Vitamin D Deficiency

Vitamin D is a fat soluble vitamin whose major function is the maintenance of adequate levels of calcium and phosphorous in the body. There are several causes for vitamin D deficiency including renal failure, inadequate exposure to sunlight, fat malabsorption, and chronic liver disease. Children that are strictly breast fed are also at high risk for vitamin D deficiency because there are decreased levels in breast milk. There are several manifestations of vitamin D deficiency including rickets in children whose epiphyses have not closed, osteomalacia in adults, and hypocalcemic tetany.



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Signs & Symptoms

Rickets in children
Child with racket of bone
Rickets is a softening of the bones in children that can be caused by a vitamin D deficiency, characterized by excess of unmineralized matrix, leading to deformation of the skeleton with loss of structural rigidity. Children with rickets have an increased tendency for fractures and several skeletal deformities including flattened occipital bones, frontal bossing, rachitic rosary, and pigeon breast deformity in infants and lumbar lordosis and bowing of the legs in ambulating children.

Bending bones
Bending Bones
Vitamin D deficiency can lead to excess of unmineralized bone causing loss of structural rigidity and bendy bones.

Rachitic rosary
Roses
Rachitic rosary is characterized by deformation of the chest as a result from overgrowth of cartilage or osteoid tissue in the costochondral junction. It is commonly associated with rickets caused by vitamin D deficiency.

Breast milk has decreased vitamin D
Down-arrow Viking (D) Daisy Breasts
Children that are strictly breast fed are also at high risk for vitamin D deficiency because there are decreased levels in breast milk.

Osteomalacia in adults
Ostrich-with-Malaysian-flag
In adults, vitamin D deficiency leads to osteomalacia caused by derangement of normal bone remodeling processes that occur throughout life. In osteomalacia, newly formed osteoid matrix formed by osteoblasts is not properly mineralized, causing excess osteoid. This bone is weak and prone to gross fractures or microfractures, commonly seen in the vertebral bodies and femoral necks.

Tetany from Hypocalcemia
Titanic with Hippo-calcified-cow
This is a medical sign consisting of the involuntary contraction of muscles, typically seen in the hands caused by hypocalcemia. Low blood calcium levels increase the permeability of neuronal membranes to sodium ions that cause a progressive depolarization which leads to increased possibility of action potentials.

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