CLINICAL RESEARCH

Conventional Rehabilitation of Edentulous Patients: The Impact on Oral Health-Related Quality of Life and Patient Satisfaction

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Purpose: **This study examined patient satisfaction and oral health-related impacts on the quality of life of patients restored with complete conventional or duplicate dentures.**

Materials and Methods: **Forty patients (aged 55 to 85 years) were assigned to receive new complete maxillary and mandibular dentures using either a conventional or duplication technique according to clinical need. Patients rated their satisfaction with their dentures on 100-mm visual analogue scales before treatment and 1 month after delivery of their new dentures. Their oral health-related quality of life was determined by completion of an Oral Health-Related Impacts on Quality of Life questionnaire (OHIP-20) at the same time points.**

Results: **Both groups of patients had similar satisfaction and OHIP ratings at the beginning of the study and 1 month after delivery of their new dentures. The two groups were comparable with regard to age and gender. Statistically significant improvement in the OHIP domains of functional limitation and physical and psychological disability was seen in both groups. The conventional group also showed significant improvement with regard to handicap, whereas the duplicate denture group showed significant improvement in the patients' rating of pain and psychological discomfort. Patient satisfaction improved significantly in both groups across all variables except ease of cleaning and ability to speak. The duplication technique resulted in patients being less satisfied with the esthetics of their new dentures.**

Conclusion: **In this study, the provision of new dentures either with a conventional technique or with a duplication technique resulted in an overall improvement in oral health-related quality of life and satisfaction. These improvements were statistically significant for some domains, which varied depending on the technique used for construction of the new dentures. Neither technique was seen to be superior, which may be a reflection of the patients' treatment expectations at the outset. Patients' reported satisfaction with their dentures and the impact that dentures have on their quality of life may not be useful measures for determining the most appropriate technique for providing new dentures.**

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INDEX WORDS: edentulism, conventional dentures, duplicate dentures, OHIP-20, satisfaction

STUDIES HAVE shown that there is a poor correlation between patient satisfaction and clinical variables[1] and that clinicians' assessment of the quality of denture-supporting tissues are poor predictors of patients' satisfaction.[2] Prosthodontists and patients also show poor agreement when it comes to the evaluation of individual prostheses.[3] Traditionally, clinicians have assessed prostheses using predetermined criteria for success which usually do not take into account the needs and attitudes of individual patients, for example, resistance to displacement away from the tissues and balanced occlusion.[4,5] The primary goal in therapies for chronic conditions such as edentulism is improvement in that condition rather than cure, and therefore it is patient-based outcomes that are most important.[4]

Parameters such as the patient's personality, the relationship between patient and dentist, and

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the attitude toward new dentures appear to be significant for determining satisfaction when providing new dentures.[6] Success with complete dentures depends largely on the patient's capacity to surmount the many limitations of dentures by the process of habituation.[7,8] The notion that duplicating favorable features of the patient's previous dentures and in particular, the polished surface shape, would facilitate this adaptation process has resulted in the development of duplication techniques.[9,10] The evidence to support this belief is limited, and much is based on clinical observation.[11]

When considering elective treatment, the use of patient-centered outcomes is of particular importance.[12] Patients' satisfaction with their dentures is likely to be affected by their ability to perform certain tasks with them.[13] In these instances the use of patient satisfaction as a primary outcome is appropriate.[14] Feine et al have written, "patient satisfaction with therapy is likely to be the distinguishing outcome of many treatments for chronic diseases for which living with treatment is a more realistic objective than cure."[15] The problems patients encounter with dentures impact on their quality of life, and as these issues are at the forefront of public health policy, their consideration is pertinent.

Patient satisfaction and oral health-related quality-of-life instruments have been developed for use in clinical settings and studies. A validated patient satisfaction instrument has been developed by asking both patients and prosthodontists to list and rank factors they felt determined the success of complete dentures.[16,17] Several studies investigating implant-supported prostheses have used both this and quality-of-life measures to describe the effects of rehabilitation of edentulous patients using implants.[18-20]

Quality-of-life measures assess the impact of disease on peoples' quality of life.[21-23] The OHIP subjective indicator, developed and validated by Slade and Spencer, has been used in many clinical trials.[24-26] The OHIP-20 comprises 20 statements grouped in seven subscales and involves questions concerning the functional limitation, the physical and psychological discomfort, the physical and psychological disability, the social effect of denture wearing on the individual's everyday life, and finally, the degree of handicap. The answers are given by the patients in a Likert response format.[26]

Studies in edentulous subjects strongly support the concept that patient-based measures are more sensitive than functional measures for detecting differences between treatments.[16,17,27]

The aim of the current study was to assess the impact of new complete dentures made by conventional and duplication techniques on patient satisfaction and oral health-related quality of life, the null hypothesis being that neither treatment method will be superior.

