

REVIEW ARTICLE

Nutrition Consideration and Oral Health Care for Edentulous Patients

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ABSTRACT

Enjoyment of food is regarded as an important aspect of living by mankind. To lead a healthy and active life, human beings need a broad range of nutrients. Nutritional deficiency, particularly of proteins, is very common in the elderly. 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.

Dentistry for the elderly must be practiced with increased awareness of the biologic factors, since the adaptive mechanism and tissue regenerative potentials in the elderly patients are usually significantly lowered. Over 60% of the elderly are malnourished, and there are many causes for this malnutrition. Also, it is not always easy to differentiate the age-related causes from the pathological. Complete denture patients depend on the health and integrity of the denture-bearing tissue for their successful function and comfort. Hence, the elderly require a different approach, modified treatment planning, and knowledge of how the tissue changes associated with senescence affect oral health services. In this review article, a brief overview is presented about the diet and nutrition of geriatric patients, its importance, and clinical significance.

Keywords: Complete denture, Diet counselling, Edentulous, Geriatrics, Healthy.

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INTRODUCTION

Geriatric dentistry deals with delivery of dental care to the elderly citizen. It is concerned with diagnosis, prevention, and treatment of dental problems associated with normal aging.

The subject of geriatrics is increasing in its importance because of the demographic shift in the present population

of the world. The population of India, including its older population, is becoming more ethnically and culturally diverse. Geriatric nutrition applies nutrition principles to delay effects of aging and disease, to aid in the management of the physical, psychological, and psychosocial changes commonly associated with growing old. Proper nutrition is essential for the health and comfort of oral tissues, which enhances the possibility of successful prosthodontic treatment in the elderly.

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.^{1,2}

Factors are:

- Psychosocial factors
- Functional factors
- Pharmacological factors
- Physiologic factors

NUTRITION AND GERIATRICS

The three basic prerequisites to sustain life are air, water, and food. Human being is supposed to inhale air and consume water and food in the pure and naturally occurring forms. However, assuming air and water are being consumed in the pure forms, food then becomes the basic requisite for a healthy life, which is in the control of a human being, but is still the one most neglected. Nutrition is important regardless of the age. However, due to many reasons, it is difficult to define the specific nutritional needs of the elderly. In addition, there is overall ignorance among the Indian population regarding oral health, diet, and nutrition. It is indeed the insufficient and imbalanced intake of nutrients, i.e., the major issue of concern.

Nutrition in geriatrics needs special attention considering a number of factors affect the nutritional status of an aging individual. In Indian diets, the main source of energy is based on plant food; and carbohydrates, fat, and protein are considered to be macronutrients. Other nutrients are vitamins and minerals, which are considered as micronutrients.

Many edentulous patients are in the latter third of their life. Their most common oral complaints result from

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the fact that aged mucosa is friable and easily injured. In this age group of patients, there is good evidence that prosthetic failures are more often the result of tissue deficiencies than technical deficiencies.

Burket discusses the effects of senescence on the teeth and the jaws as well as on the oral mucosa, the tongue, and the salivary glands. Besides losing their adaptability and tolerance to irritants, these tissues lose their repair potentialities. The changes in these tissues, resulting from senescence, may alter considerably the treatment of the geriatric patient.^{3,4}

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 nonnutrients, such as dietary fiber, 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.⁵

Importance of Water

Water accounts for 70% of the total weight of the human body. Water is a main constituent of human blood and other body fluids. A normal healthy person will require eight glasses (2 L) of water daily.

During the hot spell and when undertaking vigorous physical activity, the requirement of water increases, as a significant amount of water is lost from the body through sweat. Boiling for 10 to 15 minutes is a satisfactory method of purifying the water.⁶

ENERGY

The body needs energy to maintain body temperature, metabolic activities, physical work, and growth. The main source of energy in the Indian diet is carbohydrates, which are derived largely from cereals.

Cereals make 80% of our diet and provide 50 to 80% of energy intake. Elderly men need 46 kcal/kg/day (average 2,730 kcal/kg/day). Elderly women need 41 kcal/kg/day (average 2,230 kcal/kg/day).^{6,7}

Table 1: Amount of energy derived from various macronutrients^{6,8}

Macronutrient	Energy derived
Protein	4 kcal/g
Fat	9 kcal/g
Carbohydrate	4 kcal/g
Dietary fiber	2 kcal/g

CARBOHYDRATES

Carbohydrates provide energy of 4 kcal/g (Table 1). Glucose and fructose are simple carbohydrates found in vegetables, fruits, and honey, whereas sucrose is found in sugar, and milk contains lactose. The starches in cereals, pulses, millets, root vegetables, and glycogen in animal food are the complex polysaccharides. The elderly consume a large proportion of their calories as carbohydrates, possibly at the expense of other nutrients like protein, because of their low cost, ability to be stored without refrigeration, and ease of preparation.

