

## capitolo 14 Il corpo umano e il movimento

### verifica la comprensione

Leggi il brano e rispondi alle domande.



#### Metabolic bone disease

The normal function of bone requires an adequate supply of amino acids for the synthesis of collagen, the chief component of the organic matrix; of calcium and phosphate for mineralization of the organic matrix; and of other organic compounds and mineral elements. Also, growth, repair, and remodelling of the bone tissue require a precisely regulated supply of hormones, vitamins, and enzymes. Skeletal disease, when it is due to inadequacies in the supply or action of the above essentials, associated with abnormalities outside the skeleton, is termed metabolic; in such cases the entire skeleton is affected. Examples of such abnormalities are dietary deficiency and gastrointestinal, liver, kidney, and hormonal diseases. In addition,

osteoporosis (age-related loss of bone with tendency to fractures) is traditionally included among the metabolic conditions even though its cause is not known. Changes in bone tissue due to metabolic abnormalities are classified with regard to the amount and composition of the bone tissue. When the amount of bone is lower or higher than normal, the conditions are termed, respectively, osteopenia and osteosclerosis. These terms do not imply any specific disease but simply describe the amount of bone present.

When the normal composition of bone tissue is altered by deficient mineralization of the organic matrix, the condition is called rickets in children and osteomalacia in adults. The mineralization deficiency is in part due to a lower than normal calcium-phosphate ion product in the body fluids.

In rickets the bones become tender, soft, and deformed; X-rays show characteristic abnormalities at the growth zones, especially evident at the wrist, knee, and ankle joints. In osteomalacia, bone tenderness and pain accompany the slow development of the spontaneous, often symmetric fractures characteristically present in the osteomalacic pelvis and thigh-bones. The X-ray appearance of osteomalacia is rather normal until visible fracture has developed.

Biochemical abnormalities usually present in rickets and osteomalacia are increased blood concentration of the enzyme alkaline phosphatase, believed to be important for bone formation or resorption, and decreased blood concentrations of calcium or phosphate or both; the calcium concentration may fall to levels so low that muscle and nerve function is impaired (tetany). Microscopic examination of the bone tissue reveals the deficient mineralization of the organic matrix. The entire skeleton is affected in both rickets and osteomalacia, although abnormalities are more evident in growth centres in children and in areas of maximal mechanical load in adults.

(www.britannica.com)

- What substances are essential for a correct growth of the skeleton?
- What is osteopenia?
- What causes rickets? What is the difference between rickets and osteomalacia?

