

Nutrition and oral health in geriatric patients: Treatment of compromised nutritional status - A case report and review

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ABSTRACT:

Adequate nutrition is a vital factor in promoting the health and well-being. Good health enhances quality of life by preventing malnutrition and promoting optimal functioning. Food and nutrition are significant factors in the lives of any age group but they are especially important in the elderly since various changes occur with ageing that are impacted by nutrition. The present case study provides an overview of Nutrition and oral health in geriatric patient and the treatment of compromised nutritional status.

Key words: Nutrition, Weight loss, Diet, Geriatric.

INTRODUCTION

Nutrition is an important determinant of health in elderly patients.¹ Nutrition is defined by the council of food and nutrition of American Medical association as the science of food, the nutrients and other substances their actions, interaction and balance in relation to health and disease and the processes by which the organism digests, absorbs transport, utilizes and excretes food substances. Proper nutrition is essential to the health and comfort of oral tissues and healthy tissues enhance the possibility of successful prosthodontic treatment in the elderly². **(FIGURE 1)**



FIGURE 1 DIET AND NUTRITION

Although there is no uniformly accepted definition of malnutrition in the elderly, some common indicators include involuntary weight loss, abnormal body mass index (BMI) specific vitamin deficiencies, and decreased dietary intake³ Balanced diet can be defined as one which contains different type of food in such quantities and proportion that the need of energy, amino acids, vitamins, minerals, fats, carbohydrates and other nutrients is adequately met for maintaining health and general well being.(FIGURE 2)



FIGURE 2 BALANCED DIET

Diet, of course, is just one approach to preventing illness. Limiting caloric intake to maintain a healthy weight, exercising regularly, and not smoking are three other essential strategies⁴.

Goals of Nutrition in Geriatric (FIGURE 3)



FIGURE 3 GOALS OF NUTRITION

1. To provide adequate energy (calories) in elderly.
2. Amount, proportion and type of macronutrients and micronutrients should be correct.
3. To establish a balanced diet which is consistent with the physical, social, psychological and economical background of the individual.⁵

Energy needs decline with age due to a decrease in basal metabolism and decreased physical activity. Caloric requirements decrease with advancing age, owing to reduced energy expenditures and a decrease in basal metabolic rate.⁶

It Builds and repairs tissues and is required for the synthesis of enzymes, protein hormones and plasma proteins. Protein requirement in Adult(70 kg) is 0.8gm/kg body weigh .12%-14% of total calories comes from proteins(**FIGURE 4**)



As the patients become older, the amount of protein required increases.⁷ Protein depletion of body stores in the elderly, is seen primarily as a decrease of the skeletal muscle mass. Proteins is a must for denture wearers.⁸

It is Fuel food- supplies energy and contains the essential fatty acids which cannot be synthesized by the body. Fats contributes about 37% of total calories in the diet of the average adult. Adults are advised to reduce their fat intake to 30% of total calories.

The elderly consume a large proportion of their calories as carbohydrates, possibly at the expense of protein, because of their low cost, ability to be stored without refrigeration and ease of preparation.⁹ **(FIGURE 5)**



FIGURE 5 CARBOHYDRATE DIET

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Its a fuel food and supplies energy. It provides 50%-90% of total energy. Dietary fibers are carbohydrates which cannot be digested. Do not supply calories but they prevent constipation by promoting peristalsis and adsorbs and prevents absorption of toxins from the gut.

Fiber

Fiber in the form of bran is frequently added to dry cereals and breads, but vegetable fiber is more effective and less expensive.¹⁰

MINERALS (FIGURE 6)

Major minerals are Sodium, Potassium, calcium, Phosphorous ,Magnesium, Chlorine and trace elements are Zinc, Iron, Cobalt, Chromium, Iodine and Fluorine.



FIGURE 6 MINERALS

Functions of Minerals

1. It forms hard structure e.g. bones and teeth.
2. It constituents of body cells of soft tissues such as muscles, liver.
3. It maintains osmotic pressure
4. It essential for the activity of various enzymes.

