Influence of Mental Status on Removable Prosthesis Compliance in Institutionalized Elderly Persons

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Purpose: It is well-recognized that many institutionalized elderly persons with dementia do not wear dentures. The objective of this study was to evaluate the current status of denture use among elderly patients with dementia, in association with degree of mental impairment, to provide information relating to a decision-making process for optimal denture treatment. ***Materials and Methods:*** From August 2001 to December 2002, 101 hospitalized elderly persons in a geriatric hospital dental clinic received removable denture treatment by two certified prosthodontists. Prior to denture treatment, patient mental status was evaluated using the Mini Mental Status Examination (MMSE). Basic activities of daily living, including mobility, feeding, toilet use, dressing, and bathing, were also evaluated. Denture acceptance was determined 6 months after denture delivery. ***Results:*** Eight patients were excluded; 73 patients had accepted their dentures and 20 had not 6 months after denture delivery. The mean MMSE score for patients who did not accept denture delivery (11.7 ± 7.0) was significantly lower than that of those who did accept and wear their dentures (16.0 ± 6.8). ***Conclusion:*** The cognitive status of institutionalized elderly persons with dementia should be a criterion for clinical decision making relating to denture treatment. *Int J Prosthodont 2005;18:146–149.*

The number of elderly persons has been rapidly increasing in many industrialized countries. In Japan, the mean life span has been the longest in the world for women since 1985 and for men since 1995. The increased life span is potentially problematic for those who need long-term medical and dental care.

Many people lose teeth with age. According to a 1999 national survey in Japan,[1] in those over 80 years old, the mean number of remaining teeth was eight, and almost half were completely edentulous. Similar findings have been reported for other industrialized countries.[2,3] Loss of teeth reduces masticatory capability, subsequently influencing food selection and nutritional status, and may result in protein-energy malnutrition (PEM).[4,5] Previous studies have shown that PEM results in a higher level of mortality for these frail elderly persons.[6,7] Although adequate dental rehabilitation of edentulous patients improves mastication and diet,[8,9] many elderly people who have lost teeth, particularly those who are institutionalized, do not wear dentures.[10,11] These studies suggest that tooth loss can affect quality of life (QOL) for elderly people.

Poor physical and mental function may make dental treatment difficult to perform. A successful treatment program requires good communication among the clinician, the patient, and the patient's family, but well-established data documenting the value of denture use in frail elderly people are scarce. The present study gathered and evaluated information on denture treatment outcomes in a geriatric hospital dental clinic to provide the basis for construction of a clinical decision tree for denture treatment of institutionalized elderly persons.

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Table 1 Comparison of Dependence Characteristics of Patients with Complete and Removable Partial Dentures

Parameter	Complete dentures	Removable partial dentures
Mean age (y)*	85.1 ± 7.2	80.9 ± 7.4
Sex (male/female)	9/37	9/38
Activities of daily living (dependent/independent)		
Mobility	27/19	33/14
Feeding	38/8	40/7
Toilet use	21/25	17/30
Dressing	36/10	36/11
Bathing	9/37	8/39
Mean MMSE score	14.8 ± 7.6	15.3 ± 6.5

*Only mean age was significantly different between patients with complete dentures and those with removable partial dentures ($P = .006$).
MMSE = Mini Mental Status Examination.

Materials and Methods

From August 2001 to December 2002, 101 hospitalized elderly persons (22 men and 79 women; mean age 83 years) received denture treatment in a geriatric hospital dental clinic. One third had not been wearing dentures, and the others had dentures that fit poorly. All were medically stable. Individuals with acute stroke (within 6 months) or degenerative conditions such as Parkinson's disease were excluded. Two prosthodontists certified by the Japan Prosthodontic Society established treatment plans with patient, family, and/or caregiver. Preprosthodontic treatments such as tooth extraction and/or restoration were performed if necessary. Dentures were fabricated by conventional methods, and adjustments after delivery were performed once weekly until any pain or clinical symptoms of discomfort had disappeared.

Prior to denture treatment, the cognitive status of each patient was evaluated using the Mini Mental Status Examination (MMSE).[12] The MMSE provides a quick way to evaluate cognitive function and is often used to screen for dementia. Maximum total score on the exam is 30, and a score of 20 or less usually is understood to suggest dementia. Patients who could not respond to questions on the MMSE were excluded from the analysis. Dependence relating to basic activities of daily living (ADL), including mobility, feeding, toilet use, dressing, and bathing, was also measured.

Six months after denture delivery, denture wear and use at mealtime were evaluated. Baseline characteristics and the ratio of denture wearing were compared between those patients with maxillary and mandibular complete dentures, and those with removable partial dentures using analysis of variance (ANOVA) and chi-square tests. Differences between denture wearers and nonwearers were also evaluated with ANOVA and chi-square tests.

Results

Fifty-two completely edentulous and 49 partially edentulous patients were treated. During the observation period, 3 patients had been discharged, 3 had become unconscious, and 2 had died. Among the remaining 93 patients, 73 had been wearing their dentures, whereas 20 had not.

Comparing the patients with complete dentures ($n = 46$) and removable partial dentures ($n = 47$), the mean age was significantly higher in the complete denture group ($P < .050$), but other factors were not significantly different (Table 1). Prevalence of the patients using dentures did not differ between these groups; 37 (80.4%) had complete dentures, and 36 (76.6%) had removable partial dentures.

Comparing denture wearers and nonwearers in terms of basic ADL, only feeding and dressing differed significantly between the two groups ($P < .050$; Table 2). In addition, patients dependent in terms of basic ADL had significantly lower scores on the MMSE ($P < .050$; Table 3).

