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An analysis of satisfaction with complete immediate (over)dentures

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ABSTRACT

Objectives: The purpose of the study was to investigate denture satisfaction related to treatment modality, age, gender, denture quality, chewing ability, denture experience and patients' attitude towards denture wearing.

Methods: In a randomized controlled clinical trial 74 patients who required immediate denture therapy were treated either with complete immediate dentures, or with complete immediate overdentures on the lower canines with and without Dyna Direct[®] magnetic attachments. All patients were evaluated clinically and by questionnaires over a one year period after denture insertion.

Results: Regression analysis showed that the quality of the denture, chewing ability, attitude towards dentures in general and the expectation of the new dentures can explain the variance in denture satisfaction for 23–27%.

Conclusions: It can be concluded that with respect to satisfaction the technical quality of the dentures, as well as patients' previous attitude towards wearing dentures are the most important factors in immediate denture treatment. The treatment modality, having received an overdenture or not, appeared to be unimportant in this respect in the first year after denture insertion. © 1997 Elsevier Science Ltd. All rights reserved.

KEY WORDS: Dentures (complete), Magnets, Clinical evaluation, Function

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INTRODUCTION

Becoming edentulous is an unpleasant event. Besides changes in speech, appearance, taste and salivary flow, as well as the occurrence of pain, becoming edentulous psychologically influences a person. Losing all one's teeth can be experienced as a sign of losing vitality¹ and getting older^{2,3}. Many studies have shown that 20–30% of denture wearers are dissatisfied with the functioning of their dentures^{4–8}.

Many studies are performed on factors related to denture satisfaction in patients who have been edentulous for many years. Correlations between satisfaction and age, gender, denture quality, oral tissue condition, years of denture experience, as well as socio-psychological variables have been studied. In most of these studies the correlations were separately analysed.

The results of these investigations are different. A literature review was recently reported by Berg⁴.

In two studies^{8,9}, several factors explaining (dis)satisfaction with dentures were investigated using multivariate analysis of variance (MANOVA). In Berg's study⁹ more than a hundred different independent variables were evaluated. Four of the variables correlated with satisfaction: aesthetics, speech, patient's health and previous denture experience. When there were aesthetic or speech problems with the old dentures, the patient was more satisfied with the new ones. Healthy patients and patients who have been edentulous for a short period were more dissatisfied with their new dentures. Van Waas⁸ analysed the relationship between the quality of the dentures, the oral condition, patients' experience with dentures, patient–dentist relationship, patients' personality, and their attitude towards dentures, based on 22 variables. He found a correlation between denture satisfaction and the denture quality, the number of previously worn dentures, attitude towards wearing dentures in general and

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expectation for new dentures. Both studies, however, evaluated patients who had been edentulous for some years. Until now no research has been performed on patients who were treated with their initial set of dentures.

In order to obtain insight into the problems a dentist can expect when he removes the patient's remaining teeth and places a complete denture, those variables that possibly interfere with patients' satisfaction with immediate dentures must be studied. For that reason a randomized clinical study was performed in patients who received immediate dentures. The aim of this study was to investigate the variance of denture satisfaction one year after becoming edentulous related to clinical, sociodemographic, and psychological factors.

MATERIAL AND METHODS

For a prospective randomized, controlled clinical trial, 75 patients were selected from the patient population who required immediate denture therapy at the Dental School, University of Nijmegen, The Netherlands. All of the patients had a poor periodontal status and severely decayed teeth. According to the criteria proposed by Brewer and Morrow¹⁰, such as the absence of decay, mobility of less than 2 mm, probing depth of less than 6 mm and surrounding alveolar bone more than 6 mm of the potential abutment teeth, it was not apparent whether an immediate denture or an immediate overdenture was indicated for these patients.

With a balancing procedure¹¹ the patients were randomly assigned into three groups based on the variables of gender, age, periodontal status, participation in health insurance and the presence or absence of teeth in the posterior parts of the mandible. The first group was treated with a conventional complete immediate denture (ID group). The second group was treated with a complete immediate overdenture with the two lower canines as abutment teeth (IOD group). The third group received the same treatment as the second, however nine months after denture placement two Dyna Direct^(®) magnetic attachments (Dyna Dental Engineering BV, Bergen op Zoom, The Netherlands) were inserted in the abutment teeth (IODA group). In the maxilla the patients were already edentulous and received a new maxillary denture, or they were partially dentate and received a complete immediate denture. The treatment was performed by students of the Dental School. All dentures were made according to the 'lingualized occlusion' principles¹². Special attention was paid to the after care; several relining procedures (direct and indirect) were carried out during the first year, depending on the amount of bone reduction. The ID group consisted of 23 patients and the IOD and the IODA groups of 26 patients each. During denture therapy one patient out of the ID group expired. The average scores of the three treatment groups on the

