

Original Research

Nutritional status of patients using conventional complete denture and implant supported overdenture

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ABSTRACT:

Background: Tooth loss is an age-related problem. As the age advances, people's ability to maintain their teeth is affected due to their reduced physical capacity and income. Masticatory ability and food selection are majorly affected by loss of teeth forcing elderly edentulous people to choose soft and easy to chew foodstuff when compared with dentate individuals. **Aim of the study:** To study nutritional status of patients using conventional complete denture and implant supported overdenture. **Materials and methods:** The present study was conducted in the Department of Prosthodontics of the Dental institution. For the study, we selected 30 edentulous patients, 15 patients of which had got implant supported overdenture while 15 had got conventional complete dentures. The age of the patients ranged from 35 to 65 years. The inclusion criteria for the study were that the patients were edentulous for at least 10 years and must have been using their respective dentures regularly. The patients were placed into respective groups, Group IO- Patients with implant supported overdenture and Group CD- Patients with conventional complete denture. **Results:** In the present study, a total of 30 subjects participated, 15 patients in each group, Group CD and Group IO. The mean age of patients in Group CD was 53.12 years and Group IO was 54.54 years. We observed that on comparing the mean of different parameters, non-significant results were obtained. **Conclusion:** Comparison of nutritional status of patients wearing complete denture and patients with implant supported overdentures from past 10 year showed non-significant differences. The blood parameters for both the groups were in normal range except for cholesterol.

Keywords: Overdenture, nutrition, edentulous

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INTRODUCTION

Tooth loss is an age-related problem. As the age advances, people's ability to maintain their teeth is affected due to their reduced physical capacity and income. ¹ Relationship between masticatory function and impaired food intake for fully edentulous patients has been described in literature. ² Masticatory ability and food selection are majorly affected by loss of teeth forcing elderly edentulous people to choose soft and easy to chew foodstuff when compared with dentate individuals. ³ Edentulous individuals frequently report more chewing difficulties than dentate people, and they therefore constitute the group most likely to change their diet. For the elderly edentulous, a conventional complete denture is effective for improving masticatory

performance, appearance, and the ability to engage in social and interpersonal activities. ⁴ Moreover, many studies report that prosthetic treatments modified dietary patterns and improved the variety of food intake. As adults aged 60 years or older may exceed more than 20% of the total population worldwide by 2050, the need for conventional denture treatment in public health will increase as the population ages. ^{5,6} Hence, the present study was conducted to study nutritional status of patients using conventional complete denture and implant supported overdenture.

MATERIALS AND METHODS

The present study was conducted in the Department of Prosthodontics of the Dental institution. The ethical

clearance for the study protocol was obtained from the ethical committee of the institute. For the study, we selected 30 edentulous patients, 15 patients of which had got implant supported overdenture while 15 had got conventional complete dentures. The age of the patients ranged from 35 to 65 years. The inclusion criteria for the study were that the patients were edentulous for at least 10 years and must have been using their respective dentures regularly. The patients were placed into respective groups, Group IO- Patients with implant supported overdenture and Group CD- Patients with conventional complete denture. For the evaluation of nutritional status of patients, 50 cc of venous blood from antecubital vein was taken from each patient and sent to laboratory for evaluation. The laboratory investigation included complete blood count, haemoglobin levels, RBCs count, WBCs count, serum albumin levels, ferritin and carotene, plasma B₁₂ levels and folic acid. For anthropometric measurement, body weight and body height were measured for each subject. The mean values for each variable were calculated and compared.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS

In the present study, a total of 30 subjects participated, 15 patients in each group, Group CD and Group IO. The mean age of patients in Group CD was 53.12 years and Group IO was 54.54 years. **Table 1** shows the comparison of various blood related parameters for Group IO and Group CD. We observed that on comparing the mean of different parameters, non-significant results were obtained ($p > 0.05$ for all parameters). The mean values of majority of the variables fall in the normal values except Cholesterol levels. The mean cholesterol level is found to be increased in both the groups.

Table 1: Comparison of Blood parameters for Group IO and Group CD

Blood parameters	Group IO	Group CD	P-value
Hemoglobin (g/L)	140.08	142.70	0.72
RBC count (nX10 ⁹)	3.98	4.14	0.61
WBC count (nX10 ³)	7.2	6.3	0.35
Albumin (g/L)	40.65	40.12	0.88
Cholesterol (mmol/L)	6.35	6.72	0.28
Ferritin (g/L)	136.3	149.3	0.8
B ₁₂ (pmol/L)	272.8	288.35	0.54
Serum folate (nmol/L)	33.6	35.21	0.19
RBC folate (nmol/L)	891.65	871.39	0.21

