

**Table 30-2** Physical Signs of Nutritional Deficiency Disorders

SYSTEM	SIGN	DEFICIENCY	SYSTEM	SIGN	DEFICIENCY	
General appearance	Reduced weight for height	Calories		Atrophic papillae	Riboflavin, iron, niacin, folate, vitamin B <sub>12</sub>	
Skin and hair	Pallor	Anemias (iron, vitamin B <sub>12</sub> , vitamin E, folate, and copper)		Smooth tongue	Iron	
	Edema	Protein, thiamine		Red tongue (glossitis)	Vitamins B <sub>6</sub> , B <sub>12</sub> , niacin, riboflavin, folate	
	Nasolabial seborrhea	Calories, protein, vitamin B <sub>6</sub> , niacin, riboflavin		Parotid swelling	Protein	
	Dermatitis	Riboflavin, essential fatty acids, biotin		Caries	Fluoride	
	Photosensitivity dermatitis	Niacin		Anosmia	Vitamins A, B <sub>12</sub> , zinc	
	Acrodermatitis	Zinc		Hypogeusia	Vitamin A, zinc	
	Follicular hyperkeratosis (sandpaper-like)	Vitamin A		Goiter	Iodine	
	Depigmented skin	Calories, protein		Cardiovascular	Heart failure	Thiamine, selenium, nutritional anemias
	Purpura	Vitamins C, K		Genital	Hypogonadism	Zinc
	Scrotal, vulval dermatitis	Riboflavin		Skeletal	Costochondral beading	Vitamins D, C
	Alopecia	Zinc, biotin, protein			Subperiosteal hemorrhage	Vitamin C, copper
Depigmented, dull hair, easily pluckable	Protein, calories, copper		Cranial bossing		Vitamin D	
Subcutaneous tissue	Decreased	Calories	Wide fontanel		Vitamin D	
Eye (vision)	Adaptation to dark	Vitamins A, E, zinc	Epiphyseal enlargement		Vitamin D	
	Color discrimination	Vitamin A	Craniotabes		Vitamin D, calcium	
	Bitot spots, xerophthalmia, keratomalacia	Vitamin A	Tender bones		Vitamin C	
	Conjunctival pallor	Nutritional anemias	Tender calves		Thiamine, selenium, vitamin C	
	Fundal capillary microaneurysms	Vitamin C	Spoon-shaped nails (koilonychia)		Iron	
Face, mouth, and neck	Moon facies	Kwashiorkor	Transverse nail line		Protein	
	Simian facies	Marasmus	Neurologic		Sensory, motor neuropathy	Thiamine, vitamins E, B <sub>6</sub> , B <sub>12</sub>
	Angular stomatitis	Riboflavin, iron		Ataxia, areflexia	Vitamin E	
	Cheilosis	Vitamins B <sub>6</sub> , niacin, riboflavin		Ophthalmoplegia	Vitamin E, thiamine	
	Bleeding gums	Vitamins C, K		Tetany	Vitamin D, Ca <sup>2+</sup> , Mg <sup>2+</sup>	
		Retardation		Iodine, niacin		
		Dementia, delirium	Vitamin E, niacin, thiamine			
		Poor position sense, ataxia	Thiamine, vitamin B <sub>12</sub>			

**examination** reveals a relative maintenance of subcutaneous adipose tissue and a marked atrophy of muscle mass. Edema varies from a minor pitting of the dorsum of the foot to generalized edema with involvement of the eyelids and scrotum. The hair is sparse; is easily plucked; and appears dull brown, red, or yellow-white. Nutritional repletion restores hair color, leaving a band of hair with altered pigmentation followed by a band with normal pigmentation (flag sign). Skin changes are common and range from hyperpigmented hyperkeratosis to an erythematous macular rash (pellagroid) on the trunk and extremities. In the most severe form of kwashiorkor, a superficial desquamation occurs over pressure surfaces (“flaky paint” rash). Angular cheilosis, atrophy of the filiform papillae of the tongue, and monilial stomatitis are common. Enlarged parotid glands and facial edema result in moon facies; apathy and disinterest in eating are typical of kwashiorkor. Examination of

the abdomen may reveal an enlarged, soft liver with an indefinite edge. Lymph node and tonsils are commonly atrophic. Chest examination may reveal basilar rales. The abdomen is distended, and bowel sounds tend to be hypoactive.

**MIXED MARASMUS-KWASHIORKOR**

These children often have concurrent wasting and edema in addition to stunting. These children exhibit features of dermatitis, neurologic abnormalities, and fatty liver.

**TREATMENT OF MALNUTRITION**

The basal metabolic rate and immediate nutrient needs decrease in cases of malnutrition. When nutrients are provided, the metabolic rate increases, stimulating anabolism and increasing