Table 1. Distribution of the treated patients according to the balancing criteria

Treatment group N=74	ID N=22	IOD N=26	IODA N=26
Male	17	16	17
Female	5	10	9
Mean age in years (±S.D.)	56 (±12)	53 (±11)	53 (±11)
Periodontal condition			
Good	5	12	9
Poor	17	14	17
Posterior dentition			
Yes	13	13	13
No	9	13	13
Health insurance			
Public	11	16	13
Private	11	10	13

ID, immediate denture group; IOD, immediate overdenture group; IODA, immediate overdenture with attachments group.

balancing criteria (after exclusion of the patient who died) are presented in Table 1. No statistical differences with regard to these variables were present between the three groups (Chi-square test, $P > 0.05$).

The following variables were considered in the prognosis of denture satisfaction: age, gender, presence of a removable partial denture before treatment, denture quality, chewing ability and attitude towards wearing dentures. These variables were recorded clinically and by means of questionnaires, sampled prior to and one year after denture treatment.

The quality of the new dentures was estimated one year after treatment on a three point scale judged on occlusion and articulation, arrangement of artificial teeth, border length and the fit of the dentures.

Patients' chewing ability was assessed by means of a method described by Olthoff *et al.*¹³. All patients had to chew six cubes made of Optosil^(®) (Bayer, Germany) with ribs of 8 mm and a weight of 4.9 g. Three sets of cubes were offered to each patient. They were recovered after 40, 60 and 80 chewing strokes. The recovered material was washed and dried and then sieved with a set of 14 sieves ranging in mesh width from 11.2 to 0.125 mm. The fractions left in each sieve were weighed. Out of the measurements the theoretical 'median sieve mesh width' was assessed in which 50% of the material would have been passed. The average of the three median sieve mesh widths — after 40, 60 and 80 chewing strokes — was used as a measure for the chewing ability.

With regard to the attitude towards wearing dentures, a questionnaire was filled out by the patients before denture treatment. Eleven statements were given and the patients were asked to agree or disagree with them on a five point scale. A factor analysis was performed which resulted in three factors. These factors were grouped as 'attitude to dentures in general' (five items), 'attitude to the technical aspects of dentures' (three items) and 'expectation of the new dentures' (four items). The reliability coefficients (Cronbach's α) are

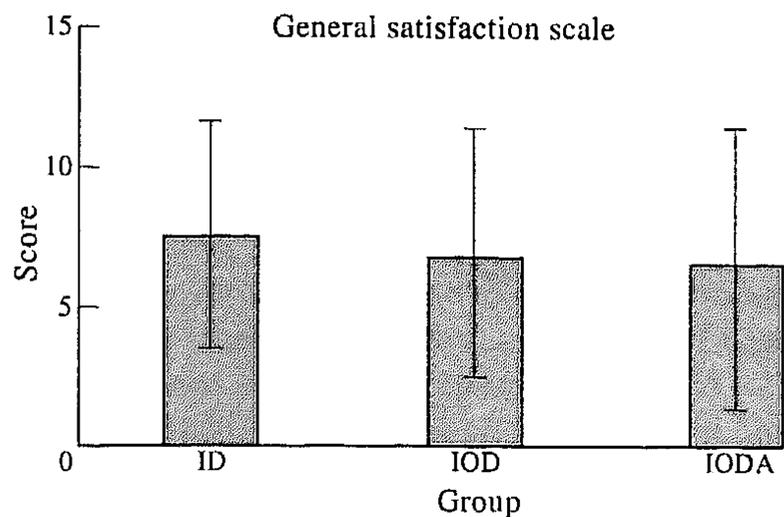


Fig. 1. Average scores and standard deviations for the three treatment groups on the denture satisfaction scale, measured one year after treatment. ID, immediate denture group; IOD, immediate overdenture group; IODA, immediate overdenture with attachments group.

0.68, 0.67 and 0.64. The scale values of the patients' answers were calculated in the sum of the item scores.

With respect to the dependent variable 'denture satisfaction' a scale was constructed of 12 items administered by a questionnaire one year after denture insertion. The items (three and five point scale) concerned patients' opinion with respect to comfort, pain, appearance and chewing ability. A factor analysis was performed with these variables given one factor, which had a Cronbach's α of 0.76 in the reliability analysis. Again, the scores of the answers on the question were added.

The relationship between values on the denture satisfaction scale and the dependent variables was, with the exception of the treatment modality, investigated by means of the Pearson correlation test and multiple regression analysis. The relationship between values on the denture satisfaction scale and the treatment modality was investigated with the use of Scheffe's test.

RESULTS

In Fig. 1 average scores and their standard deviations on the denture satisfaction scale of the three groups one year after denture insertion are presented for the three groups separately. The scale ranges from 3 to 16. The lower the score, the more satisfied the patients are. All groups have a low average score, which could be interpreted as 'satisfied'.