Materials and Methods

The study, which had received appropriate ethical approval, was undertaken within the Prosthodontic Unit of the School of Dental Sciences in Newcastle University. Patients were seen in a restorative diagnostic clinic where they were examined and placed on a predoctoral student waiting list. Patients were assigned to students for the replacement of existing dentures using either a conventional or a duplication technique.

Using data from a previous study, it was estimated that 20 patients per group would provide 80% power to detect an effect size of 0.86, assuming a type I error rate of 0.05.

Patients were invited to take part if, during their first appointment, they fulfilled the inclusion criteria given in Table 1.

Patients were provided with full written information, and written consent was obtained. Sociodemographic data, including age and gender, were collected. A standardized denture assessment was undertaken under the following headings: occlusal surfaces, polished surfaces, retention, and stability. Patients were asked to rate their level of general satisfaction with their dentures, and then as separate entities, comfort and stability, ability to chew, clean, and speak with their prostheses. This was marked on a 100-mm visual analogue scale (anchored by the words "completely dissatisfied" at one end of the scale to "completely satisfied" at the other end). They also completed an OHIP-20 instrument.

Administration of these instruments was undertaken by the author (NDP), who was not involved with

Table 1. Inclusion Criteria

- Age between 55 and 85 years
- Edentulous for more than 5 years
- Currently wearing upper and lower complete dentures
- No known history of temporomandibular joint disorders or clenching
- Able to understand and respond to the instruments

Table 2. Pre- and Posttreatment Patient Satisfaction Scores for Both Groups with p Values for Within-Group Difference

	Conventional Group—Mean (SD)			*Duplicate Group—Mean (SD)*		
Variables	*Pretreatment*	*Posttreatment*	*p Value*	*Pretreatment*	*Posttreatment*	*p Value*
Ease of cleaning	83 (27)	89 (11)	0.34	88 (22)	90 (7)	0.58
General satisfaction	33 (41)	63 (28)	**0.014**	39 (40)	77 (26)	**0.001**
Speaking ability	64 (36)	75 (27)	0.19	73 (36)	86 (14)	0.165
Comfort	20 (31)	62 (30)	**0.000**	42 (41)	68 (32)	**0.010**
Esthetics	53 (43)	77 (21)	**0.041**	57 (38)	38 (19)	**0.007**
Stability	32 (52)	68 (25)	**0.000**	29 (35)	60 (33)	**0.007**
Chewing ability	32 (36)	64 (32)	**0.004**	34 (35)	62 (33)	**0.005**

$p \leq 0.05$ shown in bold.

treatment. Data were collected using custom-made data collection sheets. They were completed by the subjects and verified by the author.

Conventional and duplication dentures were provided using standard hospital protocols.

Patients were reviewed, and minor adjustments were made to their dentures as required. When no further adjustment was required or indicated, patients were asked to return for a further review 1 month later. At this visit they were asked to repeat the two instruments.

Data were transcribed onto a spreadsheet and analyzed with available statistical packages (SPSS, SPSS Inc., Chicago, IL). The mean and the SD were calculated as summary statistics for all variables. Between-group variations of the principal outcome measures of patient satisfaction and OHIP scores were tested with independent two sample t-test. The within-group variables were compared using the paired t-test.

Results

Forty-nine patients were recruited to the study, of which 29 received conventional dentures. Nine patients from the conventional denture group were lost from the study; 5 failed to return; 2 were unable to return for health reasons; and 2 refused to complete the second questionnaire. All the 20 patients who received duplicate dentures completed the study.

There was no significant difference between groups for age ($p = 0.665$; conventional group mean age 74.2 ± 7.29 years, duplicate denture group 73.1 ± 8.61 years) or gender distribution ($p = 0.514$).

