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IMPROVING NUTRITIONAL STATUS OF ELDERLY PATIENTS WITH DENTURES: CIRCUMVENTING CHALLENGES

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ABSTRACT:

A healthy diet is essential to maintaining dental health. Improving the patients' nutritional health requires both dietary advice and replacement of lost teeth. Dietary advice cannot be provided due to time constraints or dentists' lack of nutritional counseling skills. Since primary care physicians see most older patients, it is wise for them to acknowledge the importance of oral health in the elderly and recommend that patients with dental issues see a dentist. Undergraduate clinical training should require nutritional assessments, dietary counseling, and follow-up, along with the creation of a uniform methodology for the same. To guarantee complete healthcare, dietetics, dentistry, medicine, and allied health professions must work together on research, teaching, and defining practice responsibilities for the benefit of geriatric denture wearers.

Keywords: Nutrition, Complete Dentures, Complete Edentulism, Dentures, Geriatric Nutrition, Geriatrics

1. INTRODUCTION

The average life expectancy in adults is increasing worldwide. According to the United Nations Population Fund's India Ageing Report 2023, is that the population above 60 years will double from 10.5% or 14.9 crore (as on July 1, 2022) to 20.8% or 34.7 crore by 2050. The elderly population in India constitutes around 8% of the total population (Rajan et al., 2023). Edentulism, a common condition in the geriatric population can have a significant impact on their ability to properly chew and swallow food, leading to compromised nutrition and a range of health issues.

Edentulous individuals, are commonly rehabilitated with provision of Removable Complete Dentures. Though this improves the masticatory efficiency, it is nowhere near the capacity of the natural teeth. The masticatory load in natural teeth is 200N while the maximum forces during mastication of Complete denture wearers range between 60N and 80N.

These prosthetically rehabilitated edentulous individuals are at a need to be re-educated about the food that they consume. Edentulism is mostly seen in the geriatric population who have to deal with their own sets of psychological challenges and systemic illnesses. This article aims to address the impact of edentulism on diet and nutrition in the elderly and how we, as dentists can help to prevent further health complications and improve their quality of life.

According to [Policies and Recommendations on Diet and Nutrition](#) American Dental Association

(Adopted 2016 (2016:320) Updated: August 30, 2023), it is crucial for healthcare professionals to address tooth loss in the geriatric population to ensure access to appropriate dental care and prosthetic rehabilitation. A balanced and nutritious diet is essential for maintaining good oral health, as well as overall health and well-being. A study concluded that improving masticatory efficiency by prosthodontic rehabilitation can aid in normalizing the nutritional status in certain partially edentulous non-obese and obese individuals (Usha et al., 2022, Meenakshi et al., 2021).

The main drawback of Removable Complete Dentures is that they have reduced masticatory efficiency, reduced taste perception and requires the patient to have sufficient control over its usage. Hence, these denture wearers are more averse towards hard-to-chew foods that require more time and tactfulness to chew completely. Complete denture wearers are prone to have lower levels of essential nutrients such as vitamin C, vitamin A, and calcium. This is because the major sources of these nutrients are fruits, vegetables, meats, nuts, seeds, dairy products, breads and cereals which are difficult to chew for a new denture wearer. Bouts of injury, surgery and infectious disease can bring about upsurges in catabolism, vitamin excretion and body protein usage. Furthermore, the use of a variety of medications can affect both vitamin excretion and gastrointestinal absorption. Thus, many elderly individuals may require more than the RDA (Recommended Dietary Allowance) of many nutrients and that the compromised nutrition of edentulous individuals may be more important to emphasize on (Hutton et al., 2002, Patil et al., 2023).

However, time constraints and lack of awareness and training among young dentists and dental students for nutritional counselling impede proper access to dietary guidance. Niezel et al in 1976 suggested that, the best possible general advice is that daily diets should include meat, milk, vegetables and fruit, and bread. With emphasis on good quality protein foods and a generous selection of vegetables and fruits and somewhat less stress on fats, starches, and sugars to avoid an excess of calories. For the individual geriatric new denture wearer, each diet prescription should be based on an analysis and evaluation of his individual food habits.

