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REVIEW ARTICLE

Nutritional Aspect for Geriatric Prosthodontic Patients

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Abstract

Perfect health is a prize that has been the goal of mankind throughout all ages. Nutrition provides substrates essential for expression of genetic heritage. Nutrition might influence the occurrence and severity of degenerative diseases that are associated with aging. Nutri- tional problems may result from changes associated with aging process itself, from disease or other medical conditions, from interactions with medications, or from all of these. Rela- tionship between nutrition and geriatric changes is a vicious cycle which is interrelated with each other. This article summarizes the nutritional aspects and the changes in diet associ- ated with aging. (2020, Vol. 04; Issue 01: Page 34 - 39)

Keywords: Nutrition, Geriatrics, Complete denture, Nutritional analysis.

Introduction

Proper nutrition is essential for the health and comfort of oral tissues. Healthy tis- sues enhance the possibility of successful prosthodontic treatment in the elderly. In patients with partial or complete tooth loss, prosthetic therapy may be important to maintain or restore masticatory func- tion. However, many other factors also are essential for the nutritional status of older adults. Thus, many age-related medical problems and diseases have nutritional aspects and the patient's socioeconomic status and dietary habits have a profound influence on their dietary selection. Pros- thodontist must be aware of these poten- tial detrimental effects of dental treatment and provide counteractive dietary guid- ance. Problems vary with the patient and the dental condition, so suggestions must be tailored to meet the patient's specific needs. This article describes associations between oral health and nutritional status among geriatric prosthodontic patients

Geriatric Dentistry

Geriatric dentistry is the branch of dentis- try that emphasises dental care for the el- derly population and focuses upon pa- tients with chronic physiological, physical and/or psychological changes or morbid conditions/ diseases.

Gerodontics delivers dental care to older adults which involves diagnosis and treat- ment planning and prevention of problems associated with normal ageing and age-re- lated diseases as inter disciplinary man- ner with other medical professionals (1).

Nutritional objectives

The following objectives are important for the nutrition of geriatric patients (1):

1. Establish a balanced diet which is consistent with physical, social, psycho- logical and economic background of the patient.
2. Provide temporary dietary support- ive treatment, directed towards specific goals such as carries control, postopera- tive healing or soft tissue conditioning.
3. Interpret factors peculiar to the denture age group of patients, which may relate to or complicate nutritional therapy.

Aging factors that affect nutri- tional status

1. Physiological 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 types of nutrient deficiencies are common in the elderly, including zinc and vitamin B6, seem to result in decreased or modified immune responses. Dehydra- tion, caused by declines in kidney func- tion and total body water metabolism, is a major concern in the older population. De- ficiency of several vitamins, such as B1 (thiamin), B2, niacin, B6, B12, foliate, pantothenic acid, vitamin C and vitamin E, is associated with neurological and/or behavioural impairment (2, 3).

2. Psychosocial factors

A host of life-situational factors increase nutritional risk in elders. Elders, particu- larly at risk, include those living alone, the physically handicapped with insuffi-cient care, the isolated, those with chronic dis- ease and/or restrictive diets, reduced eco- nomic status and the oldest old (3).

3. Functional factors

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

4. Pharmacological factors

Most elders take several prescription and over the counter medications daily. Pre- scription drugs are the primary cause of anorexia, nausea, vomiting, gastrointesti- nal disturbances, xerostomia, loss of taste sensation and interference with nutrient absorption and utilisation. These condi- tions can lead to nutrient deficiencies, weight loss and ultimate malnutrition (3, 4).

Oral factors that affect diet and nutritional status

1. Xerostomia

Xerostomia affects almost one in five older adults. Xerostomia is associated with dif- ficulties in chewing and swallowing, which can adversely affect food selection and contribute to poor nutritional status. The drugs which have hyposalivation as side effect may have deleterious influence on denture bearing tissues (2, 3).

2. Sense of taste and smell

Age-related changes in taste and smell may alter food choice and decrease diet quality. Other factors are health disorders, medications, oral hygiene, denture use and smoking. Sense of smell decreases markedly with age, much more rapidly than the sense of taste (2). Sensory changes may diminish the appeal of some foods (e.g., sensitivity to the bitterness of cruciferous vegetables), limiting their con- sumption and potential health benefits function (5).

3. Oral infectious conditions Periodontal disease also increases with age and may be exacerbated by nutritional deficiencies.