The pre- and posttreatment patient satisfaction scores and OHIP-20 ratings of the two groups are shown in Tables 2 and 3. There was no significant difference between the groups at the start of treatment ($p > 0.05$).

Both groups showed an improvement across all aspects of the patient satisfaction instrument. With the exception of ease of cleaning and the speaking ability scores, the improvements were all significant. OHIP-20 ratings showed a similar trend with improvements across all domains except social disability in the duplicate group. In the conventional group improvements were

Table 3. Pre- and Posttreatment OHIP-20 Scores for Both Groups with p Values for Within-Group Difference

	Conventional Group—Mean (SD)			*Duplicate Group—Mean (SD)*		
Variables	*Pretreatment*	*Posttreatment*	*p Value*	*Pretreatment*	*Posttreatment*	*p Value*
Functional limitation	13.10 (3.74)	9.85 (4.20)	**0.03**	12.25 (4.22)	8.45 (3.76)	**0.01**
Pain	15.25 (5.09)	12.90 (5.26)	0.14	14.70 (6.52)	10.90 (4.69)	**0.03**
Psychological discomfort	6.55 (3.59)	5.30 (2.72)	0.13	6.22 (4.00)	4.70 (2.32)	**0.10**
Physical disability	14.55 (5.75)	10.00 (4.71)	**0.005**	12.55 (6.29)	8.90 (4.17)	**0.01**
Psychological disability	6.85 (3.32)	4.25 (2.74)	**0.001**	6.05 (3.65)	4.05 (1.93)	**0.01**
Social disability	6.15 (4.23)	4.95 (2.01)	0.27	4.50 (2.35)	5.00 (2.03)	0.38
Handicap	5.45 (3.40)	3.30 (1.42)	**0.01**	3.95 (2.24)	3.65 (1.95)	0.69

$p \leq 0.05$ shown in bold.

Table 4. Between-Group Comparison of Pre- and Posttreatment Changes in Patient Satisfaction and OHIP-20

	Posttreatment Change in Patient Satisfaction—Mean (SD)				*Posttreatment Change in OHIP-20—Mean (SD)*		
Variable	*Conventional*	*Duplicate*	*p Value*	*Variable*	*Conventional*	*Duplicate*	*p Value*
Ease of cleaning	6 (29)	3 (20)	0.63	Functional limitation	−3.25 (6.20)	−3.80 (5.91)	0.81
General satisfaction	30 (49)	38 (46)	0.60	Pain	−2.35 (6.88)	−3.80 (7.15)	0.52
Speaking ability	12 (38)	13 (39)	0.92	Psychological discomfort	−1.25 (3.57)	−1.50 (3.93)	0.41
Comfort	42 (40)	26 (42)	0.25	Physical disability	−4.50 (6.38)	−3.60 (5.90)	0.30
Esthetics	24 (48)	−24 (35)	0.10	Psychological disability	−2.60 (2.96)	−2.00 (3.18)	0.09
Stability	45 (36)	31 (46)	0.28	Social disability	−1.20 (4.73)	0.50 (2.46)	0.08
Chewing ability	32 (44)	27 (31)	0.71	Handicap	−2.15 (3.42)	−0.30 (3.31)	**0.05**

$p \leq 0.05$ shown in bold.

significant for functional limitation, physical disability, psychological disability, and handicap. In the duplicate group, functional limitation, pain, psychological discomfort, and physical and psychological disability demonstrated significant improvement. Nevertheless, posttreatment, the two groups had similar ratings for satisfaction and OHIP-20 ($p > 0.05$).

The pre- and posttreatment changes for satisfaction and OHIP-20 scores are shown in Table 4. The only area in which one treatment offered a significant advantage over the other was with regard to handicap, where the conventional group demonstrated a significantly greater improvement over the duplicate group.

Discussion

In this study, all denture treatments were undertaken by predoctoral dental students. The outcome of treatment was analyzed after only 1 month of function. Other studies using the same patient satisfaction instrument have reviewed patients treated by experienced clinicians 2 and 6 months posttreatment. Similar pre- and posttreatment patient satisfaction scores for patients receiving conventional replacement dentures were reported.[16] The similarity of these results suggests that the use of a shortened review period to determine pre- and posttreatment changes in patient satisfaction is appropriate. The only exception to this is the improvement in speaking ability.