Furthermore, the physical nature of the diet should be consistent with the patient's experience and ability to swallow, chew, and bite with his dental prosthesis. Elderly individuals should achieve the nutritional requirements as per Recommended Daily Allowance with at least 200–300 ml of milk/milk products, and 400 g of vegetables and fruits. The following tables show the recommended dietary allowance for geriatric population (Meenakshi et al., 2022) (**Table 1 and Table 2**)

The degenerative processes which initiate the loss of teeth continue after extraction and cause further shrinkage of supporting tissues. Barone et al suggested that repeated relining and rebuilding of dentures can be avoided by

- (i) Saturating patients with therapeutic dosages of vitamins and minerals prior to surgical intervention.
- (ii) Using scientifically evaluated liquid and semisolid diets containing the maximum quantities of nutrients and the minimum number of calories during the preoperative and postoperative periods.
- (iii) Thereafter maintaining the patient on a high-protein, high-vitamin, high-mineral diet. (Barron, 1978)

Table1: RECOMMENDED DIETARY ALLOWANCE

KEY NUTRIENT	SPECIFICATIONS
Energy requirement (>51 years of age)	1,600 to 2,200 calories for women 2,000 to 2,800 calories for men
Carbohydrates – Unrefined	whole grains with fibre content
Fats – Omega3 fatty acid	oily or fatty fish nuts and seeds other foods fortified with omega 3,
Protein	Lean protein

Table 2: RDA FOR VITAMINS

1. WATER SOLUBLE VITAMINS		
VITAMIN	SOURCE	RDA
Vitamin A	Retinol- egg yolks, butter, liver, and fish liver oils Carotenoids - pumpkin, carrots, squash, spinach, tomatoes	4500 IU for men 3500 IU for women
Vitamin D	fatty fish, egg yolks, and fortified foods exposure to sunlight	20µg (800 IU)
Vitamin E	dietary intake, vegetable oils, nuts and seeds, whole grains and dark leafy vegetables	15mg
Vitamin K	green leafy vegetables, broccoli, brussels sprouts, cabbage, plant oils and margarine	120µg for men 90µg for women
2. FAT SOLUBLE VITAMINS		
Vitamin C	Raw fruit and vegetables	90mg for men 75 mg for women
Vitamin B1 (Thiamin)	Whole grains, meat, and fish	1.2 mg/day for men 1.1 mg/day for women

Vitamin B2	Milk, eggs, salmon, beef liver, almonds, spinach	1.3 mg/day for men
Riboflavin		1.1 mg/day for women
Vitamin B3 Niacin	yeast, meat, poultry, red fish, and cereal, whole grains	16 mg/day for men 14 mg/day for women
Pantothenic Acid (B5)	Sunflower seeds, fish, dairy products.	5 mg/day
Vitamin B6	Meat, poultry, fish, legumes, nuts	1.7 mg/day for men 1.5 mg/day for women
Biotin (B7)	Egg yolks, fish, pork, nuts and seeds	30 µg/day
Folate (B9)	Leafy green vegetables, enriched grains, orange juice	320-400 µg/day
B12 (cobalamin)	Meats, poultry, fish	2.0-2.4 µg/day
Choline	Egg yolk, wheat, meat, fish, synthesis in the body	550 mg/day for men 425 mg/day for women

CHALLENGES:

Provision of denture is usually accompanied with a set of instructions on how to maintain it. However, the post insertion instructions are commonly verbal, and do not include sufficient advice on how to eat and what to eat. A Cross sectional study among dental students revealed that 30% reported that they took dietary history in the routine practice. Also, 39% reported that they gave dietary advice to their patients. Only 37% expressed their confidence in rendering diet counselling to their patients (Sivakumar et al., 2016) Edentulous patients often hold a common misconception that once their teeth are gone and they have dentures, there is no need to see a dentist. Hence, they are up to five times less likely to see a dentist than their dentate counterparts (Reynolds, 1997).

Patients also feel that they receive no advice on what they can realistically expect when eating with dentures, while a majority of professionals seem to lack confidence to provide eating advice. Many patients do not think dentists are a credible provider of eating advice, feeling peer support more appropriate and offering numerous strategies for eating with dentures. Concepts for eating intervention included a patient leaflet, Web-based eating interventions, patient support blogs, waiting room videos, and improved nutrition training for dental professionals. User feedback informed prioritization of ideas, leading to the development of a leaflet on eating with dentures. Justified by the data, the leaflet focused on patient-generated tips for overcoming the functional limitations of eating with dentures, and unobtrusive healthier eating advice (Watson et al., 2019).