Oral fungal infections, especially candidi- asis, also increase in geriatric patients.

4. Dentate status

Poor oral health leads to impaired masti- catory function. Whether masticatory function plays a role in food selection is still matter of debate, but impaired masti- catory function leads to inadequate food intake and therefore alters nutrition sta- tus (4, 6). The presence of natural teeth and well fitting dentures are associated with more varied nutrition intakes and greater dietary quality (5).

5. Effects of dentures on taste and swallowing

A full upper denture can have an impact on taste and swallowing ability. The hard palate contains propioceptors. Taste sen- sitivity may be reduced when an upper denture covers the hard palate. At the same time, swallowing can be poorly coor- dinated (6, 7).

6. Effects of dentures on chewing abil- ity

In adult age, individual tends to use more strokes and chew longer, to prepare food for swallowing. Masticatory efficiency in complete denture wearers is approxi- mately 80% lower than in people with in- tact natural dentition (7, 8).

7. Effect of dentures on food choices, diet quality and general health

The effect of dentures on nutritional sta- tus varies greatly among individuals. Some people compensate for decline in masticatory ability by choosing processed or cooked foods rather than fresh food and by chewing longer before swallowing. Den- tate adults tend to eat more fruits and veg- etables than full-denture wearers (6, 7). Replacing ill-fitting dentures with new ones does not result in significant im- provements in dietary intake (6). Similarly, exchanging optimal complete dentures for implant-supported denture, has not re- sulted in significant improvement in food selection or nutrient intake (7).

Necessary nutrients vs its intake in geriatric patients

The oral aspects of aging as related to nu- tritional deficiency have been reviewed in dental literature, wherein many of the de- generative changes seen in the oral cavity may be due to essential nutrients.

1. Energy - Energy needs decline with age due to a decrease in basal metabolism and decreased physical activity (8, 9).

2. Calories- Caloric requirements de- crease with advancing age, owing to re- duced energy expenditures and a decrease in basal metabolic rate. The mean recom- mended dietary allowance (RDA) is 1600 Kcal for women and 2400 Kcal for men (10).

3. Protein- As the patients become older, the amount of protein required in- creases. Protein depletion of body stores in the elderly, is seen primarily as a decrease of the skeletal muscle mass. Protein is a must for denture wearers. The RDA for proteins, for persons aged 51 and over, is 0.8-g protein/kg body weight per day. The best sources of proteins for the elderly diet are dairy products, poultry, meats and fish in the boiled and not dried form. Nuts, grains, legumes and vegetables contain protein (11-13).

4. Carbohydrates- The elderly con- sume 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 .The rec- ommended range of intake is 50 to 60 per cent of total calories. Food sources include grains and cereals, vegetables, fruits and dairy products.

5. Fiber- An important component of complex carbohydrates is fiber, which pro- motes bowel function, may reduce serum cholesterol and is thought to prevent di- verticular disease. Fiber in the form of bran is frequently added to dry cereals and breads, but vegetable fiber is more effec- tive and less expensive (14). Reduced se- lection of foods rich in fiber that are hard to chew, could provoke gastrointestinal disturbances in some edentulous elderly, with deficient masticatory performance (15). A study conducted on the impact of edentulous state on nutrition and food in- take, inferred that even 1 gram of differ- ence in dietary fiber intake between the dentate and edentulous, could lead to ap- proximately 2% increased risk of myocar- dial infarction (16).

6. Water- Elderly are particularly sus- ceptible to negative water balance, usually caused by excessive water loss through damaged kidney (17). Under normal con- ditions, fluid intake should be at least 30 ml per kg body weight per day.

7. Vitamin A- The RDA for vitamin A is 800-1000 micrograms. Long standing

deficiency may cause hyperplasia of the gums, as well as generalized gingivitis (11).

8. Vitamin B complex

□ Thiamine - The RDA has been set at 0.5 per 1000 calories, or at least 1 mg daily. Food sources include meats (espe- cially pork and chicken), peas, whole grains.

□ Vitamin B6 (pyridoxine) - It ranges from 50 to 90% of the elderly affected, which may be an important cause of the increased prevalence of the carpal tunnel syndrome. The RDA is 1.2-1.4 mg.

