



## IMPORTANCE OF NUTRITION IN DENTURE WEARERS: A LITERATURE REVIEW

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**ABSTRACT**

Nutrition is an essential component that determines the health of geriatric patients. The nutritional health in elderly patients are affected by various factors including: physiologic, psychosocial, oral, functional, medical and dietary supplementation. Hence, dietary guidance should be an integral part of treatment for denture wearers. This literature review outlines the relationship between denture wearers and malnutrition, and the nutritional strategies implemented to obtain a good oral and general health for denture wearers.

**KEYWORDS** : geriatric diet , complete denture nutrition, nutritional analysis

**INTRODUCTION**

Masticatory efficiency for complete denture wearers is approximately 80% lower than in people with an intact natural dentition. Other factors that decline the chewing ability include the presence of mobile teeth, bone resorption, reduced sensory perceptions, and motor impairment. These reduced masticatory ability may lead to a dietary selection with a high risk for an impaired nutritional status<sup>1</sup>. Elderly people tend to consume diets with fewer vegetables, less carotene and fiber and are more associated with increased risk of cancer and heart diseases. The clinician must be aware of these limitations following a dental treatment and should provide adequate counteractive dietary guidance.

**AGEING FACTORS THAT INFLUENCE NUTRITIONAL STATUS:****1. PHYSIOLOGIC FACTORS:**

A decline in gastric acidity with age may be seen in around 10% to 15% of persons over the age of 60 years<sup>2,3</sup>. This hypochlorhydria results from atrophic gastritis and can lead to a malabsorption of food-bound vitamin B12. This Vitamin B12 deficiency in turn can result in neuropathy, megaloblastic anemia, gastrointestinal symptoms, and cognitive impairment.

In elderly, vitamin D synthesis is reduced to half that at age 20 years mainly due to insufficient sun exposure, decline in the skin's ability to synthesize vitamin D from sun, and impaired kidney or liver function needed to activate vitamin D. It is noted from studies that more than 50% of hospitalized patients were deficient in vitamin D<sup>4</sup>.

Impairment in the normal function of intestines can also result in food maldigestion and malabsorption. A classic example is the deficiency of lactase enzyme in the small intestine which cause pain, bloating, excessive gas, nausea and leads to an inefficiency to digest milk sugar, lactose. This causes older patients to avoid dairy products which contains a major source of calcium.

**2. PSYCHOSOCIAL FACTORS**

Living alone can have a major impact on the nutritional status of elderly people<sup>5</sup>. Many suffer from depression, anxiety and loneliness which indirectly undermine the desire to prepare and eat food and have been associated with anorexia, weight loss, and increased morbidity and mortality in older people. Communal dining was found to improve appetite and eating<sup>6</sup>.

**3. FUNCTIONAL FACTORS**

Functional disabilities such as arthritis, paralysis, vision and hearing impairment can also affect nutritional status

**4. PHARMACOLOGIC FACTORS: MEDICATIONS AND ALCOHOL**

Medicinal drugs have an impact on the absorption and utilization of some foods. Prescription drugs are one of the primary causes of anorexia, nausea, vomiting, gastrointestinal disturbances,

xerostomia, loss of taste and interference with absorption of nutrients.

**ORAL FACTORS**

a) Xerostomia : Dry mouth or hyposalivation is seen in one in five older adults<sup>7</sup> and can impair complete denture retention and cause burning or soreness of the oral mucosa, difficulties in chewing and swallowing, all of which adversely can affect food selection and contribute to poor nutritional status<sup>7</sup>. Intake of medications is another common cause of xerostomia<sup>8</sup>.

b) Altered sense of taste and smell: Geriatric patients have inappropriate tastes rather than loss or diminution of function<sup>9</sup> due to the sensory changes that may diminish the appeal of some foods (eg, sensitivity to the bitterness of cruciferous vegetables), limiting their consumption and potential health benefits<sup>10</sup>.

**EFFECT OF DENTURES ON TASTE AND SWALLOWING**

Taste sensitivity may be reduced when an upper denture covers the hard palate as the hard palate contains taste buds. It also makes the location of food in the mouth difficult when the upper palate is covered and interferes with the coordination of swallowing and this in turn reduces masticatory efficiency<sup>11</sup>.

**EFFECT OF DENTURES ON CHEWING ABILITY**

Chewing ability of denture wearers is approximately 80% lower than in people with intact natural dentition as they tend to use more strokes and chew longer to prepare food for swallowing<sup>12,13</sup>.

**EFFECT OF DENTURES ON FOOD CHOICES, DIET QUALITY, AND GENERAL HEALTH**

The Health Professionals Study concluded that the diet of edentulous subjects contained fewer vegetables, carotene and fiber which decreased the risk of cancer and heart disease, and contained more cholesterol, saturated fat, and calories than persons with 25 teeth or more<sup>14</sup>. Patients with poor oral function had a low-fiber diet, resulting in consumption of semisolid or soft consistency of the alimentary bolus. This consistency of bolus may be the origin of some gastric disorders<sup>15</sup>. The intake of gastrointestinal drugs also appears to be higher in adult edentulous subjects with poor masticatory ability<sup>16</sup>.

**FOOD PYRAMID**

A innovative food pyramid has been designed for people aged 70 years and above by Tufts University emphasizing the unique needs of older people<sup>17</sup> (Fig. 1).