There is deficiencies in magnesium, fluoride, folic acid, zinc and calcium in the geriatric population.¹¹

Water

Elderly are particularly susceptible to negative water balance, usually caused by excessive water loss through damaged kidney.¹²

VITAMINS

Vitamin A: Helps in maintenance of the structure and function of specialized epithelium. **(FIGURE 7)**



FIGURE 7 ; VITAMIN A DIET

Oral manifestation of its deficiency will cause hyperkeratosis of the oral mucosa and reduced salivary flow. Long standing deficiency may cause hyperplasia of the gums, as well as generalized gingivitis.¹³

Vitamin D:

It helps in the absorption of Ca and phosphorus from the intestine .It promotes the calcification of bone, cartilage and teeth. Its antagonistically acts against the action of parathyroid hormone. Increases the renal reabsorption of Ca. Vitamin D deficiency causes Rickets in children and osteomalacia in adults Most commonly seen in post menopausal females with history of low dietary Ca intake and little exposure to sunlight.

Vitamin K

It is involved in both intrinsic and extrinsic systems of coagulation and synthesis of prothrombin, Factor 7,9 and 10.

Vitamin C:

It Helps in synthesis of collagen.it decreases the food ferric iron into ferrous iron in the stomach and thus facilitates Fe absorption.Steroid biosynthesis in adrenal glands. Vitamin C deficiency causes scurvy, its oral manifestations are ecchymosis in the oral mucosa¹⁴ **(FIGURE 8)**



FIGURE 8 SCURVY

Vitamin B complex

Vitamin B complex includes thiamine(B1) which is required for carbohydrate metabolism, Riboflavin(B2) which effects the ectodermal tissues and is essential for metabolic oxidation processes and Pantothenic acid which is necessary for antibody formation. Folic acid is necessary for the proper function of the hematopoietic and leukopoietic systems and Pyrodoxine (B6) is necessary for the utilization of many amino acids. Other Vitamin B complex includes Nicotinic acid (Niacin) and Vitamin B12.

Vitamin B1 Deficiency	Beri Beri - Edema of tongue, loss of papilla, Glossodynia.
Vitamin B2 Deficiency	Angular stomatitis
Niacin Deficiency	Pellagra
Vitamin B12 Deficiency	Pernicious anemia-sore tongue
Folic acid Deficiency	Glossitis

Iron

The prevalence of iron deficiency, is relatively rare among the healthy elderly. Deficiency causes burning tongue, dry mouth, anemia's and angular cheilosis.

CASE STUDY

The patient name Radha Shyam age 75 -year-old male reported to our Department for rehabilitation of his completely edentulous mouth .The patient was suffering from Angina Pectoris for past 6 months .(FIGURE 9)



FIGURE 9 ANGINA PECTORIS

Angina pectoris (AP) is the clinical manifestation of inadequate myocardial oxygen delivery and is common among patients with stable ischemic heart disease.¹⁵ Heberden's classic description of the symptoms was a 'painful and most disagreeable sensation in the breast, which seems as if it would extinguish life but the moment they stand still, all this uneasiness vanishes'¹⁶. The exact etiology of stable angina is not well defined; however, it is thought to be secondary to a mismatch between myocardial supply and demand^{17,18}. Angina pectoris or chest

pain or cramp of the cardiac muscle, is a form of coronary heart disease .Occasionally the myocardium needs more oxygen laden blood than it receives. Transient myocardial oxygen demand is in excess of the supply It is a symptomatic expression of transient myocardial ischemia .The prognosis for patients with stable angina varies, but there is an annual mortality rate of up to 3.2%. Long-term prognosis is influenced by left ventricular systolic function, extent of coronary artery disease (CAD), exercise duration or effort tolerance, and comorbid conditions¹⁹

Arthrosclerosis of the coronary vessel is the usual cause, although anemia or hypotension, emboli, acquired arthritis, & hereditary connective tissue disease may also be involved. The classical symptom of retrosternal pain often develops during stress or physical exertion. radiates to the shoulders, left arm, or mandible, or right arm, or neck, palate & tongue .These symptoms are relieved by rest.