A study among edentate individuals indicate that edentate older adults are still at a nutritional disadvantage compared to those with remaining natural teeth (Zelig et al., 2022, Erdinc & Yigit 2023, Su et al., 2020, Ramu et al., 2014, Patil et al., 2020). This can be due to:

- (I) Lack of masticatory efficiency
- (II) Resorbed alveolar ridges
- (III) Poor neuromuscular coordination

(IV) Mistakes in denture fabrication

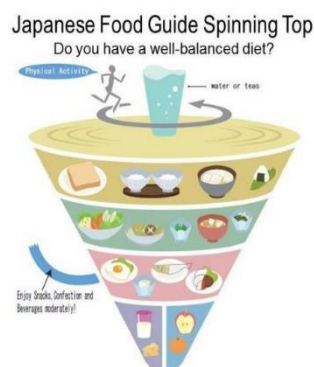
FUTURE DIRECTIONS:

Fixed prosthesis and implant supported overdentures seem to be a viable option. But it is not commonly offered to patients due to the high cost and specialization (Jabr et al., 2023). Future research should focus on longitudinal studies that have examined the relationship between dentition status and nutrient intakes in older adults, which helps to determine the temporal order of events (Kikuchi et al., 2021). Formal nutritional assessments using the Mini Nutritional Assessment (MNA), nutritional analysis, or a Triphasic is integral to create awareness regarding dietary deficiencies. Various methods including qualitative assessment for patient screening, semi-quantitative dietary analysis using food composition tables, computer-assisted nutritional analysis, and complex nutritional problem analysis can be employed for assessing the nutritional status of the patient (Griep et al., 2000, Aneja et al., 2016, Kaushik et al., 2018, Banerjee et al., 2018, Sreepathi et al., 2022).

All health care professionals need to work towards an integrated health care environment that can effectively care for the elderly's oral health needs. Increased interaction between the disciplines during under graduation and further education on the impact of oral health on general health may lead to a more open team approach that can positively affect the oral health of the elderly (Reynolds, 1997, Komagamine et al., 2016, Baxter, 1984, Lee et al., 2004).

Rounds and Papas have defined an effective method of presenting home care procedures: "Tell - Show - Do". Simple lists of recommended daily procedures that can be accomplished and checked off by the patient can serve as helpful reminders. Self-monitoring techniques have proven to be effective in lowering plaque levels by studies with elderly both in the community and in nursing home. They can also serve as a source of positive reinforcement and encouragement when reviewed with the dentist or dental hygienist at follow-up appointments (Reynolds, 1997, Ramu et al., 2015). Plaque levels could also be decreased by consuming probiotics isolated from various sources such as fruits, fermented foods, sugarcane (Martiz et al., 2023, Sreepathi et al., 2023, Kumari et al., 2023, Huligere et al., 2023). Therapeutic compounds from various sources as well as synthetic compounds, nanoparticles possess anti-inflammatory, anti-oxidant properties which decreases the plaque levels (Simha et al., 2023, Khadri et al., 2023, Pramila et al., 2022, Deepika et al., 2022).

Komagamine et al suggested that simple dietary advice that can be implemented by a dentist is more practical in daily clinical practice than tailored dietary counselling, which requires the additional services of a nutritionist and a further appointment. This intervention would have a long-term effect on the basis that once a dietary choice is made, it is likely to continue. These advices were provided in the form of pamphlets based on guidelines from the "Japanese food guide spinning top" which was published in 2005 and revised in 2010 (Komagamine et al., 2016).



Thus, the provision of a removable prosthesis should include regular nutrition counselling sessions for optimum oral health. Early identification of malnourished elderly patients and necessary support must be provided. Regular dietary assessments within a week of placement of dental prosthesis, and every 3–6 months. Nutritional counselling is essential for improving the nutritional status of patients, and dentists should be trained to provide dietary guidance and referrals to their patients.

2. CONCLUSION:

We can conclude that while it is possible to just reconstruct teeth in terms of aesthetics, it is the responsibility of the dentist to treat the patient holistically and ensure the patients well-being and success of the treatment provided. Thus, the completely edentulous geriatric patient must truly be the object of a team effort of the health professions. The medical, dental, and psychological health of the patient largely overlap, and all of these factors are tied together by the patient's nutritional well-being.

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