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REVIEW ARTICLE

DIET AND NUTRITIONAL CONSIDERATIONS IN GERIATRIC PATIENTS

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ABSTRACT

Most of the geriatric patients in the population undergoes nutritional deficiency. This is due to inability of having inadequate intake of proper nutrients in the diet, their improper food choices or their low socioeconomic status. These affect their general as well as oral health. Adequate diet and nutrition can improve their oral tissues that will lead to success of the prosthesis. This article gives a brief information about the importance of nutrition in diet for geriatric patients.

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INTRODUCTION

"As we are born, we grow old and as we grow old, we die". Actually the elderly persons are a complex combination of individual genetic predisposition, life style, socialization and environment all of which affect their health beliefs and health behaviour (James D. Woodward, 1976; Russ.Willamson, 2000). Globally the percentage of people over the age of 60 is increasing rapidly. Food and nutrition are significant factors in the lives of any age group but they are especially important in the elderly. A variety of changes occur with aging due to inadequate nutrition. Nutrition is (council of food and nutrition of the American medical association) the science of food, the nutrients and other substances therein, their action, interaction and balance in relation to health and disease and the processes by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances." (Charles.C.Swoope and Elaine Hartsook, 1977; Chester.Perry, 1961; Clifton, 1961). Nutrients are organic and inorganic complexes contained in food.There are about 50 different nutrients, which are normally supplied through the foods that provides material for building, repairing or maintaining body tissues. Regulate body process and serve as fuel to provide energy Proper nutrition in elderly is essential with the aging process for maintenance of health and oral tissues. (Charles.C.Swoope and Elaine Hartsook, 1977; Chester.Perry, 1961; Clifton, 1961) A complete denture prosthesis depends ultimately upon health and integrity of the denture- bearing tissues for successful function and comfort to the patient. If the denture bearing tissues are nutritionally deficient, the prosthesis will be uncomfortable with the complaints of the wearer, no matter how well constructed. Hence denture failures can due not only to imperfect design, but also to poorly nourished tissues. An understanding of the nutritional requirements will assist the dentist in identifying denture wearing patients Good nutrition enhances quality of life by preventing malnutrition and promoting optimal functioning.

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Nutritional requirements in geriatrics

Calories

Caloric requirements decrease with advancing age,owing to reduced energy expenditures and a decrease in basal metabolic rate. (William, 1955) The caloric intake for a 65 or older person should be approximately 10 to 20 percent less than it was at age 22. The best means of reducing calorie intake is to replace foods high in fat and sugar with complex carbohydrates. The mean RDA (Recommended dietary allowances) is 1600 Kcal for women and 2400 Kcal for men. (Kranti Ashoknath Bandodkar and Meena Aras, 2006)

Proteins (William, 1955; Kranti Ashoknath Bandodkar and Meena Aras, 2006; Barone, 1978; Detroit Mich, 1960)

A less than adequate intake of protein can hasten senescence.The chopped meat (poultry) is really more desirable for the denture-wearing patient because it is easier to chew. Powdered dry milk is excellent source of low cost protein. (William, 1955; Kranti Ashoknath Bandodkar and Meena Aras, 2006; Barone, 1978) Others elderly diet includes boiled fish. nuts, grains, legumes and Vegetables. The elderly aged 51 years and above should be recommended 0.8g protein/kg body weight per day (males-56 gms and females 46gms). The calorie intake required from protein rich food for normal individual is 9 to 10% but elderly should need 12 % or more. Protein deficiency leads to a decrease of the skeletal muscle mass., edema. (Kranti Ashoknath Bandodkar and Meena Aras, 2006; Barone, 1978)

Carbohydrates (Laura M. Romito, 2003)

