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Assessment of Role of Complete Dentures in Improving the Chewing Efficiency of Edentulous Patients

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Abstract

Introduction:

The loss of teeth leads to difficulty in chewing and smiling and an unesthetic appearance. The present study assessed the role of complete dentures in improving the chewing efficiency of edentulous patients.

Materials and Methods:

Eighty-two complete denture wearers of age group 40–75 years of both genders were enrolled in the study. The chewing efficiency of denture was determined by VMM machine. Patients were provided with the self- administered questionnaire and were advised to answer.

Results:

Out of 82 patients, there were 42 (51.2%) males and 40 (48.8%) females. The mean ± SD particle size was found to be 0.12 ± 0.07 mm in males and 0.13 ± 0.06 mm in females. A non-significant difference was observed ($P > 0.05$). The mean ± SD satisfaction level value was 1.28 ± 0.07.

Conclusion:

There was improved chewing efficiency with the complete denture, and the patient satisfaction level was high among patients.

KEYWORDS: *Chewing efficiency*, *complete denture wearers*, *questionnaire*, *satisfaction level*

INTRODUCTION

The loss of teeth leads to difficulty in chewing and smiling and an unesthetic appearance. With tooth loss, there is decreased vertical dimension and impairment of speech. Complete denture has been considered the best treatment option for partially and completely edentulous patients.[1] Complete denture therapy is considered successful when there is sufficient retention, support, and stability. Complete denture facilitates quality of diet and subsequently patient satisfaction.[2]

It is evident that with the progression of time, there is considerable bone loss. It is commonly seen with mandibular dentures.[3] Unstable denture leads to insufficient mastication and dissatisfaction.[4] With the advancement in prosthodontics, there are multiple treatment options for completely edentulous patients, such as dental implants and implant-supported overdenture. All treatment options have a few advantages and disadvantages over others.[5]

The most important factor that determines the outcome of the denture treatment is chewing efficiency.[6] With efficient chewing patient is able to eat. With that patient is able to maintain sufficient nutrients in the body.[7] With sufficient mastication aided by a complete denture, the purpose of having adequate nutrition is fulfilled. It is evident that a chewing ability of 25% is capable of inducing adequate food digestion.[8] Considering this, the purpose of this prospective study is to assess the role of complete dentures in improving the chewing efficiency of edentulous patients.

Methodology

This prospective, single-center observational study was conducted among 82 complete denture wearers of either gender. Inclusion criteria selected for the study were complete denture wearers of age group 40–75 years of both genders, duration of edentulism not more than 2 years, and those willingly giving their written consent for the participation of the study. Exclusion criteria were patients with implant supported overdentures and those not willing to participate in the study. The duration of the study was 6 months.

Selected patients were instructed to chew 10 g of peanuts with fifty strokes. Care was taken not to swallow peanuts particles. Following chewing, all were advised to spit out the remaining fragments in a bowl. Their dentures were removed and placed in the bowl. Peanuts particles stuck to the denture were collected in the bowl. Those in the oral cavity were rinsed with water, and they were instructed to rinse in the bowl. All the chewed peanuts were carefully collected in the sieve and shifted to a Petri dish that was stored in the incubator for 2 days at 37°C. On the vibration table, the Petri dish containing chewed peanuts was placed for 60 s. The clusters got arranged in vibrator, and the finest particle size got dispersed separately in the Petri dish.

VMM machine was used for the measurement of micro finest chewed particles. Particle size as small as 2 μm was measured. A single particle was selected, and InSpec software was used for the measurement of particle size. The length and width were calculated in micrometers (μm). Two reading of each particle was taken at different times, and the mean was taken as final value. Length and width of each particle were multiplied, and the mean value of ten particles was taken for each patient. After 5 weeks of complete denture usage, chewing efficiency was recorded. Patients were provided with the self-administered questionnaire containing items such as "Change on chewing with the artificial teeth as compared to natural teeth;" "Are you satisfied with the eating habits?"; "Do you feel conscious during chewing with the denture?"; "Do you feel trouble in chewing any kind of food?"; "Do you need for special food preparation in order to make chewing food easier?"; "What is the stability of your denture in eating sticky food?"; "Do you require additional force to swallow the food?"; "Do you ever feel difficulty with the denture between meals?"; "Do you need longer time for chewing food?"; and "Are you embarrassed on having food with others?"

Statistical analysis

A descriptive statistic was used for the study. SPSS version 17.0 was used with the level of significance set below 0.05.

