

# Evaluation of the Nutritional Status of Elderly Patients with Different Prosthodontic Treatment

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## ABSTRACT

**Introduction:** The reduced masticatory ability may lead to changes in dietary selection with risk of an impaired nutritional status, especially in elderly complete denture (CD) wearers. Elderly denture wearers are vulnerable to compromised nutritional health due to various factors, including physiologic, psychosocial, oral, functional, medical, and dietary supplementation.

**Aim:** The present study aims to evaluate the nutritional status of elderly patients with different prosthodontic treatment.

**Materials and methods:** A total of 150 participants were involved in the study. Examination of dentition involved assessment of distribution of teeth (distal extension case or not), number of missing teeth in the edentulous area, and the type of prosthetic treatment recommended. For measuring nutritional assessment, detailed information about quantity of foods and nutrients consumed was collected. Participants were asked to keep a last-three-meals diary record of all food and drink consumed, both in and out of home in terms of standard bowl, cup, glass, teaspoon, and tablespoon sizes. Independent Student's t test and Tukey's test were used to assess the level of significance.

**Results:** Out of 150 participants, 46.7% were completely edentulous and 53.3% were partially edentulous. A total of 70 participants were recommended for CD, 40 for fixed partial denture, 26 for distal extension denture prosthesis, and 14 for tooth-supported denture prosthesis. The CD group showed the highest alteration in the mean values than partial denture group.

**Conclusion:** The present study concluded that prosthetic rehabilitation becomes increasingly important as the level of edentulism increases to improve dietary habits, and nutrition forms an integral part of the prosthodontic treatment in maintaining the health of the body among elderly population.

**Keywords:** Denture, Edentulous, Nutritional status, Prosthodontic rehabilitation.

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## INTRODUCTION

A large segment of the elderly, more than one-third of those aged above 65 years, are edentulous.<sup>1</sup> The relationship among dentition status, masticatory function, and nutrient intake is of importance. The effect of edentulous state on nutritional and health status is an important but an overlooked public health issue.<sup>2</sup>

As the age progresses, it is a much accepted fact that there exists some relationship between health of oral tissues and general health. Absence of teeth due to any reason affects the health of oral tissues and the body in a huge way by altering the quality of life along with nutrition and food habits.<sup>3</sup> As far as dental implants are concerned, reports of initial analysis involving both functional and esthetic components of life have been proved to be in favor of both patients and the dentists.<sup>4</sup>

To improve oral health outcomes, an adequate knowledge of the way the individuals use health services and the factors predictive of this behavior is essential. In this modern era of information and technology, we may comprehend the ever-increasing awareness and heightened consumer rights regarding overall health issues. Commonly quoted motives for making a complaint within dentistry are: Poor treatment quality, negligence, overcharging, misconducts, etc. Also, with increasing clinical governance and patient partnership in delivering high-quality oral health care, it is necessary that patients' concerns are dealt with appropriately.<sup>5</sup>

Among older patients, diet also plays a key role in disease prevention, as poor diets have been linked to illnesses, such as osteoporosis, atherosclerosis, and bowel disease. Although nutritional state is influenced by factors, such as age, socioeconomic status, and general health, it would appear that dental status is also significant. Poor oral health and loss of teeth can have very

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significant negative effects on dietary intake and nutritional status for elderly patients. As a result, the American Dietetic Association recently stated that oral health and nutrition have a synergistic bidirectional relationship. There is evidence that good oral health generally has very positive effects on the nutritional intake of older adults.<sup>6</sup>

So, the present study was conducted to evaluate the nutritional status of elderly patients with different prosthodontic treatment.