Carbohydrates describe a varied class of nutrients that are a major source of energy within the human diet. The average adult stores about 300 g of carbohydrate in the liver and muscle tissue as glycogen.Carbohydrates provide 4 kcal/g. Recommendations for a healthy diet suggest that 55% to 60% of total energy intake comes from carbohydrates. (Kranti Ashoknath Bandodkar and Meena Aras, 2006; Detroit Mich, 1960; Laura M. Romito, 2003) Food sources are grains, cereals, vegetables, fruits and dairy products. The most compleex carbohydrates is dietary fibre (bran) found in cereals and bread that maintain bowel function, reducce cholesterol, reduces the effects of toxins and carcinogens (Massler, 1983; Brodeur and Laaurin, 1993). Fibers also provide roughage. As these fibers travel down the GIT, they help to cleanse the intestines, which have thousands of villi projecting into the lumen. (Massler, 1983) This is particularly important in the elderly if they subsist on a soft, non-detergent diet and possess a hypotonic intestinal tract with less vigorous peristaltic movements.

Fats

Intake of excessive amounts of food rich in saturated fats such as butter, lard, eggs, pork can contribute to atherosclerosis. Elderly persons are adviced to maintain their dietary fat intake at 20-35% of total calories. (Detroit Mich, 1960)

It is advised every family to divide its expenses on food under 5 sub headings, and recommended that:

1. Milk should get first priority
2. Then vegetables and fruits
3. 1/5 should be spent on meet, fish and eggs
4. 1/5 should be spent on Cereals
5. Least should be spent on vegetable oil and sugars

Water

Water is probably the most important and essential nutrient in diet of man. Water lost by kidneys, intestine, lungs and skin must be balanced every day by the intake of water from drinking of water, beverages, soup, and other food, especially vegetables. (Massler, 1979) The elderly are very prone to negative water balance, usually caused by excessive water loss through damaged kidneys (Massler, 1979). Inadequate intake of fluid by the elderly will lead to rapid dehydration and associated problems such as hypotension, elevated body temperature and dryness of the mucosa, decreased urine output and mental confusion. Under normal conditions, fluid intake should be at least 30 ml per kg body weight per day.

Vitamins

Vitamins are organic nutrients which are required in small quantities for a variety of biochemical functions and which generally cannot be synthesized by the body, and must therefore be supplied by the diet. (Ramsey, 1970) The foods rich in water-soluble vitamins, B-complex and C, need to be ingested daily. Some of the atrophic mucous membranes and the smooth sore tongues often seen in elderly people may be due to intake of less B-complex vitamins. The recommended dietary allowances of vitamins are vitamin A-800-1000mg B complex-B1—1.2mg; B2—1.7mg; B6—2.0mg; Niacin 14mg, B12-3 mg.) vitamin C-60 mg,vitamin D-5 mg, vitamin E-8-10mg. The elderly are frequently deficient in vitamin D because of the lack of sun exposure and an inability to synthesize vitamin D in skin and convert it in the kidney. Vitamin D is essential for the regulation and promotion of the intestinal absorption of calcium and phosphorus.

Minerals

Calcium-According to the 1980 edition of Recommended Dietary Allowances, 800 mg/day of calcium for adults 51 years of age and older is advisable. Based on newer knowledge it is recommended especially that post menopausal women have a calcium intake of 1000 – 1500 mg/day for good skeletal growth. The intake of 100 – 1500 mg/day is thought to be more desirable for preventing osteoporosis, currently a major cause of hip and other bone fractures in women aged 65 years and older. The rapid shrinkage of the alveolar bone creates loss of masticatory function. This loss can limit food choices to liquid and soft foods that do not provide the chewing stimulus for the bone mineralization necessary for maintaining alveolar bone height. (Baxter, 1984) Zinc utilization declines with advancing age due to decrease intestinal absorption decreases after the age of 65 years. Thus it is conceivable that some of the clinical findings of decreased taste acuity, mental lethargy and slow wound healing may be the results of Zinc deficiency. The RDA is 15 mg. (Baxter, 1984) The iron deficiency in elderly is less seen but blood loss often leads to anemia. Dry mouth, burning tongue, angular cheliosis can also seen in elderly due to iron deficiency. The RDA is 10 mg.

