

## Kwashiorkor

Kwashiorkor is described as a malnutrition state which occurs through severe protein deficiency. Patients develop edema and swollen bellies, as well as liver dysfunction from decreased apolipoprotein synthesis. Patients can become anemic due to decreased protein anabolism, while developing desquamative skin lesions.



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### Protein Deficiency

#### Protein-ribbon Hiding

Kwashiorkor develops from a severe deficiency in dietary protein. This disorder typically is seen in areas of famine or poor food supply. An example of this is seen when a mother weans a child from breastmilk, replacing the diet with starchy carbohydrates.

### Swollen Belly

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The classic example of kwashiorkor is a malnourished child with pitting edema of the lower limbs with a distended abdomen. The swelling of the gut occurs because there is an osmotic imbalance in the GI system, which is a consequence of protein deficiency. Retention of water leads to the swollen belly seen with this disorder.

### MEALS

#### MEALS of grain

The acronym, MEALS, helps to summarize kwashiorkor. It represents Malnutrition, Edema, Anemia, Liver malfunction and Skin lesions.

### Malnutrition

#### Nutritional-mallet

Malnutrition is associated with this disease, though it should be remembered that kwashiorkor symptoms arise specifically from protein deficiency.

### Edema

#### Edamame

Edema occurs in patients, typically in the abdomen, shins and ankles. This takes place because the lack of protein leads to an osmotic imbalance, leading to retention of water.

### Anemia

#### Anemone

Decreased protein in the diet limits anabolic processes. Because of this, blood cell production may be impaired, slowly causing the development of anemia.

## **Liver Malfunction**

### **Broken Liver**

Due to a shortage of amino acids (from protein), there is impaired synthesis of VLDL apoprotein. This causes accumulation in the liver of unused lipids which would normally participate in lipoprotein synthesis, leading to fatty liver in patients.

## **Skin Lesions**

### **Skin Leeches**

Low protein intake leads to various skin lesions in patients who develop kwashiorkor. A common condition is ulcerating dermatosis, which is a type of desquamative rash.