

Nutrition and the Elderly Dental Patient

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OVERVIEW

Body mass increases between ages 20 and 50, then remains stable until about age 65, when weight loss occurs as a result of both lean and adipose tissue loss. The percentage of body fat increases around age 40 and then decreases after age 70. Intra-abdominal and intramuscular fat increase with aging. Older women have a lower waist-to-hip ratio than older men, and these lower ratios indicate a fat distribution that is less likely to be associated with hyperinsulinemia, hypertension, and diabetes.

Compared with younger men, older men experience a 20% decrease in total energy expenditure. Older women, however, experience only a minimal change in total energy expenditure. The explanation for this is that men tend to markedly reduce their physical activity with retirement, while women continue doing the bulk of the housework throughout their life. Resting metabolic rate decreases by 20% in men and 13% in women. These age-related reductions in resting metabolic rate result from a small decrease in triiodothyronine levels, reduced responsiveness to norepinephrine, reduced muscle tone and strength of muscle contraction, and reduced $\text{Na}^+\text{K}^+\text{ATPase}$ activity. However, the major factor affecting resting metabolic rate is decreased food intake with aging. Nonsmoking women ages 55 to 74

consume 300 kcal/day less than women ages 19 to 29; for men, the decrease is 950 kcal/day. Older persons also have a decreased thermic response to food.

PROTEIN-ENERGY UNDERNUTRITION

Protein-energy undernutrition (malnutrition) results from a deficient supply or absorption of nutrients or an excessive utilization of nutrients by the body. Marasmus and kwashiorkor are two forms of protein-energy undernutrition.

Marasmus is a condition of borderline nutritional compensation in which a patient has a marked depletion of muscle mass and fat stores but normal visceral protein and organ function. Because the patient has depleted nutritional reserves, any additional metabolic stress (eg, surgery, infection, burn) may rapidly lead to **kwashiorkor** (hypoalbuminemic protein-energy malnutrition). Characteristically, elderly patients deteriorate to this state more rapidly than young patients; even relatively minor stress may be the cause. Usually, susceptible elderly patients are underweight, but even those who appear to have ample fat and muscle mass are susceptible if they have a recent history of rapid weight loss.

About 16% of elders living in the community consume < 1000 kcal/day, an amount that cannot maintain adequate nutrition. Undernutrition also occurs in 3-12% of older outpatients, 17-65% of older persons in acute care hospitals, and 26-59% of older persons living in long-term care institutions. Studies show that being underweight in middle age and later places a person at greater risk of death than being overweight. As Table 16-1 shows, protein-energy undernutrition can lead to many conditions.

Table 16-1. Conditions Resulting from Protein-Energy Undernutrition
Cognitive dysfunction
Anergy
Fatigue
Decreased muscle strength (frailty)
Hip fracture
Orthostatic hypotension
Pressure sores
Pedal edema
Decreased natural killer cell activity
Decreased CD4+:CD8 ratio
Decreased serum antibody response to antigen challenge
Anemia
Infections
Altered thyroid function (euthyroid sick syndrome)
Increased drug-drug interactions (decreased albumin binding and fat deposits)

Etiology

An elderly person may eat less food for several reasons (see Table 16-2). Diminished senses of smell and taste may decrease the pleasure of eating. Changes in taste are variable and are often associated with **lifelong cigarette smoking, poor dental hygiene** and disease. Aging is associated with a decrease in the opioid (dynorphin) feeding drive and an increase in the satiety effect of cholecystokinin. Recent studies suggest that the early satiety in older persons may be caused by a nitric oxide deficiency, which decreases the adaptive relaxation of the fundus of the stomach in response to food.

Table 16-2. Causes of Protein-Energy Undernutrition in the Elderly

Diminished sense of smell
Diminished sense of taste
Early satiety
Use of medications (eg, digoxin, theophylline)
Withdrawal from medications (eg, anxiolytics, psychoactives)
Alcoholism
Depression
Anorexia nervosa, anorexia tardive
Late-life paranoia
Mania
Dementia
Dysphagia
Dental problems
Xerostomia
Hyperthyroidism
Hypercalcemia
Pheochromocytoma
Chronic infection
Cancer
Chronic obstructive pulmonary disease
Malabsorption syndrome
Physical disability (eg, tremors)
Difficulty shopping for or preparing food
Low-salt, low-fat diet
Poverty
Loneliness

Certain **medications** can produce weight loss by causing anorexia (eg, digoxin, fluoxetine, quinidine, hydralazine, vitamin A, psychotropics), causing nausea (eg, antibiotics, theophylline, aspirin); increasing energy metabolism (eg, thyroxine, theophylline); or causing malabsorption (eg, sorbitol vehicle in theophylline elixir, cholestyramine). Also, withdrawal from certain drugs (eg, alcohol, anxiolytics, psychotropics) may be associated with weight loss.