In comparison with the original Food Guide Pyramid<sup>18</sup>, the modified food pyramid for the aged focuses on fewer servings of grain products, more servings of dairy and adequate intake of water. Elders should be encouraged to have six to eight 8 oz glasses of fluid

daily which does not include any caffeine-containing beverages as they are diuretics. The intake of soft foods is advised for the next few days and a regular diet can be taken by the end of the week.<sup>19</sup>

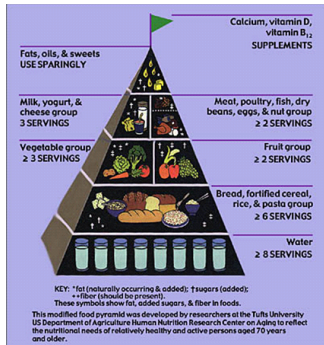


Figure 1: Modified food pyramid by Tufts University

**THE FIVE FOOD GROUPS**

All the essential nutrients for optimal health can be obtained by eating a variety of foods in the optimal amounts from the following five food groups:

**1. Vegetable-Fruit group**

Four servings of vegetables and fruits, subdivided into 3 categories:

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

**2. Bread-cereal group:**

Six servings of enriched cereals, breads and flour products.

**3. Milk group:**

Three servings of milk and milk-based foods such as cheese.

**4. Meat group:**

Two servings of meat, fish, poultry, eggs, dried beans, peas, nuts.

**5. Miscellaneous foods:**

Fats, Oils, sugars and alcohol; the only serving recommendation is for about 2-4 tablespoons of polyunsaturated fats, which supply essential fatty acids.

**RECOMMENDED DIET FOR A NEW DENTURE WEARER**

**First post-insertion day**

Vegetable-Fruit group: Juices

Bread-Cereal group: Gruels cooked in either milk or water.

Milk group: Fluid milk may be taken in any form.

Meat group: Eggs in egg-nogs, pureed meats, meat broths, or soups. The sample menu should contain a glass of milk at least once a day.

**Second and third post insertion day**

Vegetable-Fruit group: Juices; Tender cooked fruits and vegetables, (seedless and skinless)

Bread-cereal group: Cooked cereals, softened breads boiled, rice, noodles and macaroni.

Milk group: Fluid milk and cottage cheese.

Meat group: Chopped beef, ground liver, tender chicken/fish in a cream sauce, scrambled eggs, thick soups, etc.

The sample menu must include butter or margarine, a glass of milk at least once a day.

**Fourth day and after**

By the fourth day, or as soon as the sore spots have healed, firmer foods can be eaten in addition to the soft foods. These should ideally be cut into small pieces before eating. The sample menu must contain butter or margarine and a glass of milk.

**NUTRITION COUNSELING AND DIETARY GUIDANCE FOR THE AGED**

Since denture construction requires a series of appointments, dietary analysis and counseling should be incorporated into the treatment sequence.

**TRIPHASIC NUTRITIONAL ANALYSIS**

**PHASE 1:**

The first phase includes screening of all patients and obtaining their medical-social history, checking for clinical signs of deficiency, taking selected anthropometrical measurements and assessing of their dietary intake.

If nutritional problems deficiencies are detected, based on any of these parameters, the nutritional evaluation should progress to Phase 2. If adequate information is available in phase 1 to ensure a rational basis for therapy, the nutritional assessment should be terminated and appropriate dietary counselling instituted. In 1995, Vogt et al has developed a series of questionnaire to identify older individuals with nutritional problems [Tables 1 and 2].

Table 1: Questionnaire for assessing the nutritional health of elderly adults<sup>[20]</sup>

Q No.	Question	Score
1	I have an illness or condition that made me change the kind and/or amount of food I eat.	2
2	I eat fewer than two meals per day.	3
3	I eat few fruits, vegetables, or milk products.	2
4	I have three or more glasses of beer, liquor, or wine per day.	2
5	I have tooth or mouth problems that make it hard for me to eat.	2
6	I don't always have enough money to buy the food I need.	4
7	I eat alone most of the time.	1
8	I take three or more different prescribed or over-the-counter drugs a day.	1
9	Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
10	I am not always able to shop, cook and/or feed myself.	2

Table 2: Scores

Total score	Nutritional risk
0-2	Good nutritional health
3-5	Moderate nutritional risk
6 or more	High nutritional risk

**PHASE 2:**

A semiquantitative dietary analysis and routine blood chemistry should be noted in this phase.

**SEMIQUANTITATIVE DIETARY ANALYSIS**

The services of a registered dietician is utilised in this level of assessment. Nutrients in all the foods and beverages consumed in a 3 to 5 day period are calculated using Food Composition Tables or computer-assisted nutrient analysis programs. Average intake of nutrients and calories can be quantitated and compared with the norms.

**BIOCHEMICAL ASSESSMENT**

Blood tests provide a more definitive information regarding the nutritional status of the patient, hence blood should be assessed.

**PHASE 3:**

Phase 3 is carried out by a physician to assess complex nutritional problems. The analysis in this phase comprises of comprehensive nutritional biochemical assays of blood, urine and tissues, as well as tests of metabolic and endocrine function. The patient should be instructed to see his physician for more detailed diagnostic procedures and treatment if any nutritional deficiency is present. In adjunct to this the dentist can instruct to avoid excessive use of cariogenic foods.

**CONCLUSION:**

Denture wearers are at a risk of poor nutrition and the dentist should

be aware of nutritional risk factors and provide nutritional guidance to the patients so that they adapt well to the balanced diet. Comprehensive health care of the denture wearers require periodic communication and coordination of services of the dentist along with the dietician to ensure effective nutritional care for elderly complete denture patients.

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