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Da Costa

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## Modern Surgery - Chapter 14. Rickets

John Chalmers Da Costa  
*Jefferson Medical College*

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#### XIV. RACHITIS, OR RICKETS.

**Rickets** is a chronic disorder of nutrition arising during the early years of life (the first two or three) as a result of insufficient or of improper diet, aided and abetted in many cases by bad hygienic surroundings. A deficiency of fat and phosphate in the food or the use of a diet which, by inducing gastrointestinal catarrh, prevents assimilation, causes rickets. The disease is not common in nursing children unless breast-feeding has been unduly prolonged, and children fed upon artificial food are particularly apt to develop it. Holt says such diet is very deficient in fat and often in proteids, and contains an excess of carbohydrates ("Diseases of Infancy and Childhood"). The disease is essentially a city malady, "being principally seen in children living in crowded tenements where the effects of improper food are most strikingly shown; yet even here the disease is rare in those who get a plentiful supply of good breast-milk" (Holt). Rickets must not be regarded as a bone disease. It is true the bones are affected, but so are various structures and organs, all of the disorders being due to an underlying nutritive defect. Some maintain that lactic acid, produced in the intestinal canal, causes bone inflammation, but most observers do not believe the bone-changes are inflammatory. Children are rarely born with rickets, but develop it later, the period of greatest liability being between the seventh month and the fifteenth month. So-called congenital rickets is usually sporadic cretinism.

**Evidences of Rickets.**—The condition is one of general ill-health; the child is ill-nourished, pallid, flabby; it has a tumid belly and suffers from attacks of diarrhea and sick stomach; it is disinclined for exertion and has a capricious appetite; it is liable to night-sweats; enlarged glands are often noted, the teeth appear behind time, and the fontanels close late. In health the posterior fontanel closes in the second month and the anterior fontanel in the eighteenth month. In rickets the anterior fontanel is often open when the child is 3 years of age. The sutures are often open at the end of the first year. The head is square in shape, the cranial bones are thick, and areas of thickening known as bosses appear over the parietal bones. The head is large and the forehead bulges. The long bones become much curved, the upper part of the chest sinks in, curvature of the spine appears, and the pelvis is distorted. The ligaments are relaxed and lengthened and the joints are wobbly. The muscles are feeble and ill developed. Infantile convulsions are common. Nocturnal restlessness and night terrors are the rule. Laryngismus stridulus and tetany may occur. Swelling appears in the articular heads of long bones, by the side of the epiphyseal cartilages, and in the sternal ends of the ribs, forming in the latter case *rachitic beads*. The lesions of rickets are due to imperfect ossification of the animal matter which is prepared for bone-formation, and the soft bones gradually bend. The swellings at the articular heads are due to pressure forcing out the soft bone into rings. Rachitic children rarely grow to full size, and the disease is responsible for many dwarfs. Most cases recover without distinct deformity, but the time lost during the period when active development should have gone on cannot be made up, and some slight deficiency is sure to remain. Bowlegs, knock-knees, and spinal curvatures are usually rachitic in origin. The disease may be associated with



scurvy, inherited syphilis, or tuberculosis. In appearance the rickety child is pot-bellied, pale and anemic, and usually fat and flabby, though occasionally thin. There is great liability to enlargement of the tonsils, gastro-intestinal catarrh, and bronchial catarrh. The blood is deficient in red corpuscles and hemoglobin, and sometimes there is leukocytosis. The disease lasts for many months and is usually recovered from. It does not directly produce death, but is a powerful indirect cause of infant mortality because it lessens resistance and predisposes to many diseases. It is almost always afebrile; rarely congenital; and in unusual cases known as late rickets develops between the fifth and tenth year. The so-called acute rickets is practically always scurvy (Holt). The victims of rachitis are very liable to fracture the bones from slight force and green-stick fractures are particularly prone to occur. After fracture of a rickety bone union is usually delayed.

**Treatment.**—The treatment consists in having the child live as much as possible in the open air and sunshine. Salt-water baths are useful. Sea-air is very beneficial. Fresh food (milk, cream, and meat-juice) should be ordered. Cod-liver oil, syrup of the iodid of iron, arsenic, and some form of phosphorus are to be administered. It is absolutely necessary to improve the primary assimilation. Slight deformities of the extremities require no special treatment unless they increase. If the deformity is marked or is increasing, use braces; employ massage, manipulation and faradism. Holt points out that by the time the child is two years of age the bones are so firm that the pressure of a brace cannot cure the deformity. Hence after this age braces are useless. Severe established deformities of the extremities are usually treated surgically. Kyphosis is treated by making the patient lie upon a hard bed without a pillow. The child sits up a few hours each day, the shoulders being held back and support applied to the body. In bad cases, during the time the child is erect it should wear a brace or plaster-of-Paris jacket. Daily manipulation, the child lying prone, is helpful. Friction and electricity to the spinal muscles do good.

