

Original research article

Health and Nutritional Considerations in Dentistry and Medicine

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Abstract

A well-proportionate diet is essential from the beginning stages of life for complete growth, development, and maintenance of normal body functioning, physical activity, and health. It is a critical element in the social health of communities as well as the health (at cellular, organ and whole-person levels) of the individuals within them

Keywords: Balanced diet, Malnutrition, Edentulous, Geriatrics

Introduction

Nutritional science covers all the processes involved in achieving a healthy balance between our requirements and the provision of nutrients, supplied at the right time and in appropriate proportions at cellular, organ, whole-body and group/ population levels. It considers a range of factors that influence digestion, absorption, metabolic transformation and functions. Food is at the core of nutrition. Health is essential for normal growth and development, for current health and for future health (including the future adult health of fetus and child).

WHAT A BALANCED DIET IS?

A balanced diet is one that provides all the nutrients in required amounts and proper proportions. It can easily be achieved through a blend of the four basic food groups. The quantities of foods needed to meet the nutrient requirements vary with age, gender, physiological status, and physical activity. A balanced diet should provide around 50 to 60% of the total calories from carbohydrates, preferably from complex carbohydrates, about 10 to 15% from proteins, and 20 to 30% from both visible and invisible fat. In addition, a balanced diet should provide other non-nutrients, such as dietary fibers, antioxidants, and phytochemicals, which bestow positive health benefits. Antioxidants, such as vitamins C and E, beta-carotene, riboflavin, and selenium protect the human body from free radical damage.

Other phytochemicals, such as polyphenols, flavones also afford protection against oxidant damage. Spices like turmeric, ginger, garlic, cumin, and cloves are rich in antioxidants.¹¹



WHAT IS MALNUTRITION?

Malnutrition is defined as “a state of nutrition in which a deficiency or excess (or imbalance) of energy, protein and other nutrients causes measurable adverse effects on tissue/body form (body shape, size, and composition) and function, and clinical outcome.” Many nutritional deficiencies show oral manifestations which serve as good soil for many pathologies.

IMPACT OF ORAL HEALTH ON NUTRITION

Nutrition and oral health are inseparably associated to each other. Poor nutritional status can impair oral health while poor oral health can influence the individual’s dietary intake resulting in malnutrition. Individuals with teeth loss experience chewing difficulty due to reduced masticatory abilities which can food choice and nutritional status. Such individuals often experience difficulty in having harder foods like fruits, raw vegetables and meat and may prefer cooked foods with softer textures which they can chew without any discomfort. Cooking may alter the antioxidant properties of vegetables by decreasing their potential of scavenging free radicals. There is also the possibility that edentulous peoples ingest foods with soft texture, but calorie-rich and high-fat contents. Ritchie et al. reported higher consumption of refined carbohydrates, sugar and dietary cholesterol in denture wearing individuals than dentate peoples. Individuals with these dietary foods are more prone for variety of systemic diseases. Ranta et al. suggested that adequate rehabilitation of missing teeth is helpful to increase the dietary intake of vegetables and fruits of individuals to achieve their nutritional needs. Other

oral symptoms which can alter dietary intake and leading to malnutrition include pain due to caries, periodontitis, mucosal lesions⁵²

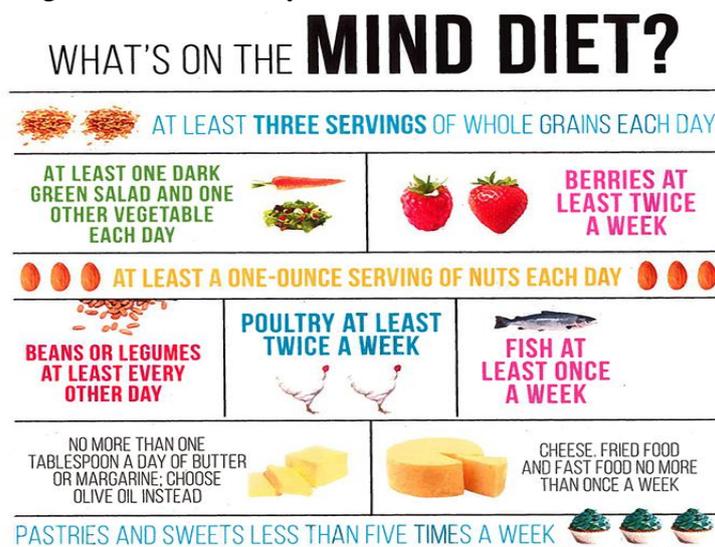
IMPACT OF EDENTULISM ON GENERAL HEALTH

According to several studies, tooth loss can affect general health in several ways as indicated as follows⁴¹.

- (a) lower intake of fruits and vegetables, fiber, and carotene and increased cholesterol and saturated fats, in addition to a higher prevalence of obesity, can increase the risk of cardiovascular diseases and gastrointestinal disorders [27,28];
- (b) Increased rates of chronic inflammatory changes of the gastric mucosa, upper gastrointestinal and pancreatic cancer, and higher rates of peptic or duodenal ulcers [29,30];
- (c) Increased risk of noninsulin-dependent diabetes mellitus [31,32];
- (d) increased risk of electrocardiographic abnormalities, hypertension, heart failure, ischemic heart disease, stroke, and aortic valve sclerosis [33-35]. A study also demonstrated a possible association between complete edentulism and an increased risk of coronary heart disease .Furthermore, a more recent large prospective study concluded that the number of teeth was a dose-dependent predictor to cardiovascular mortality [36];
- (e) decreased daily function, physical activity, and physical domains of health-related quality of life [37,38];
- (f) increased risk of chronic kidney disease [39];
- (g) association between edentulism and sleep-disordered breathing, including obstructive sleep apnea [40].

