

Micronutrient Exam: Clinical Interpretation of Nutrition Focused Physical Exam Findings

SIGNS	POSSIBLE NUTRITION-RELATED CAUSES	POSSIBLE NON-NUTRITION-RELATED CAUSES
HAIR		
Alopecia (thin, sparse, patchy)	Iron, Zinc, Biotin, Protein deficiency	Aging, chemotherapy or radiation to the head; Stress of illness; Hormonal changes; Endocrine disorders; Medications
Color changes, depigmentation, lackluster	Protein-calorie malnutrition, Manganese, Selenium, Copper deficiency	
Easily plucked with no pain; Dull, dry; Lack of natural shine	Protein deficiency, Malnutrition, Essential fatty acid deficiency	Over-processing of hair, as in excess bleaching
Corkscrew hair, unemerged coiled hairs, shape of swan neck	Vitamin C deficiency	Menkes syndrome
Flag Sign (alternate banding of dark and light colors in hair – lack of melanin)	Protein-calorie malnutrition	
Lanugo (very fine, soft hair)	Calorie deficiency	
EYES		
Xanthelasma (small, yellowish lumps around eyes), Circumferential Arcus (white rings around iris in both eyes)	Hyperlipidemia	Circumferential Arcus may be normal in adults >45 years old
Angular Blepharitis (inflammation of eyelids, “grittiness” under eyelids)	Riboflavin, Biotin, Vitamin B6, Zinc deficiency	Poor eye hygiene
Pale Conjunctiva	Vitamin B6, Vitamin B12, Folate, Iron, Copper deficiency; Anemias	Non-nutritional anemia

SIGNS	POSSIBLE NUTRITION-RELATED CAUSES	POSSIBLE NON-NUTRITION-RELATED CAUSES
EYES CONT.		
Night Blindness, dry membranes, dull or soft cornea, infected, ulcerated eye - Keratomalacia	Vitamin A deficiency	Eye diseases; Uremia; Hypothyroidism
Angular Palpebritis (redness and fissures of eyelid corners); Red and inflamed conjunctiva, swollen and sticky eyelids	Niacin, Riboflavin, Iron, Vitamin B6 deficiency	
Ring of fine blood vessels around cornea	General poor nutrition	
Bitot's spots (white or grey spots on conjunctiva)	Vitamin A deficiency	
Ophthalmoplegia (often associated with Wernicke's disease; also can be seen with Rickets)	Thiamin, Phosphorous deficiency	Brain lesion; Grave's disease; Stroke
FACE		
Skin color loss, dark cheeks and under eyes; Scaling of skin around nostrils	Protein-calorie deficiency; Niacin, Riboflavin, and Vitamin B6 deficiency	
Pallor	Iron, Folate, Vitamin B12, and Vitamin C deficiency	
Hyperpigmentation (usually around the face, neck, hands, sun-exposed skin)	Niacin deficiency	Hormonal changes; Excessive sun exposure; Anti-seizure medications
Enlarged parotid gland	Protein deficiency; Bulimia	Mumps; Portal cirrhosis; Sjogren's Syndrome; Salivary duct stone
MOUTH		
Soreness, burning	Riboflavin deficiency	Oral candidiasis
Angular Stomatitis or Cheilitis (redness, scars, swelling or fissures at corners of mouth)	Riboflavin, Niacin, Iron, Vitamin B6, Vitamin B12 deficiency; Vitamin A toxicity	Excessive salivation due to ill-fitting dentures; Dry skin; Dehydration; Herpes
LIPS		
Soreness, burning lips, pale	Riboflavin deficiency	

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TONGUE		
Sore, swollen, scarlet, raw-beefy red tongue	Folate, Niacin deficiency	
Soreness, burning tongue, purplish/magenta	Riboflavin deficiency	
Smooth, beefy red tongue	Vitamin B12, Niacin deficiency	
Glossitis (sore, swollen, red, and smooth tongue)	Riboflavin, Niacin, Vitamin B6, Vitamin B12, Folate, Severe iron deficiency	Crohn's; Uremia; Infection; Malignancy; Anticancer therapy; Trauma
Pale tongue	Vitamin B12, Folate, Iron deficiency	
GUMS		
Gingivitis, swollen, spongy, bleeds easily, redness, retracted gums	Vitamin C, Niacin, Folate, Zinc deficiency; Severe Vitamin D deficiency; Excessive Vitamin A	Poor oral hygiene; Genetics; Smoking/chewing tobacco; Pregnancy; Diabetes; Medications
TASTE		
Hypogeusia; Dysgeusia (Sense of taste diminished/ altered)	Zinc deficiency	Medications such as antineoplastic agents or sulfonyleureas
TEETH		
Gray-brown spots, mottling	Increased fluoride intake	
Missing or erupting abnormally	Generally poor nutrition	
Dental caries	Vitamin D, Vitamin B6 deficiency; Inadequate fluoride; Excessive sugar	Poor oral hygiene
NECK		
Thyroid enlargement; Goiter	Iodine deficiency	Hypo- or hyperthyroidism; Inflammatory process; Malignancy; Various cysts; Thyroiditis
NAILS		
Beau's lines (transverse ridges, horizontal grooves on the nail)	Severe zinc deficiency; Protein deficiency; Hypocalcemia	Severe illness (i.e. MI or high fevers); Immunosuppressive therapy or chemotherapy
Muehrcke's Lines (transverse white lines)	Malnutrition, Hypoalbuminemia	Chronic liver or renal disease

