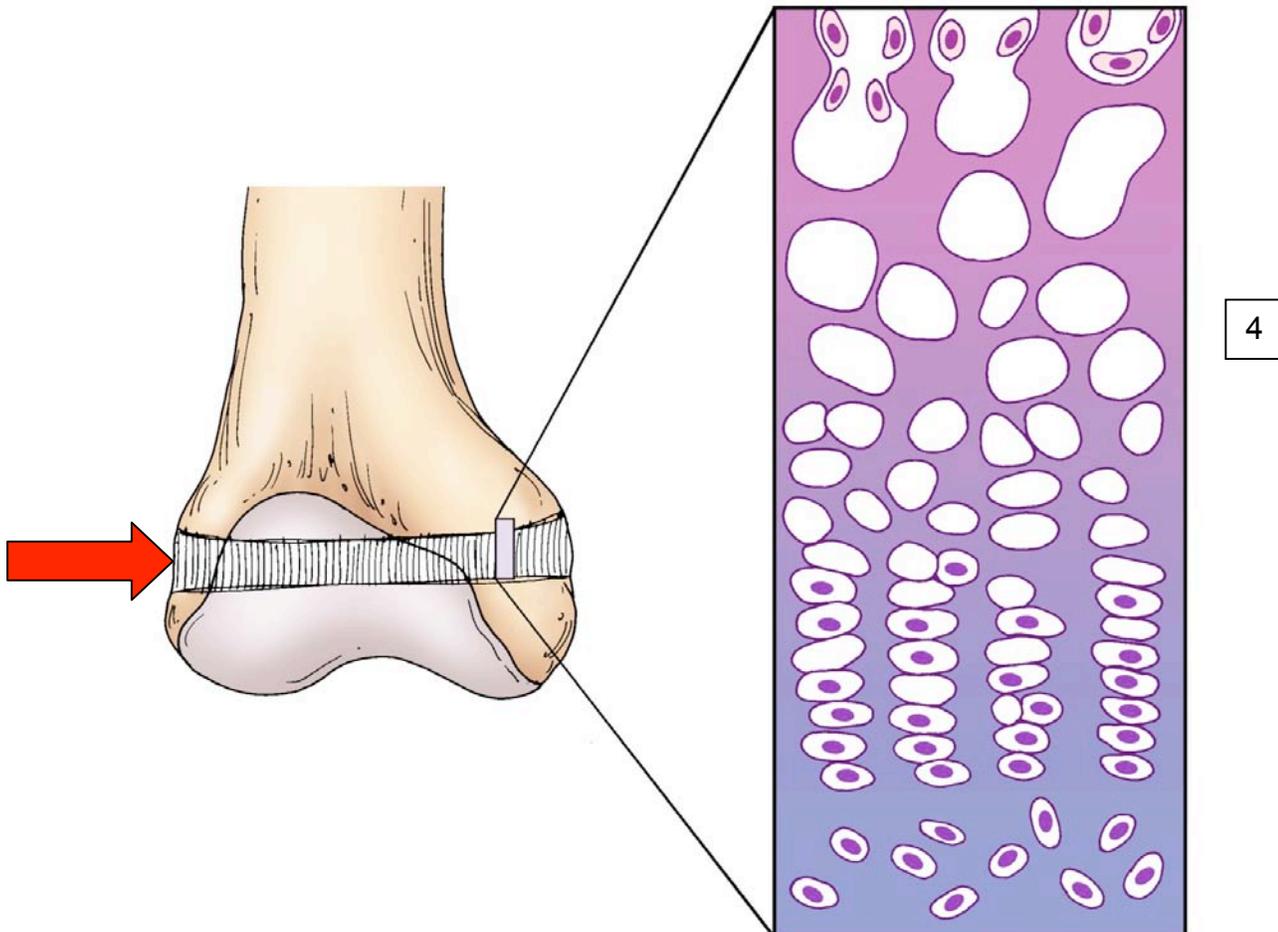
# METABOLIC BONE DISEASE

The growing child has two areas of growth associated with almost every bone in the body. One growth center is called the growth plate or physis.