THE MIND DIET

The MIND diet emphasizes foods shown to support a healthy brain and recommends limiting potentially damaging choices. MIND-recommended foods are rich in nutrients such as vitamin E and the omega-3 fatty acid docosahexaenoic acid (DHA). "Dietary vitamin E (tocopherol), which is found in nuts, plant oils, seeds, and leafy greens, is a very potent antioxidant associated strongly with brain health," The more closely the recommendations are followed, the greater the impact on neurological health is likely to be^{18,19}.



Include These	Limit These
<ul style="list-style-type: none"> • Green leafy vegetables: every day • Other vegetables: at least once per day • Nuts: every day • Berries: at least twice per week • Beans: every other day • Whole grains: three times per day • Fish: at least once per week • Poultry: at least twice per week • Olive oil • Wine: one glass per day 	<ul style="list-style-type: none"> • Red meats • Butter and stick margarine: less than 1 tablespoon per day • Cheese: less than one serving per week • Pastries and sweets: limit • Fried or fast food: less than one serving per week

FACTORS AFFECTING NUTRITIONAL STATUS OF THE ELDERLY

Malnutrition is a common problem in the elderly population throughout the world. Nutritional problems may result from changes associated with the aging process, diseases, or other medical conditions.^{8,9}

Factors are¹⁰:

1. Physiologic factors
2. Psychosocial factors
3. Functional factors
4. Pharmacological factors

Physiologic factors

- With a decline in lean body mass in the elderly, caloric needs decrease and risk of falling increases.
- Vitamin D deficiency in turn, is a major cause of metabolic bone disease in the elderly.
- Declines in gastric acidity often occur with age and can cause malabsorption of food-bound vitamin B12.
- Many nutrient deficiencies common in the elderly, including zinc and vitamin B6, seem to result in decreased or modified immune responses.
- Dehydration, caused by declines in kidney function and total body water metabolism, is a major concern in the older population.
- Overt deficiency of several vitamins is associated with neurological and/or behavioural impairment B1 (thiamine), B2, niacin, B6 [pyridoxine], B12, foliate, pantothenic acid, vitamin C and vitamin E).

Psychosocial factors

- A host of life-situational factors increase nutritional risk in elders.
- Elders, particularly at risk, include those living alone, the physically handicapped with insufficient care, the isolated, those with chronic disease and/or restrictive diets, reduced economic status and the oldest old.

Functional factors

- Functional disabilities such as arthritis, stroke, vision, or hearing impairment, can affect nutritional status indirectly.

Pharmacological factors

- Most elders take several prescription and over-the counter medications daily.

- Prescription drugs are the primary cause of anorexia, nausea, vomiting, gastrointestinal disturbances, xerostomia, taste loss and interference with nutrient absorption and utilization. These conditions can lead to nutrient deficiencies, weight loss and ultimate malnutrition.

DIET RECOMMENDED FOR THE ELDERLY

Dietary guidance, based on the assessment of the edentulous patient's nutrition history and diet, should be an integral part of comprehensive prosthodontic treatment. All the nutrients necessary for optimal health in the desirable amounts can be obtained by eating a variety of foods in adequate amounts from the following five food groups:

1. Serving of potatoes and other vegetables and fruits.
2. Four servings of enriched breads, cereals, and flour products.
3. Two servings of milk and milk-based foods, such as cheese.
4. Two servings of dried beans, peas, nuts.
5. Additional miscellaneous foods including fats, oils, and sugars, as well as alcohol; the only serving recommendation is for about 2 to 4 tablespoons of polyunsaturated fats, which supply essential fatty acids.¹⁵

FACTORS THAT AFFECT DIET AND NUTRITIONAL STATUS

The effect of dentures on nutritional status varies greatly among individuals.⁷⁻⁹ Oral impairments affect diet and nutrition due to changes in the ability to taste, bite, chew and swallow foods. Dentures affect the chewing performance adversely. The elderly people tend to use more strokes and chew longer to prepare food for swallowing. According to a recent study, masticatory efficiency in complete denture wearers was approximately 80% lower than in people with intact natural dentition.¹⁰ Rhodus and Brown in a study of 67 older adults from institutionalized and free living geriatric population having xerostomia on sialometry reported that statistically significant inadequacies in the nutritional intake patterns. Subjects with xerostomia had significant deficiencies of fiber, potassium, vitamin B-6, iron, calcium and zinc. Taste and food perception were significantly reduced in elders with xerostomia.^{22,26} Papas et al reported that people with full dentures consumed fewer calories and lower levels of several specific nutrients than did those who had partial dentures or natural dentition.²³ Norlen et al stated that edentulous women had higher intake of fat and higher coffee consumption than dentate ones.²⁵ Apart from masticatory efficiency several other oral conditions such as painful mucosal disorders, oral dryness may also lead to nutritional problems¹². Adequate nutrition plays a vital role in maintaining the health of aging oral tissues which in turn is going to influence the prognosis of the prosthesis¹³. An adequate dentition either natural or artificial is not always essential for sufficient food intake for maintaining balanced nutrition in normal health, but is necessary to support extra demands of illness and aging.

A careful screening, diet evaluation and regular follow-ups will help to identify nutritional risk and deal with it. The objective of diet counselling was to correct the imbalance in nutrition that interfere with the body, as well as oral health.¹⁴

CONCLUSION

Hazards of imbalanced diet, consumption of excessive amount of cariogenic food should be clearly elucidated by the dentist and dietary advice must be given accordingly. Thus, dietary counselling and analysis should be incorporated into the treatment sequence of fabrication of denture prosthesis.

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