**MATERIALS AND METHODS**

Ethical approval for the study was obtained from Educare Institute of Dental Sciences, Malappuram, Kerala, India, and informed consent was obtained from all the participants prior to the study. The present study was conducted during October to December 2016, with a total of 150 patients reporting to the prosthodontic outpatient department of the hospital for the treatment of missing teeth. The study participants were included in the study with the following criteria: Patients above 60 years of age; patients without any history of systemic illness, known as drug allergy; patients without any medical history of limitation of any extremity or functional limitation; patients without any psychological disorder; and patients who were not financially above the poverty line.

Examination of dentition involved assessment of distribution of teeth (distal extension case or not), number of missing teeth in the edentulous area, and the type of prosthetic treatment recommended. While planning for the treatment, third molars were not included. Accordingly, patients were divided into following groups: Completely edentulous (CE) and partially edentulous (PE). The PE group were further categorized into three groups: Group I – less than 8 missing teeth, group II – 8 to 18 missing teeth, and group III – more than 18 missing teeth. Patients were also divided depending on the type of prosthetic treatment required: Complete denture (CD), removable partial denture (RPD), and fixed partial denture (FPD).

For measuring nutritional assessment, detailed information about quantity of foods and nutrients consumed was collected. Participants were asked to keep a last-three-meals diary record of all food and drink consumed, both in and out of home in terms of standard bowl, cup, glass, teaspoon, and tablespoon sizes according to the Indian Council of Medical Research guidelines.<sup>7</sup> Written

and oral instructions for completion of records by the participants were provided: 1 cup = 200 mL, 1 bowl = 200 gm, 1 glass = 200 mL, 1 teaspoon = 5 mL, 1 tablespoon = 15 mL. For certain dishes with multiple food items, the main ingredients were identified. Data were tabulated on energy (fats, carbohydrates, proteins) and nutrient (iron, calcium) values.<sup>8,9</sup>

All the tests were done again after 3 months following prosthodontic treatment. All the results were evaluated using Statistical Package for the Social Sciences version 20 software. Independent Student’s t test and Tukey’s test were used to assess the level of significance.

**RESULTS**

Out of 150 participants, 46.7% were CE and 53.3% were PE. Around 70 participants were recommended for CD, 40 for FPD, 26 for distal extension denture prosthesis (DEDP), and 14 for tooth-supported denture prosthesis (TSDP), as shown in Table 1.

The CD group showed the highest alteration in the mean values than partial denture group, as shown in Table 2. Table 3 highlights the mean changes between different groups categorized according to number of missing teeth from baseline to 3 months. Although a nonsignificant ( $p > 0.05$ ) difference was observed while comparing mean change in fat, carbohydrates, iron, and calcium, proteins shows a statistically significant variation. Table 4 shows that the mean changes between removable prosthesis and fixed prosthesis from baseline to 3 months, proteins show

**Table 1:** Dental status of all the patients

Variable		n = 150 (%)
Dentition status	Completely edentulous	70 (46.7)
	Partially edentulous	80 (53.3)
Prosthesis recommended	CD	70 (46.7)
	FPD	40 (26.7)
	DEDP	26 (17.3)
	TSDP	14 (9.3)
Missing teeth	Group I	36 (45)
	Group II	28 (35)
	Group III	16 (20)
Prosthesis type	Removable (CD + DEDP + TSDP)	110 (73.3)
	Fixed (FPD)	40 (26.7)

TSDP: Tooth-supported denture prosthesis; DEDP: Distal extension denture prosthesis; CD: Complete denture; FPD: Fixed partial denture

**Table 2:** Mean changes between completely and partially edentulous patients from baseline to 3 months

Variable	Complete denture	Partial denture (RPD ± FPD)	t-value	p-value	
Nutrients	Proteins (gm)	26.45 ± 6.02	18.26 ± 7.54	5.85	0.001
	Fat (gm)	2.80 ± 12.65	2.85 ± 11.67	0.68	0.670
	Carbohydrates (gm)	5.85 ± 2.80	4.90 ± 3.01	4.01	0.002
	Iron (mg)	7.60 ± 5.50	3.88 ± 6.20	3.15	0.002
	Calcium (mg)	4.56 ± 1.68	4.01 ± 1.56	2.85	0.020