The physis (1) is a single layer of specialized cells that generate cartilage cells. These cartilage cells (2) grow and mature and become larger and then are changed into bone cells. The bone cells (3) then reshape themselves to produce the appearance of a tibia, femur, finger bone or wrist bone over the 16 years that the child is growing. The orderly growth in the skeleton requires that the growth plate be nurtured with a certain amount of hormones and that the basic building blocks that are required to produce bone be available such as calcium, phosphorus and vitamin D.

Alterations in the presence or absence of any of these items will result in an abnormal formation of bone that may result in a diminished length of the bone, abnormal width of the bone, predilection to fracture. The most



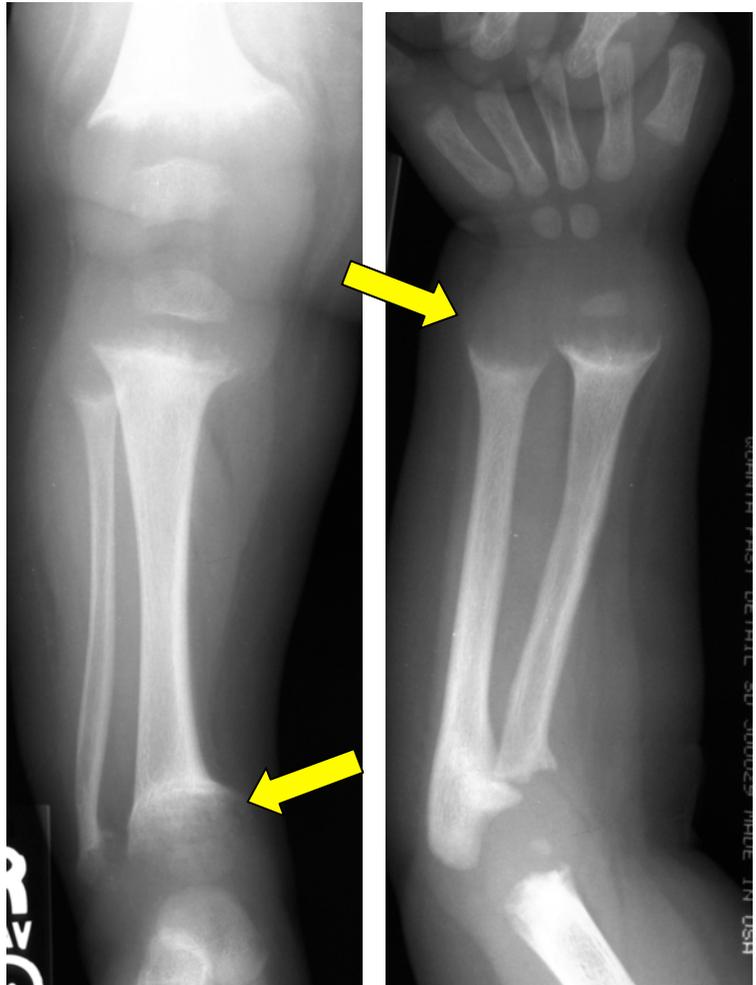
common form of a metabolic bone disease is called Rickets. In a typical child with Rickets the changing of the cartilage cell into a calcified cartilage cell is defective (4). Because of this lack of mineralization the growth plates are classically abnormal on x-rays. The x-rays however will not definitively tell the pediatric orthopedic surgeon what is the underlying abnormality, i.e., is there a lack of vitamin D, is there an inability of the child to use vitamin D properly or are some of the basic building blocks called type I collagen, which are similar to 2 x 4s, being produced at an abnormal rate or strength. Blood work and a genetics assessment is often required to establish the diagnosis. For most children medical management with active vitamin D supplements, calcium, calcitonin or phosphorus may be used in varying amounts to stimulate the bones to produce a more "normal bone" while the

child is growing. Medical management may in certain cases have to be continued through adulthood.

While parents are more concerned about the abnormal bowlegged appearance or curved forearm appearance of their child, in many cases the bowing will improve over several years time with medicine .

The child may be followed every six to twelve months to document improvement in the bony alignment of the upper and lower extremities.

If the bowing does not improve then some minimally invasive surgery may be performed to convert bowed legs into straight legs or severely knock-kneed legs into straight legs.



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