TABLE 97-4 PHYSICAL FINDINGS OF NUTRITIONAL DEFICIENCIES

Clinical Findings	Possible Deficiency or Form of Malnutrition	Possible Excess
Hair, nails		
Corkscrew hairs and unemerged coiled hairs	Vitamin C	
Easily pluckable hair	Acute malnutrition	
Flag sign (transverse depigmentation of hair)	Acute malnutrition	
Sparse hair	Biotin, zinc; acute malnutrition	Vitamin A
Transverse ridging of nails	Acute malnutrition	
Skin		
Cellophane appearance	Acute malnutrition	
Cracking ("flaky-paint" or "crazy-pavement" dermatosis)	Acute malnutrition	
Follicular hyperkeratosis	Vitamins A, C	
Petechiae (especially perifollicular)	Vitamin C	
Purpura	Vitamins C, K	
Pigmentation, scaling of sun-exposed areas	Niacin	
Poor wound healing, decubitus ulcers	Vitamin C, zinc; acute malnutrition	
Scaling	Vitamin A, essential fatty acids, biotin	Vitamin A
	Zinc (hyperpigmented)	
Yellow pigmentation sparing sclerae (benign)		Carotene
Eyes		
Night blindness	Vitamin A	
Papilledema		Vitamin A
Perioral		
Angular stomatitis	Riboflavin, pyridoxine, niacin	
Cheilosis (dry, cracking, ulcerated lips)	Riboflavin, pyridoxine, niacin	
Oral		
Atrophic lingual papillae (slick tongue)	Riboflavin, niacin, folate, vitamin B_{12}, iron; acute malnutrition	
Glossitis (scarlet, raw tongue)	Riboflavin, niacin, pyridoxine, folate, vitamin B_{12}	
Hypogeusesthesia, hyposmia	Zinc	
Swollen, retracted, bleeding gums (if teeth present)	Vitamin C	
Bones, joints		
Beading of ribs, epiphyseal swelling, bowlegs	Vitamin D	
Tenderness, subperiosteal hemorrhage in children	Vitamin C	
Neurologic		
Confabulation, disorientation	Thiamine (Korsakoff's psychosis)	
Drowsiness, lethargy, vomiting		Vitamin A
Dementia	Niacin, vitamin B_{12}, folate	
Headache		Vitamin A
Ophthalmoplegia	Thiamine, phosphorus	
Peripheral neuropathy (e.g., weakness, paresthesias, ataxia, footdrop, and decreased tendon reflexes, fine tactile sense, vibratory sense, and position sense)	Thiamine, pyridoxine, vitamin B_{12}	Pyridoxine
Tetany	Calcium, magnesium	
Other		
Edema	Thiamine; acute malnutrition	
Heart failure	Thiamine ("wet" beriberi), phosphorus	
Hepatomegaly	Acute malnutrition	Vitamin A
Parotid enlargement	Acute malnutrition (consider also bulimia)	
Sudden heart failure, death	Vitamin C	

offset it. Total protein loss and protein balance can be calculated from urinary urea nitrogen (UUN) as follows:

$$\text{Protein catabolic rate (g/d)} = [\text{24-h UUN (g)} + 4] \times 6.25 \text{ (g protein/g nitrogen)}$$

The value of 4 g added to the UUN represents a liberal estimate of the unmeasured nitrogen lost in the urine (e.g., creatinine and uric acid), sweat, hair, skin, and feces. When protein intake is low (e.g., less than ~20 g/d), the equation indicates both the patient's protein requirement and the severity of the catabolic state (Table 97-5). More substantial protein intakes can raise the UUN because some of the ingested (or intravenously infused) protein is catabolized and converted to UUN. Thus, at lower protein intakes, the equation is useful for estimating *requirements*, and at higher protein intakes it is useful for assessing protein *balance*.

$$\text{Protein balance (g/d)} = \text{protein intake} - \text{protein catabolic rate}$$