

disturbances. Dietary protein intake is limited only to the reference daily intake (Recommended Dietary Allowance [RDA]) for the child's age. Restriction of protein intake below the RDA is believed to negatively affect growth and neurodevelopment. Malnutrition due to factors including anorexia, dietary restrictions, metabolic acidosis, and increased energy expenditure is common in these children ([Carrero, Stenvinkel, Cuppari, et al, 2013](#)).

Sodium and water are not usually limited unless there is evidence of edema or hypertension, and potassium is not usually restricted. However, restrictions of any or all three may be imposed in later stages or at any time that abnormal serum concentrations are evident.

Dietary phosphorus is controlled through reduction of protein and milk intake to prevent or correct the calcium–phosphorus imbalance. Phosphorus levels can be further reduced by oral administration of calcium carbonate preparations or other phosphate-binding agents that combine with the phosphorus to decrease gastrointestinal absorption and thus the serum levels of phosphate. Treatment with (inactive) 25-OH vitamin D and/or (active) 1, 25-dihydroxy vitamin D is begun to increase calcium absorption and suppress elevated parathyroid hormone levels ([Wesseling-Perry and Salusky, 2013](#)).

Metabolic acidosis is alleviated through administration of alkalizing agents, such as sodium bicarbonate or a combination of sodium and potassium citrate.

Growth failure is one major consequence of CKD, especially in preadolescents. These children grow poorly both before and after the initiation of hemodialysis. The use of recombinant human growth hormone to accelerate growth in children with growth retardation secondary to CKD has been successful ([Gupta and Lee, 2012](#)). **Osseous deformities** that result from renal osteodystrophy, especially those related to ambulation, are troublesome and require correction if they occur. Dental defects are common in children with CKD, and the earlier the onset of the disease, the more severe are the dental manifestations (including hypoplasia, hypomineralization, tooth discoloration, alteration in size and shape of teeth, malocclusion, and ulcerative stomatitis). Therefore, regular dental care is important in these children.

Anemia in children with CKD is related to decreased production