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NAILS CONT.		
Koilonychia (spoon-shaped, concave)	Iron, Protein deficiency; Anemia	Considered normal if seen on toenails only; Diabetes; Systemic Lupus; Raynaud's Disease; Hypothyroidism
Splinter Hemorrhage	Vitamin C deficiency	Bacterial endocarditis; Trichinosis; Vascular disease
Brittle, soft, dry, weak or thin; split easily	Magnesium deficiency; Severe malnutrition; Vitamin A and Selenium toxicity	Metabolic bone disorder; Thyroid disorder; Systemic amyloidosis; Aging
Central ridges	Iron, Folate, Protein deficiency	Severe arterial disease
SKIN		
Slow wound healing, decubitus ulcers	Zinc, Vitamin C, Protein deficiency; Malnutrition; Inadequate hydration	Poor skin care; Diabetes; Steroid use
Acanthosis Nigricans (velvety hyperpigmentation in body folds)	Obesity; Insulin resistance	Hypothyroidism; Insulin Resistant Diabetes; Cushing's Syndrome; Acromegaly; Metabolic syndrome
Psoriasis	Biotin deficiency	
Eczema	Riboflavin, Zinc deficiency	Atopic dermatitis
Follicular Hyperkeratosis (goose flesh)	Vitamin A or C deficiency	Infection of hair follicle; Syphilis
Seborrheic Dermatitis (scaliness, waxy, oiliness, crusty plaques on the scalp, lips and nasolabial folds)	Biotin, Vitamin B6, Zinc, Riboflavin, Essential fatty acid deficiency; Vitamin A excess or deficiency	Nasal drainage
Petechiae (purple or red spots due to bleeding under the skin)	Vitamin C, Vitamin K deficiency	Abnormal blood clotting; Severe fever
Purpura (purple-colored spots and patches on the skin, and in mucous membranes, including the lining of the mouth)	Vitamin C, Vitamin K deficiency; Excessive Vitamin E	Anticoagulant therapy; Injury; Thrombocytopenia
Xerosis (abnormal dryness)	Vitamin A, Essential fatty acid deficiency	Aging; Allergies; Hygiene; Hypothyroidism; Uremia; Ichthyosis
Perifollicular Hemorrhage	Vitamin C deficiency	

SIGNS	POSSIBLE NUTRITION-RELATED CAUSES	POSSIBLE NON-NUTRITION-RELATED CAUSES
SKIN CONT.		
Dryness, sandpaper feel, flakiness	Increased or decreased Vitamin A	
Pellagra (thick, dry, scaly pigmented skin on sun-exposed areas)	Niacin, Tryptophan, Vitamin B6 deficiency	Psoriasis; Sun or chemical burns
Lack of fat under skin, cellophane appearance	Protein-calorie deficiency, Vitamin C deficiency	
Bilateral edema	Protein-calorie deficiency, Vitamin C deficiency	Congestive heart failure; Kidney or liver disease
Yellow Pigmentation	Vitamin B12 deficiency	Liver disease; Excessive hemolysis; Bile obstruction
Yellow to Orange Pigmentation	Excessive beta-carotene	
Cutaneous flushing – increased redness, desquamation	Niacin excess (flushing) or deficiency (desquamation)	High fever; Hyperthyroidism; Rosacea; Medications
Body edema, round swollen face (moon face)	Protein, Thiamin deficiency	Medication, especially steroids
Pallor, fatigue, depression	Iron, Vitamin B12, Folate deficiency; Anemia	Blood loss
Poor skin turgor	Dehydration	May be normal finding in elderly
GASTROINTESTINAL		
Anorexia, flatulence, diarrhea	Vitamin B12, Vitamin B6 deficiency	GI disorders
SKELETAL SYSTEM		
Demineralization of bone	Calcium, Phosphorus, Vitamin D deficiency; Excessive Vitamin A	
Epiphyseal enlargement of wrists, legs and knees; bowed legs; Rickets or osteomalacia; frontal bossing (prominent forehead)	Vitamin D deficiency	
Bone tenderness/pain	Vitamin D deficiency	Fractures; Arthritis; Cancer
MUSCULAR SYSTEM		
Weakness	Phosphorus or potassium deficiency; Vitamin C, Vitamin D, Vitamin B6 deficiency; Anemia	

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MUSCULAR SYSTEM CONT.		
Wasted appearance	Protein-calorie deficiency	
Calf tenderness, absent deep tendon reflexes, foot and wrist drop	Thiamin deficiency	Spinal cord or nerve damage
Peripheral neuropathy, tingling, "pins and needles"	Folate, Vitamin B6, Pantothenic acid, Phosphate, Thiamin, Vitamin B12 deficiency; Vitamin B6 toxicity	Nerve damage
Muscle twitching, convulsions, tetany	Magnesium or Vitamin B6 excess or deficiency; Calcium, Vitamin D, Magnesium deficiency	
Muscle cramps	Chloride, Sodium, Potassium, Magnesium, Calcium, Vitamin D deficiency; Dehydration	
Muscle pain	Biotin, Vitamin D deficiency	Fibromyalgia
NERVOUS SYSTEM		
Listlessness	Protein-calorie deficiency	
Inability to concentrate, defective memory; Confabulation; Disorientation	Thiamin deficiency (Korsakoff's psychosis), Vitamin B12 deficiency	Head trauma; Cerebral hemorrhage; Brain tumor; Alzheimer's disease
Seizures (Tetany), memory impairment, and behavioral disturbances	Calcium, Magnesium, Zinc, Vitamin D deficiency	
Peripheral neuropathy with weakness and paraesthesias; Ataxia and decreased tendon reflexes, fine tactile vibrator and position sense	Vitamin B12, Thiamine deficiency (Wernicke encephalopathy), Copper, Vitamin B6 deficiency	
Increased weakness; impaired cognitive function; irritability; anorexia	Folate, Vitamin B12 deficiency	
Dementia	Niacin, Vitamin B12 deficiency; Hypercalcemia; Aluminum toxicity	Disease or age-related; Medications