□ Vitamin B12 (riboflavin) - The RDA is 3.0 microgram. It is found in kidney, heart, milk, eggs, liver and green leafy veg- etables. Deficiency causes fissuring and redness of eyelid corners and mouth ma- genta-coloured tongue and genital derma- tosis (11).

9. Vitamin C- The RDA is about 60 mi- crogram. Food sources include citrus fruits, tomatoes, potatoes and leafy vege- tables. Deficiency causes spongy, bleeding gums, petechiae, delayed healing tissues, painful joints (13).

10. Vitamin D- The elderly are fre- quently deficient in Vitamin D because of lack of sun exposure. Vitamin D is found in fish liver oils. The RDA is 5 microgram.

11. Vitamin E - The RDA is 8-10 mg al- pha-TE.

12. Minerals- A study conducted by J. Crystal Braxter illustrated deficiencies in magnesium, fluoride, folic acid, zinc and calcium, in the geriatric population (18).

13. Folic acid- RDA is 500 microgram. Good food sources of folic acid include leafy green vegetables, oranges, liver, leg- umes and yeast. Deficiency causes mega- loblastic anemia, mouth ulcers, glossody- nia, glossitis, stomatitis.

14. Calcium- The recommended daily allowance of calcium is 800 mg/day. Cal- cium absorption is decreased in the el- derly and moreover lactase deficiency re- sulting in lactose intolerance is also com- mon in elderly persons. This is another reason for modifying the milk for elderly individuals (19). Food sources of calcium include milk and milk products. Elderly patients with complete dentures often ex- perience a rapid and excessive ridge re- sorption, which may be related to negative balance of calcium, which contributes to development of osteoporosis (13).

15. Iron- The RDA for iron is 10 mg. Good food sources include meat, fish, poultry. Deficiency causes burning tongue, dry mouth, anemia and angular cheilosis (11).

16. Zinc- The RDA is 15 mg. Good sources of zinc are animal products, whole grains and dried beans. Deficiency causes decreased taste acuity, mental lethargy and slow wound healing (13).

Prosthodontic Management of Geriatric Patients

The logical sequence of eating food is bit- ing, chewing and swallowing and it is much easier for the new denture wearer to master this complex of masticatory move- ments in the reverse order. Consequently, food of a consistency that will require only swallowing, such as liquids, should be prescribed for the first few days after in- sertion of the denture. The use of soft foods is advocated for the next few days and a firm or regular diet can be eaten by the end of the week (20).

Since denture construction requires a se- ries of appointments, dietary analysis and counselling can be easily incorporated into the treatment sequence. Advice should be properly given by Prosthodon- tics. A balanced diet with adequate nutri- ents is essential for oral health and in turn, oral health enhances nutritional well being. A proper nutritional assessment and suitable dietary advice is often a more appropriate way to cope with malnutrition and instituting successful prosthetic ther- apy. A person's ability to chew food relies on the presence of effective teeth or den- tures together with normal saliva flow (11). William T Fischer (1955) conducted a study on prosthetics and nutrition. He ex- plained that nutrition is one of the major factors that determines the success or fail- ure of the prosthetic appliance in the

mouths of aging people (10). Wical K.E and Brusse (1979) demonstrated the effects of calcium and vitamin D supplementation on alveolar ridge resorption in immediate denture patients. Massler M (1979) in his study on geriatric nutrition and osteopo- rosis concluded that the success or failure of an oral prosthesis depends as often on upon the health of the oral tissues as upon the technical skills of the prosthodontist. He also described the role of taste and smell in appetite in nutrition (17).

Conclusion

Lack of motivation among the elderly pop- ulation regarding maintenance of oral health can be attributed to their perceived limited need for oral health care during ageing. This level of perception among the elderly in most of the countries might be because of the low and unevenly distrib- uted dental services during their child- hood and adulthood. Hence the primary need would be to educate and motivate the elderly population regarding importance of oral health care.

Treatment of oral disease themselves is equally challenging. Hence to improve the scenario one needs to concentrate on over- coming barriers such as socioeconomic status, general health status, physical and cognitive disabilities and access to dental service among the elderly popula- tion. Improper nutrition not only affects physical appearance but also it affects psychological status of patient. Malnutri- tion is more common in uneducated vil- lage people.

Prosthodontist is a geriatric dentist who interacts with more number of older peo- ple as compare to other profession. So, it is a major role for a prosthodontist to guide the older people regarding malnutri- tion, balanced diet and age related dis- eases.

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