Mean MMSE score for denture nonwearers was significantly lower than for denture wearers ($P < .050$; Table 2). When the patients were divided into two groups using an MMSE score of 14 as the cutoff point for severe dementia, patients with a score of 14 or lower were 0.31 times more likely not to wear their dentures (95% confidence interval 0.11 to 0.85); of a total of 73 denture wearers, 32 scored below 14, whereas 14 of 20 nonwearers had a score below this cutoff.

Discussion

The results of this study demonstrated that measurement of cognition function can provide helpful criteria in clinical decision making relating to the advisability of denture treatment for institutionalized elderly

Table 2 Comparison of Dependence Characteristics of Denture Wearers and Nonwearers

Parameter	Wearers	Nonwearers
Mean age (y)	82.5 ± 7.6	84.5 ± 7.3
Sex (male/female)	15/58	3/17
Activities of daily living (dependent/independent)		
Mobility	50/23	10/10
Feeding*	65/8	13/7
Toilet use	32/41	6/14
Dressing*	61/12	11/9
Bathing	14/59	3/17
Mean MMSE score*	16.0 ± 6.8	11.7 ± 7.0

*Dependence in feeding and dressing, and mean Mini Mental Status Examination (MMSE) score were significantly different between denture wearers and nonwearers (P = .016, .010, and .020, respectively).

Table 3 Relationship Between Activities of Daily Living (ADL) and Mean Mini Mental Status Examination (MMSE) Score

Basic ADL	Mean MMSE score		P value
	Dependent	Independent	
Mobility	15.9 ± 7.2	13.5 ± 6.5	.107
Feeding	16.0 ± 6.8	10.2 ± 6.5	.003
Toilet use	17.2 ± 7.8	13.6 ± 6.2	.015
Dressing	16.0 ± 6.7	11.6 ± 7.3	.011
Bathing	17.8 ± 8.6	14.4 ± 6.6	.078

persons. On the basis of these results, we have constructed a decision tree for determining the value of denture treatment for institutionalized elderly individuals (Fig 1).

It is well-recognized that cognitive impairment, particularly loss of executive control function associated with frontal lobe brain damage, is highly correlated with difficulties in instrumental ADL. This function influences the effective use of prosthetic devices such as hearing aids, canes, or walkers.[13] Degree of executive control impairment is an important determinant of variance in level of care received.[14] As the MMSE is a widely used examination worldwide for determining mental status and the examination's score is highly correlated with executive control function in elderly people,[15] we adopted the MMSE score in constructing the decision tree. In general, a low MMSE score will more accurately predict inability to wear dentures than will inability to perform certain ADL, such as eating or dressing independently, which in some instances may result from disabilities unrelated to impaired mental function. For this reason, only MMSE scores were included in our decision tree. Furthermore, several previous studies have shown that positive self-perception of affective status, economic status, and QOL, as well as denture quality, are important predictors of successful denture treatment.[16,17] Therefore, self-perception does form a part of executive control function.

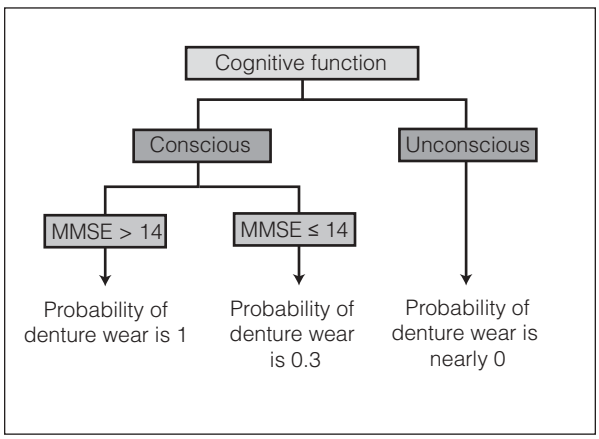

Fig 1 Decision tree for denture treatment of disabled elderly persons based on Mini Mental Status Examination (MMSE) score.

In this study, we were obligated to treat three patients who became unconscious during the observation period because of specific requests from family members wishing to preserve the patient's dignity and natural appearance. The findings obtained can be useful as a tool to document for family members of individuals in a similar condition that such individuals are unlikely to be successful denture wearers. In Japan, it is particularly important to be able to predict

who may be a successful denture wearer because almost all denture treatments are supported by public insurance.

Our goal is to perform denture treatment for this institutionalized elderly population to enhance QOL. It has been demonstrated among community-dwelling elderly people that wearing dentures enhances QOL, so it is reasonable to expect that this may be true for institutionalized elderly people.[18]

In this study, denture treatment included adjustment after denture delivery. We asked patients about painful spots and general comfort of the denture and repeated adjustments until clinical symptoms of discomfort had disappeared. This procedure requires that patients have sufficient cognitive skills to identify and characterize points of discomfort. Patients with an MMSE score of less than 14, which indicates severe dementia,[12] often complained of painful locations that, on physical examination, did not coincide with the actual region of mucosal irritation; as a result, denture treatment failed.

Within the context of the limited results of this study, it can be concluded that frequency of denture wearing will be significantly lower for those patients with an MMSE score of 14 or lower. It is also possible that some nonwearers in this study may still use their old dentures instead of the new ones.[19] Additional longitudinal studies are obviously needed to clarify the stage at which institutionalized patients will no longer wear their dentures. The results of this study suggest that denture treatment can be effective before severe cognitive decline develops. A decision tree constructed from the results of this study may assist patients and their family members in determining whether denture treatment can be usefully performed.

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