Depression is one of the most common reversible causes of weight loss in older persons. When depressed, they are more likely to lose weight than depressed younger persons. Some very old persons may stop eating because of the "unbearable weight of continued life." Management of this condition depends on the patient's ethical beliefs. **Alcoholism** in late life is often associated with weight loss, squalor syndrome, and depression.

The recurrence of **anorexia nervosa** in older persons who had an episode in their teens is being increasingly recognized. Abnormal attitudes about food intake and body image are not rare in underweight older persons. When these abnormal attitudes are associated with severe weight loss, the condition is called **anorexia tardive**. Late-life **paranoia** and late-life onset of **mania** may also be associated with weight loss.

Dementia usually produces weight loss because the person forgets to eat. Those who are wanderers can use large amounts of calories in a single day; consuming sufficient calories may be difficult. Demented persons may have a number of pica, including coprophagia. Recent studies show that patients with Alzheimer's disease do not have increased metabolism. On the other hand, persons with Parkinson's disease have a markedly increased metabolic rate, presumably because of their continuous tremors.

Dysphagia from a stroke or another neurologic disorder or from esophageal pain caused by candidiasis may result in decreased food intake. **Dental problems** may decrease food intake by up to 100 kcal/day. **Xerostomia** can also decrease food intake.

Medical causes of weight loss include hyperthyroidism, hypercalcemia, pheochromocytoma, and chronic infections (eg, tuberculosis, cancers). Malabsorption syndromes, particularly a late onset of celiac disease, should also be considered. Tremors and other physical problems with eating (eg, an inability to cut food after a stroke) can be

corrected with adaptive utensils, such as a heavy-handled spoon or a rock-bottom knife. Older persons tend to tolerate medically prescribed diets poorly and thus lose weight.

Poverty is a major cause of low food intake. Elders on fixed incomes may have to choose between filling their drug prescription or buying food.

Problems with shopping and food preparation may result in insufficient food being available in the home. **Loneliness** can diminish the desire to prepare meals.

VITAMIN DEFICIENCIES

Noninstitutionalized older persons in Newfoundland who took a daily vitamin and trace mineral supplement had improved immune function compared to a control group who did not take a supplement. Older men who took vitamin C were shown to live longer than those who did not; older women had no such advantage. Increasing evidence indicates that free radical damage may play a role in the pathogenesis of many diseases in older persons, including atherosclerosis, cancer, arthritis, and Parkinson's disease. This has reopened the question of the pharmacologic use of free radical scavengers (vitamins and minerals) to prevent a diverse group of degenerative diseases.

About 25% of older Americans take a vitamin and mineral supplement, with women more likely to do so than men. Vitamin deficiencies are common in institutionalized older persons, but vitamin replacement studies have failed to show any major effects except for a decreased hip fracture rate with vitamin D replacement.

Vitamin A deficiency is rarely a problem in older persons. This vitamin should be avoided because it can produce hypercalcemia, liver dysfunction, and pseudotumor cerebri.

Thiamin (vitamin B1) deficiency occurs mainly in alcoholics. Thiamine replacement can result in hypoglycemia in persons with liver dysfunction because they have inadequate glycogen reserves. Glucose administration can precipitate acute thiamine deficiency with delirium, ataxia, and bilateral sixth nerve palsies (Wernicke's syndrome). Thus, in alcoholics, thiamine and glucose should always be administered together.

Riboflavin (vitamin B2) and pyridoxine (vitamin B6) deficiencies are common among nursing home residents. Signs of vitamin B2 deficiency include cheilosis, glossitis, angular stomatitis, seborrheic dermatitis, and a magenta tongue; signs of vitamin B6 deficiency

include sideroblastic anemias. A vitamin B complex is indicated for those with signs of vitamin B2 deficiency; pyridoxine is indicated for those with signs of vitamin B6 deficiency.

Niacin deficiency occurs in older persons who are alcoholics, are receiving isoniazid, or have carcinoid syndrome. Characteristically, the patient develops pellagra, i.e., dermatitis on areas exposed to the sun, dementia, and diarrhea or constipation. High doses of nicotinic acid, but not nicotinamide, lower the cholesterol level. Nicotinic acid is complexed with chromium to produce glucose tolerance factor and may play a minor role in the hyperglycemia of aging. However, the practice of taking these agents as supplements is not recommended for older persons.