Results

Table 1 shows that out of 82 patients, there were 42 (51.2%) males and 40 (48.8%) females. Table 2 shows that the mean ± SD particle size was found to be 0.12 ± 0.07 mm in males and 0.13 ± 0.06 mm in females. A non-significant difference was observed ($P > 0.05$). Table 3 shows that the mean ± SD satisfaction level value was 1.28 ± 0.07.

Discussion

The number of geriatric populations is on the rise. Subsequently, the cases of edentulism are also increasing day by day.[9,10,11] With the improvement and advancement in prosthetic dentistry, the success rate of prosthetic appliances has increased significantly.[12,13,14] The psychosocial and functional consequences have been overcome by complete denture fabrication.[6,8] The present study assessed the role of complete dentures in improving the chewing efficiency of edentulous patients. Bajoria *et al*.[15] determined the satisfaction level and masticatory efficiency in 30 conventional complete denture wearer patients by using a Likert rating scale (0–5) recorded before starting the treatment, following insertion of the new denture, and 45 days postoperatively. There were 12 males and 18 females. The results of the study showed that the rehabilitation with conventional complete dentures produced an improvement ($P < 0.05$) in satisfaction level and masticatory efficiency.

Our results demonstrated that there were 82 patients, of which there were 42 (51.2%) males and 40 (48.8%) females. Pandey *et al*.[16] conducted a study on 20 completely edentulous patients age ranged 50–70 years and determined the chewing efficiency by scanning the T-scan sensor sheet by using a pressure distribution mapping system software. In all patients, T-scan was recorded at the time of denture insertion, and subsequently, the second and third T-scans were recorded at 3 weeks and 6 weeks in the laboratory. The authors found that the bite scan score in the left and right sides increased slowly after the adaptation of balanced dentures at different follow-ups. The increment of bite scan score was 7.53 for right bite scan (F) and 7.10 for left bite scan (F), which was statistically significant ($P < 0.05$).

We observed that the mean ± SD particle size was 0.12 ± 0.07 mm in males and 0.13 ± 0.06 mm in females. Sharma *et al*.[17] in their study on 15 patients assessed the masticatory bite force, chewing efficiency, and patient satisfaction with conventional dentures and two implant-retained mandible overdentures. Authors determined chewing efficiency between conventional denture and two implant-retained mandibular overdenture by using 6 g of peanuts with 40 chewing strokes. OHIP edentulous patient satisfaction questionnaire was employed for this study. Results demonstrated that there was significantly decreased particle size (76.34%) with implant-supported overdenture as compared to conventional denture. Conventional denture required 69 strokes as compared to 40 strokes by implant-supported overdenture. With implant supported overdenture, higher patient satisfaction score was achieved.

We observed that the mean ± SD satisfaction level value was 1.28 ± 0.07. Pocztaru *et al*.[18] compared the satisfaction levels and masticatory performance in patients with normal dentition and in those with implant-supported overdentures with ball and bar-clip retention systems in 24 subjects. There were 12 edentulous patients and 12 dentate subjects. Satisfaction levels and masticatory performance were calculated with the old dentures, with the unattached new dentures, and with the new dentures with ball and bar-clip attachments. Both masticatory performance and satisfaction levels significantly improved after implant treatment. No significant differences were observed between the overdentures with ball and bar attachments. However, the masticatory performance after treatment was still significantly lower than the performance of the healthy subjects.

Conclusion

Our results showed that there was improved chewing efficiency with the complete denture and that the patient satisfaction level was high among patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Figures and Tables

Table 1

Distribution of patients

Total- 82		
Gender	**Male**	**Female**
Number (%)	42 (51.2%)	40 (48.8%)

Table 2

Assessment of chewing efficiency

Gender	**Mean particle size (LXW) (mm)**	**SD (mm)**	***P***
Male	0.12	0.07	0.91
Female	0.13	0.06	

Table 3

Evaluation of patient satisfaction

Questionnaire	Satisfied (1)	Not sure (2)	Dissatisfied (3)	Total dissatisfied (4)	*P*
Any change on chewing with the artificial teeth as compared to natural teeth	76	6	0	0	0.01
Are you satisfied with your eating habits?	72	5	3	0	0.05
Do you feel conscious during chewing with the denture?	78	4	0	0	0.01
Do you feel trouble chewing any kind of food?	76	6	0	0	0.05
Do you need special food preparation to make chewing food easier?	75	7	0	0	0.04
What is the stability of your denture in eating sticky food?	78	3	1	0	0.03
Do you require additional force to swallow the food?	80	2	0	0	0.01
Do you ever feel difficulty with the denture between meals?	77	4	1	0	0.01
Do you need a longer time for chewing food?	81	1	0	0	0.02
Are you embarrassed about having food with others?	79	3	0	0	0.01