DISCUSSION

In the present study, we observed that the results showed that the blood parameters for both the groups fall in the normal value range except for cholesterol levels. Also, statistically insignificant comparison was seen for all parameters. The studies were compared to previous studies from the literature. Yamazaki T et al investigated whether treatment with a mandibular implant supported overdenture improves nutrient intake and markers of nutritional status better than a conventional complete denture in edentulous patients. Medline, EMBASE and the Cochrane Central Register of Controlled Trials were searched for eligible studies published up to April 2016. We included studies which compared the treatment effect of an overdenture to conventional denture on nutrition, in which primary outcomes included changes in intake of macronutrients and/or micronutrients and/or indicators of nutritional status. Two reviewers independently evaluated eligible studies and assessed the risk of bias. We used a fixed effects model to estimate the weighted mean difference (WMD) and 95% CI for change in body mass index (BMI), albumin and serum vitamin B12 between overdenture and conventional denture 6 months after treatment. Of 108 eligible studies, 8 studies involving 901 participants were included in the narrative appraisal. Four studies reported changes in markers of nutritional status and nutrient intake after treatment with a prosthetic, regardless of type. In a meta-analysis of 322 participants aged 65 years or older from three studies, pooled analysis suggested no significant difference in change in BMI between an overdenture and conventional denture 6 months after treatment, and no significant difference in change in albumin or vitamin B12 between the two treatments. They concluded that the modifying effect of overdenture treatment on nutritional status might be limited. Further studies are needed to evaluate the effectiveness and efficacy of denture treatments. Hamdan NM et al conducted randomized clinical trials (RCT), and compared the amounts of total dietary fiber (TDF), macronutrients, 9 micronutrients, and energy in diets consumed by persons with IOD and CD. Male and female edentate patients ≥ 65 yrs (n = 255) were randomly divided into 2 groups and assigned to receive a maxillary CD and either a mandibular IOD or a CD. One year following prosthesis delivery, 217 participants reported the food and quantities they consumed to a registered dietician through a standard 24-hour dietary recall method. The mean and median values of TDF, macro- and micronutrients, and energy consumed by both groups were calculated and compared analytically. No significant between-group differences were found ($p > .05$). Despite quality-of-life benefits from IODs, this adequately powered study reveals no evidence of nutritional advantages for independently living medically healthy edentate elders wearing two-implant mandibular overdentures over those wearing conventional complete dentures in their dietary intake at one year following prosthesis delivery.^{7,8}

Komagamine Y et al investigated the effect of a simultaneous combination of simple dietary advice delivered by dentists and provision of new complete dentures on dietary intake in edentulous individuals who request new dentures. Through a double-blinded, parallel, randomized controlled trial in which 70 edentate persons who request new complete dentures will be enrolled, eligible study participants will be randomly allocated to either a dietary intervention group receiving dietary advice or to a control group receiving only advice on the care and maintenance of dentures. Outcome measures include daily intake of nutrients and food items, assessed using a brief self-administered diet history questionnaire; antioxidant capacity, determined using blood and urine samples; nutritional status, assessed with the Mini-Nutritional Assessment-Short Form; oral health-related quality of life, assessed with the Japanese version of the Oral Health Impact Profile-EDENT and the Geriatric Oral Health Assessment Index; subjective chewing ability; masticatory performance, assessed using a color-changeable chewing gum and a gummy jelly; patient self-assessment of dentures; mild cognitive impairment, assessed with the Japanese version of the Montreal Cognitive Assessment; and functional capacity, assessed with the Japan Science and Technology Agency Index of Competence. Outcome measures, except for antioxidant capacity, are to be implemented at three time points: at baseline and at 3 and 6 months following intervention. Antioxidant capacity data are to be collected twice: at baseline and at 3 months following intervention. Differences between the groups at 3 and 6 months and within-group changes are to be compared using the paired t test. Simple dietary advice that can be implemented by a dentist would be more practical in clinical practice than tailored dietary counseling. The results of this study will provide beneficial information on dietary intake changes for both edentulous individuals requesting new complete dentures and dentists. Wöstmann B et al investigated the impact of implant-prosthetic rehabilitation combined with nutritional counseling on the nutritional status of patients with severely reduced dentitions. An explorative intervention study including an intra-individual comparison of 20 patients with severely reduced dentitions in terms of nutrition- and quality of life-related parameters recorded at baseline and at six and twelve months after implant-prosthetic rehabilitation. Twenty patients from the Department of Prosthetic Dentistry of Justus-Liebig University of Giessen, with a mean age of 63 years, who had fewer than ten pairs of antagonists. The baseline data collection included dental status, a chewing ability test, laboratory parameters, anthropometric data (body mass index), energy supply, a 3-day dietary record, an analysis of the oral health-related quality of life (OHRQoL) with the OHIP-G14, the Mini-Mental Status (MMS) and Mini Nutritional Assessment (MNA). Six months after implantation and prosthetic rehabilitation, individual nutritional counseling was

performed by a dietician. Data were again collected and analyzed. A final follow-up was conducted 12 months after prosthetic rehabilitation. This study does not confirm the assumption that the implant-prosthetic rehabilitation of patients with severely reduced residual dentitions with or without an individual nutritional counseling influences nutritional status.^{9,10}

CONCLUSION

Within the limitations of the present study, it can be concluded that comparison of nutritional status of patients wearing complete denture and patients with implant supported overdentures from past 10 year showed non-significant differences. The blood parameters for both the groups were in normal range except for cholesterol.

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