Vitamin B12 deficiency can lead to dementia, megaloblastic anemia, incontinence, orthostatic hypotension, or posterior column disease (loss of position and vibration sense). Up to 5% of persons over age 80 have vitamin B12 deficiency. The most common cause is pernicious anemia, which results from a lack of intrinsic factor. The diagnosis of vitamin B12 deficiency is made by documenting a vitamin B12 level $<200 \text{ ng/dL}$ are deficient, as demonstrated by elevated methylmalonic acid and homocysteine levels in the urine. Thus, patients who are suspected clinically of vitamin B12 deficiency and who have vitamin B12 levels between 200 and 300 ng/dL should have their urine methylmalonic acid and homocysteine levels checked. Traditionally, the Schilling test has been used to diagnose pernicious anemia. However, it is now recognized that when older persons develop gastric achlorhydria, they may be able to absorb vitamin B12 that is not bound to food but cannot liberate vitamin B12 that is bound to food and therefore absorb it. Thus, in most cases, the Schilling test is not clinically useful. Although oral vitamin B12 has been used to treat this deficiency, most authorities recommend vitamin B12 1000 ng IM every month.

Vitamin C deficiency is associated with increased bruising, poor wound healing, and the development of pressure sores. Ingesting vitamin C at any dose results in false-negative fecal and urinary occult blood tests; ingesting megadoses can interfere with serum and urine glucose tests and may result in oxalate kidney stones, increased serum salicylate levels, and rebound scurvy (bleeding after withdrawal).

TRACE MINERAL DEFICIENCIES

Zinc deficiency, as indicated by plasma zinc levels $< 70 \mu\text{g/dL}$, occurs in institutionalized, shut-in, and ambulatory elderly persons. Zinc loss in the urine occurs in persons with diabetes, cirrhosis, and alcoholism and in those using a diuretic. Zinc deficiency is associated with poor wound healing, impaired immune function, night blindness, and hypogonadism. High doses of zinc have been reported to slow the progression of age-related macular degeneration.

Selenium deficiency reportedly occurs in patients receiving long-term tube feedings. The major features are muscle weakness and pain.

Copper deficiency is associated with anemia and possibly mild glucose intolerance.

DETERMINE YOUR PATIENT'S NUTRITIONAL HEALTH

The warning signs of poor nutritional health are often overlooked by health professionals. Use this checklist to find out if your patient is at nutritional risk. The patient should read the statements below and circle the number in the yes column for those that apply. For each yes answer, score the number in the box. Total the nutritional score.

Table 16-3. Nutritional Health in the Elderly Checklist Used by the Patient	
	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	2
I eat fewer than 2 meals per day.	3
I eat few fruits or vegetables, or milk products.	2
I have 3 or more drinks of beer, liquor, or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take 3 or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
I am not always physically able to shop, cook and/or feed myself.	2
TOTAL	

Total Your Nutritional Score. If it's:

0-2 **Good!** Recheck your nutritional score in 6 months.

3-5 **You are at moderate nutritional risk.** See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center or health department can help. Recheck your nutritional score in 3 months.

6-more **You are at high nutritional risk.** Bring this checklist the next time you see your doctor, dietitian or other qualified health or social service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

(This checklist and the one below were developed by the Nutrition Screening Initiative, Washington, DC, a project of the American Academy of Family Physicians, the American Dietetic Association and the National Council on the Aging, Inc.)

DETERMINE YOUR PATIENT'S ORAL HEALTH

If your patient answered "yes" to "I have tooth or mouth problems that make it hard for me to eat" on the previous checklist, the patient should answer the questions below:

Table 16-4. Oral Health in the Elderly Checklist (check all that apply)	
Do you have tooth or mouth problems that make it hard for you to eat, such as loose teeth, ill-fitting dentures, etc.	<input type="checkbox"/>
Is your mouth dry?	<input type="checkbox"/>
Do you have problems with:	<input type="checkbox"/>
lips (soreness or cracks in corners of your mouth)?	<input type="checkbox"/>
tongue (pain or soreness)?	<input type="checkbox"/>
sores that do not heal?	<input type="checkbox"/>
bleeding or swollen gums?	<input type="checkbox"/>
toothaches or sensitivity to hot or cold?	<input type="checkbox"/>
pain or clicking in your jaw?	<input type="checkbox"/>
Have you visited a dentist:	<input type="checkbox"/>
within the past 12 months?	<input type="checkbox"/>
in the last 2 years	<input type="checkbox"/>
never been to a dentist	<input type="checkbox"/>
If you have visited a dentist, was the main reason for your visit:	<input type="checkbox"/>
regular checkup	<input type="checkbox"/>
to have a denture made	<input type="checkbox"/>
to have teeth cleaned	<input type="checkbox"/>
bleeding or sore gums	<input type="checkbox"/>
to have tooth filled	<input type="checkbox"/>
loose teeth/loose tooth	<input type="checkbox"/>
to have tooth pulled or other surgery	<input type="checkbox"/>
oral or facial pain	<input type="checkbox"/>
to have a root canal	<input type="checkbox"/>
adjustments or repair of denture	<input type="checkbox"/>
other	<input type="checkbox"/>

The patient should discuss with the care provider what can be done to correct the problems indicated. Also, the patient should bring this checklist to the dentist for the next visit. The patient should remember that warning signs suggest risk, but do not represent diagnosis of any condition.