Nutritional guidelines for a prothodontic patient (James.F.Smith, 1966)

1) Eat variety of food
2) Build diet around complex carbohydrates

3) Eat at least 5 servings of fruits and vegetables daily
4) Select fish, poultry, lean meat or dried peas and beans every day
5) Obtain adequate calcium
6) Limit intake of bakery products
7) Limit intake of processed food high in sodium and fat
8) Consume 8glasses of water a day
9) Maintain ideal weight. Excess weight is stress on the body and may contribute to a variety of medical problems.
10) Avoid too much of sodium herbs and species to enhance flavors.
11) If elder drinks alcohol, it should be used in moderation.

Diet recommendations for older adults (Human nutrition information service, 1992)

The Five Food Groups 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 five food groups. (Human nutrition information service, 1992)

1. Vegetable Fruit Group :

Four servings of vegetables and fruits.

It is subdivided into three categories

- Two servings of good sources of vitamin C, such as citrus fruits, salad greens, and raw cabbage
- One serving of a good source of provitamin A, such as deep green and yellow vegetables or fruits
- 1 serving of potatoes and other vegetables and fruits.

2. Bread – Cereal Group

Four servings of enriched bread, cereals, and flour products

3. Milk - Cheese group

Two servings of milk and milk based foods, such as cheese (but not butter)

4. Meat, Poultry, Fish and Beans Group

Two servings of meats, fish poultry, eggs, dried beans and peas, and nuts

5. Fats, Sugar and Alcohol Group

Additional miscellaneous foods, including fats and oils, sugar and alcohol

The only serving recommendation is for about 2 to 4 tablespoons of polyunsaturated fats, which supply essential fatty acids. Food guide pyramid as in figure 1 is an outline of each days eatung. It is not a rigid prescription, but a general guide to choose a healthy diet. The pyramid shows a variety of foods for eating and to get the nutrients,the right amount of calories needed to maintain a healthy weight. The pyramid emphasizes foods from the five food groups. Food in one group can't replace those in another. Human nutrition information service, 1992)

Modified food pyramid (Russell *et al*., 1999; Carol, 2003)

The food guide pyramid has been modified for the elderly aged 70 years or above. The modified food pyramid as in Figure 2 for elders stresses fewer servings of grain products and more servings of dairy and emphasizes adequate water intake

Water / liquids

8 or more servings.

Choose bound water (water bound to an organic or inorganic molecule) rather than free water. Bound water can be more effectively absorbed from the intestines and carried into the tissues and cells by the vascular systems.

Eg: vegetable soups, fruit juices

Nutritional status in geriatric patient (Kranti Ashoknath Bandodkar and Meena Aras, 2006; Carol, 2003)

Three phase nutritional analysis

Phase I

- All patients are screened
- Medical and social history to be taken
- Find clinical signs of deficiencies
- Conduct selected anthropometrical measurements
- Assess adequacy of diet intake

Qualitative dietary assessment

- Purpose is to determine what an individual is eating now, what he or she has eaten in the past and recent changes in the diet
- If potential nutritional problems are detected based on any of these parameters, nutritional evaluation should progress to phase II or concluded at phase I

Phase II

Semi quantitative dietary assessment

- Dietary intake assessed using more quantitative means
- Nutrients in all foods and beverages consumed during 3-5 day period are calculated using Computer-assisted Nutrient Analysis Programs
- Average caloric and nutrient intakes can be quantitated and compared with norms

Biochemical assessment

- Automated blood tests are done

Phase III

- Is done for more complex nutritional problems
- Physician and registered dietician are required

Analysis include: nutritional biochemical assays of blood, urine and tissues, as well as tests of metabolic and endocrine function