**Table 3:** Mean changes between different groups categorized according to number of missing teeth from baseline to 3 months

Variable		Groups I vs II	Groups I vs III	Groups II vs III	f-value	p-value
Nutrients	Proteins (gm)	0.291	0.252	0.920	4.60	0.001
	Fat (gm)	0.131	1.010	0.978	0.23	0.620
	Carbohydrates (gm)	0.128	0.262	0.162	1.56	0.566
	Iron (mg)	0.201	0.083	0.234	3.01	0.154
	Calcium (mg)	0.421	0.432	0.458	1.35	0.232

**Table 4:** Mean changes between removable prosthesis and fixed prosthesis from baseline to 3 months

Variable		Removable (CD ± DEDP ± TSDP)	Fixed prosthesis	t-value	p-value
Nutrients	Proteins (gm)	25.52 ± 6.86	10.38 ± 6.88	5.12	0.001
	Fat (gm)	2.25 ± 12.56	1.51 ± 6.66	0.24	0.542
	Carbohydrates (gm)	4.46 ± 3.85	4.54 ± 9.68	3.42	0.681
	Iron (mg)	5.89 ± 4.48	2.88 ± 8.52	1.88	0.022
	Calcium (mg)	4.02 ± 2.01	3.24 ± 1.01	2.96	0.124

the highest alteration in the mean as compared with fixed and it was statistically significant.

## DISCUSSION

Proper nutrition is essential to the health and comfort of oral tissues to enhance the possibility of successful prosthodontic treatment of the elderly. Proper nutritional assessment and suitable dietary advice is often more appropriate in coping with malnutrition than merely instituting prosthodontic therapy.<sup>10</sup>

According to Marshall et al,<sup>11</sup> the presence of natural teeth and well-fitting dentures was associated with higher and more varied nutrient intake and greater dietary quality. Muller et al<sup>12</sup> found that CD patients had significantly lower ratings regarding difficulty in chewing. In geriatric patients, balanced nutrition is necessary for the oral health and comfort to increase the longevity and success of prosthodontic treatment. Hence, we assessed various nutritional variables in older patients who underwent different prosthodontic treatments.

The present study shows an increase in intake of nutritional values in patients having CD compared with patients using RPD or FPD. Similar results were obtained by Krall et al<sup>13</sup> who, from their study, concluded that patients with RPDs had similar nutritional intake values when compared with persons with intact dentition status. Furthermore, they also reported better nutritional consumption values for these persons compared with patients with missing teeth who had not undergone prosthetic rehabilitation and in persons who wore CDs. From the present study results, we also assessed a significant increase in consumption of proteins in patients who wore CD compared with patients wearing RPDs and FPDs. As stated by Goel et al,<sup>10</sup> this may be due to an increase in intake of softer carbohydrate-rich and low-

protein diet by CD wearers. While comparing the mean calcium intake by the patients, all the groups showed a significant increase in the mean values of the calcium. The current study results were in correlation with the results of Aneja et al,<sup>14</sup> who also observed significant increase in calcium intake on denture wearers. This might be due to significance increase in uptake of fruits, vegetables, and salads after prosthetic rehabilitation.

To improve the diet quality, individual patients undergoing prosthodontic treatment need dietary counseling. The main objective of diet counseling for these patients is to correct imbalances in nutrient intake that interfere with body and oral health. This includes obtaining a nutrition history, evaluating the diet, educating the patient about diet components important for oral health, motivating the patients to improve diet, and follow-up to support patient efforts to change food behaviors.<sup>15</sup>

## CONCLUSION

Within the limitation, the present study concluded that prosthetic rehabilitation becomes increasingly important as the level of edentulism increases to improve dietary habits, and nutrition forms an integral part of the prosthodontic treatment in maintaining the health of the body among elderly population.

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