Denture patients preferring soft foods high in simple sugars and fat should be advised the importance of complex carbohydrates. The fiber component of complex carbohydrates promotes bowel function, lowers glycemic response, reduces serum cholesterol, and prevents diverticular disease. Most of the fruits and vegetables (except potatoes, watermelon, sweet corn), whole grains, beans, and lentils are low glycemic index foods.^{6,7}

PROTEINS

Dietary proteins should provide the eight essential amino acids in proper proportions and in sufficient quantities to help synthesize tissue proteins of the body.

Vegetable proteins, such as cereals, legumes, and vegetables are of poor quality in comparison with animal proteins.

In general, lysine is deficient in cereal proteins, and pulses or legume proteins are deficient in methionine. However, when both cereal and pulses (legumes) are consumed in the diet in proper proportions, they can overcome each other's inadequacies. Daily requirement of protein is 0.8 gm/kg body weight (60 gm for males and 55 gm for females per day).^{6,7}

As the patient becomes older, the amount of protein required per kilogram of body weight is increased. Too much protein never damages the health of older persons. Body functions are quickly distracted from their normal activity when good-quality proteins are omitted from the diet. Disturbances are evident in 1 day and become severe within a few days. Protein deficiency results in lower antibody production and a consequent reduced resistance to infection and anemia and a decrease in muscle volume.³

FATS

The maximum amount of fat that can be consumed in the diet should not exceed 30% E (about 60 gm visible

fat/day). Fat intake, if it exceeds 35% E, may increase the risk of diet-related noncommunicable diseases and should be avoided. However, daily fat intake in the diet can be between 20 and 30% E (20–40 gm/day). Low-fat milk and dairy foods should be consumed. Processed, premixed, ready-to-eat and fast foods should be avoided.⁷

The use of butter/ghee should be limited. Intake of saturated fat and cholesterol should be restricted. Excess intake of these would result in obesity, diabetes, cardiovascular disease, and cancer. Use of palm oil, sesame, rice bran, or cottonseed oils is advocated, as they have higher thermal stability. For bakery items, use of coconut oil, palm oil, palm kernel oil, or their blends/solid fractions is recommended.⁶

DIETARY FIBER

Dietary fiber is the remnants of the edible part of plants and is similar to carbohydrates. Dietary fiber is imperious to digestion and absorption in the human small intestine. Polysaccharides, oligosaccharides, lignin, and similar plant products constitute dietary fiber.

The dietary fiber exhibits one or more of either laxation (fecal bulking and softening; increased frequency; regularity), blood cholesterol attenuation, and blood glucose attenuation. Animal foods do not contain fiber. Cereals, seeds, beans, many fruits and vegetables, bran, and whole grain are sources of fiber. In the Indian scenario, fiber deficiency is rare, as it is consumed adequately in everyday Indian diets. However, a minimal intake of 20 to 35 gm fiber is recommended for long-term good health.⁶

IMPORTANCE OF VITAMINS

An increased vitamin intake for geriatric patients is important. Vitamins contribute to nervous stability and effective resistance to bacterial infection by promoting the growth of healthy tissue. The intake of all vitamins should be increased in aged persons, especially vitamins A, B complex, C, and D. Elderly patients seem to require vitamin C in large quantities. They feel better and are able to do more work when vitamin C is added to their diet. Vitamin C is nontoxic even in high doses.

These are essential organic and calorie-free molecules necessary for the human body. They are further classified as fat-soluble and water-soluble vitamins. As a person grows older, they become less active physiologically and thus, need lesser calories to sustain their weights. The diet should be properly cooked, less salty, spicy, and soft. Food should be consumed in smaller quantities at regular intervals, and sufficient water is to be consumed to prevent dehydration or hyponatremia (Table 2).⁶