**Scorbutus (Scurvy).**—This disease is rare to-day in adults, but was at one time very common among those who took long voyages, or who engaged in campaigns, or were the victims of sieges. Of recent years it is very uncommon, and has occurred chiefly among voyagers in the Arctic regions or those who were beleaguered. Some years ago I saw several cases in a large almshouse. It is important to remember that though scurvy is rare in adults, it is by no means uncommon in ill-nourished infants. (A most graphic picture of scurvy as it used to occur will be found in "A Voyage Around the World," by Lord Anson. Compiled by the Rev. R. Walter.)

Scurvy is a constitutional malady due to the consumption of improper diet, and especially to the employment of a diet characterized by the absence of vegetables.

The use of salt meat as a staple article seems to favor the production of the disease. Garrod considered absence of potassium salts to be the real cause. Absence of variety in diet, bad water, poorly ventilated quarters, and insufficient exercise favor the development of the disease.

Scurvy begins with weakness, drowsiness, muscular pains, and great susceptibility to cold. The skin is pallid or dirty white, and is occasionally mottled and often peels off. The patient is breathless on the slightest exer-

tion. The pulse is excessively weak and slow. There is no fever. After two or three weeks the gums become tender, painful, and swollen, and bleed at frequent intervals; the breath becomes offensive, the teeth loosen and even drop out; subcutaneous hemorrhages take place, giving rise to petechiæ or extensive extravasations; the vision becomes dim; the urine becomes scanty and of low specific gravity; cutaneous vesicles form, rupture, and give rise to bleeding ulcers, and ulcers likewise arise from breaking down of blood extravasations; hemorrhages take place into and between the muscles, and in severe cases beneath the periosteum and into joints, and blood may flow from the nose, lungs, kidneys, stomach, and intestines. Deep hemorrhages are felt as hard lumps. Bleeding at an epiphyseal line may separate the epiphysis from the shaft. If an inflammation or ulceration arises at any point, fever is observed. It was observed by DeHaven, who commanded the Grinnell expedition in search of Sir John Franklin, that scurvy causes old and soundly healed wounds to ulcerate. The same observation was made years before in Lord Anson's voyage. A sailor of the "Centurion" had been wounded fifty years before at the battle of the Boyne. He developed scurvy and the old wound opened. Most cases of scurvy get well under proper treatment, but complete recovery is not attained for a long time. Sudden death is liable to occur if any exertion is made.

Captain Cook succeeded in preventing scurvy among his sailors by providing plenty of fresh water; guarding them against fatigue, wet, and extremes of heat and cold; attending to cleanliness and ventilation, and stimulating cheerfulness. This great navigator lost no men from scurvy. After the time of Captain Cook, the British Admiralty, acting on the suggestions of Lind and Blane, provided ships with lime-juice or lemon-juice with the most beneficial results in preventing the disease. Scurvy is prevented at the present time by employing a proper diet and by maintaining cleanliness and hygienic conditions.

The following agents are believed to be especially useful as preventatives: fresh meat, lemon-juice, cider, vinegar, milk, eggs, onions, cranberries, cabbages, pickles, potatoes, and lime-juice. When the disease develops, give vinegar, lemon-juice, onions, scraped apples, cider, nitrate of potassium, whiskey or brandy, and plenty of nourishing food. Antiseptic mouth-washes are necessary and strychnin is a valuable stimulant to the circulation. Sleep must be secured and ulcers are treated by antiseptic dressings and compression.

**Infantile scurvy** may exist alone or with rickets (scurvy rickets). It occurs most often in the children of the well-to-do, those who have been brought up on artificial foods. It occurs between the eighth and eighteenth months. The child is anemic, suffers from gastro-intestinal disorders, spongy and bleeding gums, weakness of the legs, general muscular tenderness, night-sweats, and often febrile attacks (Rotch), bleeding from the nose, bleeding beneath the skin (blue spots), bloody urine and stools, bleeding beneath the periosteum, into joints, viscera, or muscles. A subperiosteal hemorrhage is very dense, is tender, is fusiform in outline, and does not fluctuate. It is sometimes mistaken for sarcoma. In one case seen by the author a hemorrhage beneath the periosteum of the femur was mistaken for a sarcoma. The limb attacked is flexed, and the child will not move it. Separation of an



epiphysis may result from hemorrhage between it and the bone. Infantile scurvy is often unrecognized. If promptly treated, recovery is the rule, otherwise death may occur from exhaustion.

*Treatment.*—Keep the child quiet in bed and give liberal amounts of cow's milk and beef-juice. Administer orange-juice, grape-juice, scraped apples, and tonics. To children over one year of age give potatoes. Antiseptic mouth-washes are necessary.