Table 16-5. Protocol for Oral Health and Nutritional Interventions in the Elderly

Screening Alerts	Older Adults, Family, Friends	Social Service Professionals	Dietitians, Dental Hygienists, Health Professionals	Dentists
Mouth Pain	Complete oral health checklist Identify location of pain and, if possible, source Note additional symptoms and relationship to eating Contact dentist with all relevant information	All prior interventions If appropriate, ask for permission to contact dentist, regarding mouth pain	All prior interventions Recommend ways for older patients to modify diet-soft / liquid diet recommendations Screen for chronic disease and anatomic anomalies	All prior interventions Oral examination Check dentures for fit Adjust dentures/occlusion
Tooth Decay (coronal root)	Modify diet to eat fewer sugary (especially sticky) foods and drinks Avoid frequent snacking Practice proper oral hygiene (brushing, flossing) Contact dentist	All prior interventions Give older adults visual materials on oral hygiene Assist older adults with proper food selection and eating habits See nutrition support interventions	All prior interventions Administer food frequency form with Palmer Classification of Cariogenicity and make dietary recommendations Clean teeth and apply topical fluoride	All prior interventions Treat as appropriate (restoration, extraction, replacements)
Bleeding gums, loose teeth	Improve oral hygiene (brushing, flossing) Modify diet to eat more foods with fiber and fewer soft foods that stick to teeth and gums Contact dentist	All prior interventions Give older adults visual materials on proper oral hygiene Assist older adults with proper food selection See nutrition support interventions	All prior interventions Screen for nutrient deficiency-recommend dietary changes Oral hygiene instruction Scale and clean teeth Screen for chronic disease (e.g., diabetes)	All prior interventions Conduct gingival cleanings Perform periodontal surgery
Soft tissue sores, lesions in mouth, inflammation (tongue, lips, gums, etc.)	Complete oral health checklist Stop alcohol and/or tobacco use Contact dentist and/or doctor	All prior interventions Assist older adults with proper food selection and preparation Refer to dietitian See nutrition support interventions	All prior interventions Soft/liquid diet recommendations Screen for allergies, chronic and infectious disease, nutrient deficiencies (esp. vit. B,C) Screen for drug-nutrient interactions	All prior interventions Biopsy sore tissue Adjust dentures Refer suspicious lesions to physician Refer to dietitian for diet counseling
Dry Mouth	Eat foods that require a lot of chewing (such as sugarless chewing gum), snack on hard sugarless candies) Drink plenty of water and other fluids Contact dentist and/or doctor	All prior interventions Encourage older adults to participate in social dining Assist older adults with proper food selection and adequate hydration Prepare special snacks Offer mouth rinses	All prior interventions Review older patient's diet and eating habits and make appropriate recommendations Screen for drug-nutrient interactions Screen for chronic disease (e.g., diabetes)	All prior interventions Evaluate salivary glands Prescribe treatment (artificial saliva)
Taste and/or swallowing difficulties	Eat cold, stimulating foods Eat pureed or liquid meals as able Eat pureed or liquid meals as able Contact doctor, dietitian and/or dentist	All prior interventions Assist older adults with proper food selection and adequate hydration Refer to dietitian See nutrition support interventions	All prior interventions Counsel patient to eat thickened liquids, pureed foods, soft diet, cold stimulating foods Determine whether nutritional supplements or enteral support is needed	All prior interventions Screen for drug-nutrient interactions
Dentures (new, long-term)	Continue to eat variety of foods, contact dietitian if diet changes are needed Contact dentist if dentures cause any pain or difficulty when eating	All prior interventions Ask older adults who have dentures but do not wear them if they are experiencing any pain Help older adults modify food texture/consistency as recommended by a dietitian or dentist	All prior interventions Recommend appropriate foods (liquid, soft, modified, normal) according to denture status (new, recently adjusted, etc.)	All prior interventions Teach older patients about proper denture fit, care, and how to recognize they need adjustments. Ask older patients to bring dentures

		See nutrition support interventions		(including partials) to each visit
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