Table 2: Recommended daily allowance and sources of vitamins^{6,8}

Vitamin	Recommended daily allowance	Sources of vitamins
Thiamine	1 mg/day	Whole grain cereals, nuts, legumes, green leafy vegetables, organ meats, pork, liver, and eggs
Niacin	6.5–7.2 mg/day	Foods of animal origin
Riboflavin	1.2 mg/day	Flesh foods, poultry, dairy products, legumes, nuts, and green leafy vegetables
Pyridoxine	2 mg/day	Meat, fish, poultry, pulses, nuts, and wheat
Folic acid	200 µg/day	Leafy vegetables, fruits and yeasts, cereals, and pulses
Vitamin B12	2.4 µg/day	Liver, meat, egg, and milk are good sources
Vitamin C	40 mg/day	Fresh amla, citrus fruits, guava, banana, and certain vegetables like tomatoes
Vitamin A	600 mg/day	Fruits and vegetables green or deep yellow/orange in color, like green leafy vegetables, carrots, tomatoes, sweet potatoes, papaya, mango, etc.
Vitamin D	5 µg/day	Sun exposure, fortified dairy products

IMPORTANCE OF MINERALS

The minerals are of particular importance to aged persons. Calcium loss contributes to bone fragility. This disturbance may be caused by a change in gastric acidity, which begins decreasing in the middle third of life, resulting in hypochlorhydria. Since both calcium and vitamin C require a strong acid environment for optimum absorption, deficiencies of this type are common in aged persons. The result is a negative balance of calcium, which contributes to the development of osteoporosis. Thus, it is easy to understand the retardation or even failure of body repair in old people. The calcium level may be improved by increasing the intake of milk and milk products plus a vitamin D supplement of 400 to 1,000 units a day. Acidulated milk with a soft curd is especially valuable.⁹

Minerals are calorie-free and essential nutrients, which regulate many biological functions. Minerals, such as iron, zinc, and copper aid in collagen formation, wound healing, and inflammation regulation.^{6,7}

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. The great majority (70–80%) of edentulous patients have also acknowledged the benefit of complete denture treatment and declared themselves satisfied with their dentures.²

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.²

DISCUSSION

Geriatrics refers to the branch of medicine that treats all problems peculiar to the aging patient, including the clinical problems of senescence and senility.⁹

Teeth are not a prerequisite in healthy individuals for proper digestion. However, edentulous subjects with poor masticatory function consume more medications than those with better masticatory function for their digestive problems. The impaired masticatory function may lead to adherence to a specific diet and an unbalanced diet in elderly individuals. Apart from masticatory efficiency, several other oral conditions, such as painful mucosal disorders and oral dryness may also lead to nutritional problems. Adequate nutrition plays a vital role in maintaining the health of aging oral tissues, which, in turn, influences the prognosis of the prosthesis. 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.

Lack of motivation among the elderly population regarding maintenance of oral health can be attributed to their perceived limited need for oral health care during aging. Hence, the primary need would be to educate and motivate the elderly regarding the importance of oral health care.

Prosthodontists are in a strategic position to evaluate and correct nutritional deficiencies that promote premature aging of oral tissues by providing a functional prosthesis. A prosthodontist needs to understand aging patient and their requirements, and provide prosthetic treatment to meet their demands and thus, help them toward optimal health and a happier life.

The quality of a denture-wearing patient can definitely be improved by diet counseling. Older people with dry mouth are likely to prefer foods that are high in fats, oils, and sugars due to ease of chewing and swallowing. Older people with altered taste and smell may consume more sugars as a way of making food palatable. Some people may not consume some foods that are good

sources of dietary fiber due to problems with their teeth or dentures.¹⁰

Makwana et al¹¹ evaluated the nutritional status in edentulous and edentulous denture-wearing elderly patients and found that risk of malnutrition was eight times higher in edentulous as compared with dentulous subjects.

To sum up, there are profound and complex links between nutrition and oral health. The dentist's vision should extend beyond the care of the oral cavity alone. Healthy aging will depend on the sum of an entire lifetime. What one eats might predict future health problems. Also, the starting point of the entire digestive process is the mouth.

Making it possible for edentulous persons to be comfortable and have good capacity to grind food is the beginning to allowing them to follow nutritional guidance successfully. The treatment of completely edentulous persons through rehabilitation with implant-retained dentures, particularly the mandibular dentures, improves the masticatory capacity and self-esteem of these patients, who once again find it a pleasure to eat and smile. This, in turn, reflects on their social relationships.^{12,13}

CONCLUSION

The geriatric population, being a very important asset for our society, their experience and guidance in real life are indispensable. Many edentulous patients are "sick patients." These patients have deficient tissues on which to build dentures. One of the most important factors of a satisfactory prosthetic service is the nutrition of the patient. Dietary supplements and specific diets were suggested to maintain the nutritional health of edentulous patients throughout the course of their treatment for prosthetic restorations.

The concluding principle is that proper nutrition is an important aid in preventive medicine in geriatric people in which the practicing prosthodontist can play a vital role.

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