Intercorrelations between the denture satisfaction scale and the independent variables are given in Table II. It demonstrates that denture satisfaction correlates with denture quality, chewing ability, attitude to dentures in general, attitude regarding the technical aspects of dentures, and expectation of new dentures. Treatment modality, age, gender or denture experience did not demonstrate a correlation with denture satisfaction. Furthermore, it can be seen that there was a correlation between the attitude towards denture wearing, quality of the dentures and chewing efficiency. No differences

between the three groups was seen with regard to the denture satisfaction scale (Scheffe's test, $P > 0.017$).

Table III shows the results of the multiple regression analyses. The analyses indicate that quality of the denture and chewing ability, explain the variance of denture satisfaction. With respect to the attitude towards denture wearing, no relationship was found between denture satisfaction and 'attitude in general'. However, in the 'forwards' analysis a relationship between denture satisfaction and expectation, as well as in the 'backwards' analysis with the technical aspects, was found. The positive correlations in Table III can be interpreted as follows: the higher the quality of the denture, the better the chewing ability and the more positive the attitude of the patient; consequently the more satisfied the patients. The percentages of explained variance in denture satisfaction varied between 23 and 27%.

DISCUSSION

In this study patients' opinions about dentures were evaluated one year after inserting immediate (over)dentures. Satisfaction appeared to be high, as reported earlier¹⁴. This perception did not change during the first year. Regarding the tremendous change in function from the dentate to the edentulous state, this is remarkable. No good reason could be determined for this phenomenon, taking into account long-term problems with dentures^{4,8}. In a previously published article¹⁴ it was reported that no differences in denture satisfaction were present between the immediate overdenture groups and the immediate denture group. This finding was the reason for further analysis of the existing data.

In the regression analyses, the three attitude scales towards wearing dentures explained changes in denture satisfaction. Taking Table II into account, it is clear that intercorrelation between the three scales explains this result. In the regression analyses, satisfaction could also be explained by the quality of the dentures evaluated by dentists and by the chewing ability measured by means of the chewing test. Together they explained 25% of the variance. These results agree with those of previous studies performed in groups of patients who were edentulous for many years, and support the assumption that the same factors are important for immediate denture treatment^{4,8}.

It was surprising that the 'attitude towards wearing dentures' was a prospective tool for assessing satisfaction with dentures in immediate denture patients, since they had little, if any, experience with dentures. When the attitude is positive and the patient expects a positive result, the patient will be more satisfied.

These results suggest that dentists should do their utmost in constructing immediate dentures of high quality, including provision of a good balanced occlusion and meticulous follow-up after care. It also

Table II. The intercorrelation between the scores of denture satisfaction scale and the scores of the dependent variables, given in the Pearson correlation coefficients and levels of significance

	<i>Denture quality</i>	<i>Chewing ability</i>	<i>Attitude in general</i>	<i>Attitude technical</i>	<i>Expectation</i>
General satisfaction	0.27*	0.35**	0.27*	0.29*	0.32**
Denture quality	/	0.30*	—	—	—
Chewing ability	0.30**	/	—	—	—
Attitude in general	—	—	/	0.34**	0.58***
Attitude technical	—	—	0.34*	/	0.40***
Expectation	—	—	0.58***	0.40***	/

— Not significant.

* Significant ($0.01 < P < 0.05$).** Strongly significant ($0.001 < P < 0.01$).*** Very strongly significant ($P < 0.001$).**Table III.** Results of the regression analyses

<i>Independent variable:</i>	<i>General satisfaction</i>		
<i>Regression analysis:</i>	<i>Blockwise</i>	<i>Forwards</i>	<i>Backwards</i>
<i>Significance Level:</i>	<i>P</i>	<i>P</i>	<i>P</i>
Dependent variables			
—age	—	—	—
—gender	—	—	—
—having a (partial) denture before treatment	—	—	—
—denture quality	0.03	—	0.02
—chewing ability	0.01	0.001	0.01
—attitude in general	—	—	—
—attitude technical	—	—	0.003
—expectation	—	0.003	—
Explained variance	24%	23%	27%
<i>P</i> -value model	0.02	0.002	0.001

—Not significant

The regression coefficients in case of significant correlations are always positive.

suggests that improving the chewing efficiency of immediate dentures can increase patient satisfaction, although patients are often unaware of that¹⁵. In addition, careful explanation of the limitations of dentures is important for successful treatment.

The fact that no differences in satisfaction were found between the immediate overdenture and the immediate complete denture groups does not imply that overdenture treatment is not beneficial. In a previous paper evaluating overdenture patients we reported positive results with respect to mandibular bone reduction¹⁶. Retention of the roots of the lower canines resulted in reduction of alveolar bone loss to a great extent, which could result in more patient satisfaction.

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