The patient was living alone in his home and had problem of eating due to which he was losing weight Her most recent check-up revealed a weight reduction of 3 kg from her previous visit in a interval of week. This was a cause for concern. The cause for weight loss needs to considered such as new hyperthyroidism, diabetes, malignancy, depression, or oral problems. These can be ruled out by history, physical examination, and laboratory tests .The patient was edentulous and required complete denture rehabilitation

Role of nutrition in Prosthodontics:

A denture is a mechanical object intended to function in a biologic environment that is vital and constantly changing. The functional demands of the prosthesis must be kept within the metabolic ability of the tissues which supports the prosthesis. (FIGURE 10)



FIGURE 10 COMPLETE DENTURE REHABILITATION

The success of complete denture prosthesis depends on oral health and integrity of the denture bearing tissues. The realization of these factors forms the entire basis for the essential role of nutrition in prosthodontics.

Optimizing diet and nutrition in older adults

By Carl O. Boucher: He states that the main objective of diet counseling for prosthodontic patient is to correct imbalances in nutrient intake that may interfere with maintenance of the oral tissues.

Ava Knapp: Triphasic nutritional analysis Phase 1:1. Medical and social history 2. Clinical signs of nutritional deficiency 3. Qualitative dietary assessment
Phase 2: 1 Semi quantitative dietary analysis 2.Biochemical assessment
Phase 3: Comprehensive nutritional biochemical assays of blood, urine, and tissues as well as tests of metabolic and endocrine functions.²⁰

By Carole A. Palmer:

Step1: Observation for clinical signs of nutritional problems.

Step2: Determine dental, medical, personal and social history.

Step3: Dietary history and evaluation.

Step4: Dietary diagnosis.

Step5: Provide dietary guidance in the dental office

Step6: Community services to assist nutrition care.

Case study discussion

The patient in our case report required comprehensive physical and cognitive examination, and laboratory tests to exclude new medical problems as contributing causes for his weight loss. The dental emergency kit included nitroglycerine tablets (0.3 to 0.4 mg) or translingual spray, which are replaced every 6 months because of their short shelf life. During an angina attack all dental treatment should be stopped immediately Nitroglycerine is administered sublingually &100% oxygen is given at 6L/min, with the patient in a semi supine or 45° position. Vital signs should be monitored after nitroglycerine is administered because transient hypotension may occur. There is a decrease pressure, which causes a decrease of the blood flow to brain. Pulse rate may increase upto160 beats/min. Blushing of the face & shoulders is common. A headache may occur after administration, often analgesics are indicated. Weight loss in the elderly is a worrisome clinical sign. Weight loss in the elderly due to voluntary or involuntary causes has been associated with mortality^{21,22} Functional, psychological, social, and economic issues associated with concomitant medical problems may all contribute to poor nutrition and weight loss in the frail elderly patient²³ Weight loss related to poor oral intake is also associated with peptic ulcer disease, GERD, and congestive heart failure, as well as dental or chewing problems^{24,25} The comprehensive assessment may include the services of physicians, nurses, dieticians, occupational and physical therapists, speech and language pathologists, and social workers, each of which can lend

their respective expertise to the effective diagnosis of the functional, psychological, and socioeconomic contributors to malnutrition in older patients.

GUIDELINES FOR NUTRITION COUNSELING:(FIGURE 11)

1. Eat a variety of food- Maintain ideal weight
2. Build diet around complex carbohydrates
3. Include citrus fruit or juice containing Vitamin C everyday
4. Select fish, poultry, or dried peas and beans everyday
5. Obtain adequate Calcium e.g. milk products, curd, cottage cheese
6. Limit intake of bakery products high in fat and simple sugars-Simple desserts are best (custard and fruits)
7. Limit intake of processed foods high in Sodium and fat-Instead of using salt use other herbs e.g. oregano, garlic, onion.
8. Consume 6- 8 glasses of fluid daily which includes soups, coffee, tea, juices as well as water.
9. Plan interesting meals, plan other activities around meal time (listen to music or watch TV)
10. Limit the intake of alcohol thought use of an alcoholic beverages before a meal may stimulate the appetite



FIGURE 11 NUTRITION COUNSELING

CONCLUSION:

Denture wearers represent a segment of the older population especially vulnerable to poor nutritional health. The ability of the oral tissues to withstand the stress of dentures is greater if the patient is well nourished. Dietary assessment must be an integral part of treatment for the denture patient. The attention to the complexity of multiple comorbidities is essential to the successful nutritional assessment of elderly patients.

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