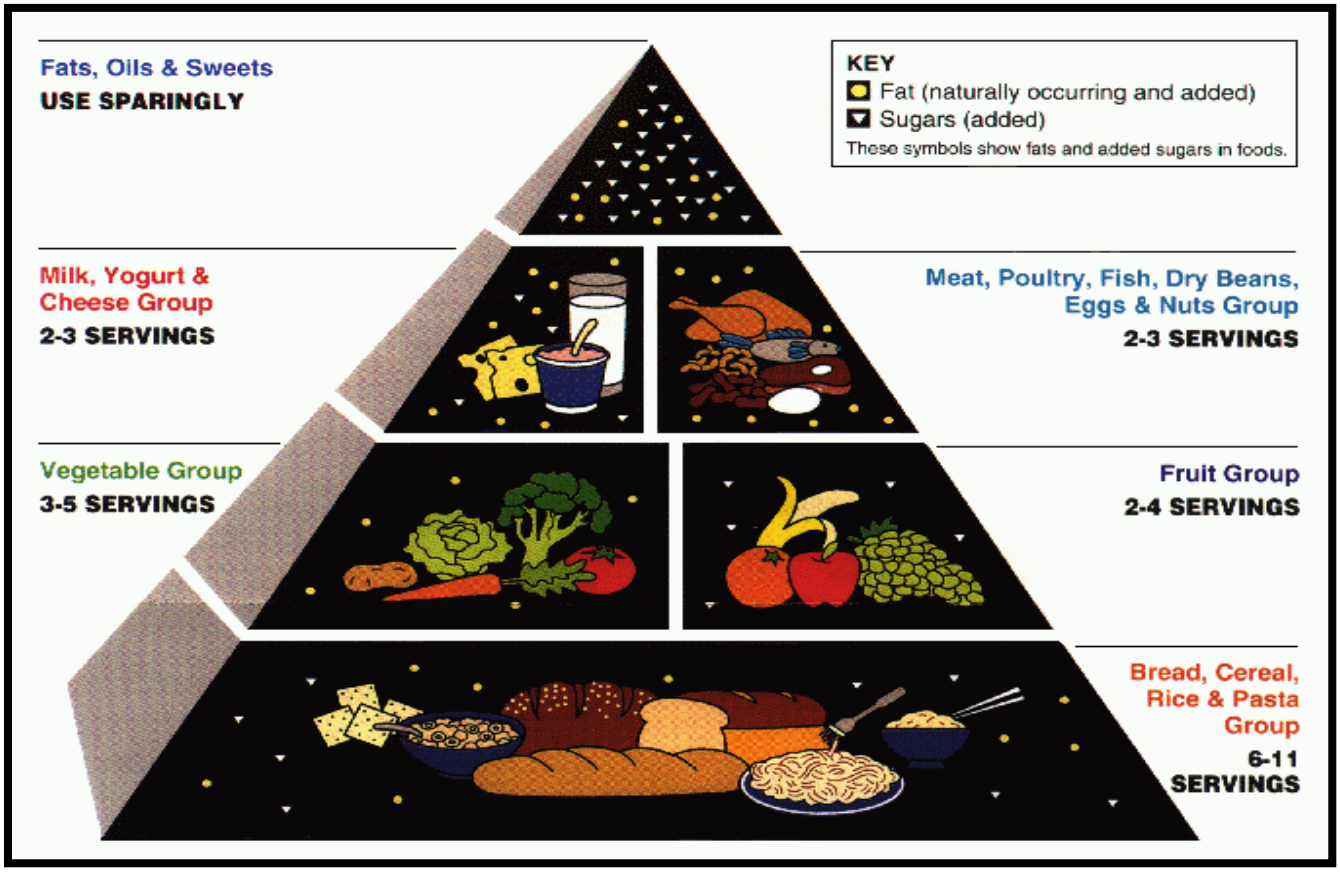

Figure 1. Food guide pyramid

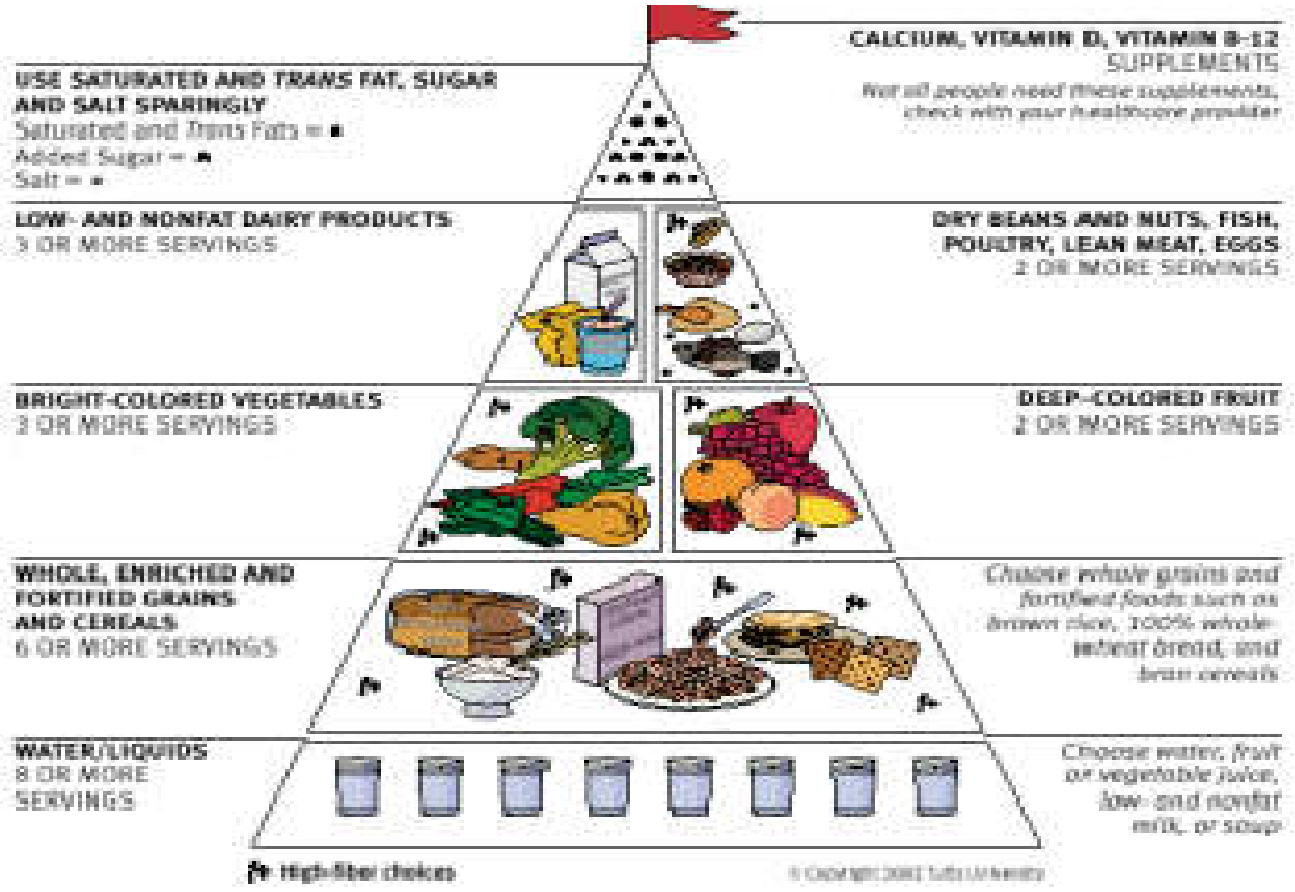

Figure 2. Modified food guide pyramid

Diet suggestions for all first time denture wearer (Carol, 2003)

After first day of post insertion of denture it is recommended for all new denture wearer patients to have complete liquid diet like fruit juices,vegetable soup, milk, egg nogs, pureed meats for first few days to get slowly accustomed with the denture and followed by soft diet like cooked and boiled rice, cooked fruits, vegetables,cereals, breads softened in milk, noodles, chopped meat, fish in second and third post insertion day. During these eating ulcers may occur in the mucosa and after it is healed in four to five or more days, the patients are suggested to have hard and firm food cut into small pieces. The patients are requested to eat slowly for first few days and after they are accustomed with their denture the mastication and neuromuscular coordination improves.

Conclusion

Denture wearers are particularly vulnerable to compromised nutritional health. The dentist who is aware of nutritional risk factors can identify patients in need of nutritional guidance. The ability of the oral tissues to withstand the stress of the denture is greater if the patient is well-nourished. Dietary guidance is an integral part of treatment for the denture-wearing patient. Dentists should therefore be prepared to access the nutritional quality of the diets of prosthetic patients and to guide them toward good nutritional practices.

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