The compliance of patients recruited to the duplicate group was 100%, whereas nearly one-third of patients in the conventional denture group were lost (9 of the original 29 patients). This represents an area of weakness in the study. Five of the "lost patients" failed to return for 1-month review. It is possible to interpret this in one of two ways; either these patients were entirely satisfied with their replacement dentures, or alternatively, they were totally dissatisfied and did not wish to waste more time. An additional two patients were unable to return due to ill health, and the last two refused to complete the second set of questionnaires. It is interesting that the nine who failed to complete the study were from the conventional denture group. The reasons for the differences between the two groups are unclear and purely speculative, but may be related to patients' previous interactions with the dental profession.

In this nonrandomized study, there was no significant difference in satisfaction or OHIP-20 between the two treatment groups at the beginning of treatment. There was, however, a trend that the conventional group had higher OHIP-20 and lower patient satisfaction scores pretreatment as compared with the duplicate denture group. An assumption was made that the patients allocated to the duplicate group had dentures that demonstrated a higher degree of technical "correctness" as assessed by the referring clinician. A consultant in restorative dentistry allocated the patients within this study to treatment groups, and criteria for allocation were not recorded. A subjective analysis of the degree of clinical correctness of the current denture and the clinician's perceived level of patient satisfaction is, however, likely to have influenced their decision. Nevertheless, the previous findings of Heydecke,[2,3] suggest that a clinician's assessment of dentures is a poor predictor of patients' satisfaction. The pretreatment differences demonstrated in this study were not significant when assessed by patient-based measures.

Both groups showed significant increase in all aspects of the patient satisfaction instrument, apart from ease of cleaning and speaking ability, and for the duplicate group, esthetics. The first finding was to be expected as this domain was included in order to provide quality control for the instrument and confirmed that patients could use a visual analogue scale. When the techniques for duplicating dentures were first described, one of the advantages of the technique was claimed to be its ability to reproduce the polished surface shape of the previous dentures and therefore facilitate the adaptive process.[9,10] It was therefore not surprising that no significant changes in the ability to speak were seen, when the polished surface shape had been duplicated in the duplicate dentures. However, speech is a complex skill requiring prolonged adaptation to changes in polished surface shape, thus the lack of significant improvement may very well be due to a shorter review period. Similar failure to see significant improvements in speech has been reported in other studies at early review,[27] whereas studies using a 6-month review period demonstrated significant differences pre- and posttreatment with conventional dentures.[28,29]

A significant decrease in the patients' satisfaction with their duplicate denture esthetics is less easy to understand. Maintenance of the polished surface shape and incisal plane position may have resulted in a degree of disappointment if there was an expectation of change that did not materialize. Alternatively, limitations of the duplication technique may have resulted in inadvertent increase in vertical dimension and, in particular, a lowering of the incisal plane in the maxillary arch.[30]

Both groups also showed an improvement trend across all domains of the OHIP-20 instrument except for social disability in the duplicate group. The magnitude of improvements tended to be greater for the duplicate group in relation to functional limitation, pain, and psychological discomfort. It is suggested that patients attending for replacement of previously satisfactory dentures largely do so because the dentures have become uncomfortable/painful due to ongoing alveolar resorption, poor tissue adaptation, and a tendency toward overextension. Correction of only the fitting surface with duplicate dentures should result in reestablishment of correct extensions and good tissue adaptation. This should reduce pain and functional limitations that occur as a result of pain. Patients wearing dentures that have no beneficial qualities are more likely to experience impacts on their quality of life relating to actual disability. Correction of all aspects is more likely to produce a greater level of improvement in conventional dentures than is seen with duplication techniques.

The differences between treatments were only significant in relation to handicap where the conventional approach appeared to offer advantages over the duplication technique.

There is a belief held by many prosthodontists that patients will adapt better to duplicated dentures, and yet, comparison of the conventional and duplication technique with regard to the number of reviews required shows no difference related to technique.[31] It is also debatable as to what extent the duplication technique is limited in its ability to truly duplicate the previous denture.[30]

Patients' interpretation of the difficulties they experience with their dentures is inherently personal and therefore highly subjective. For comparison, they only have to recall their own dentate or partially dentate state, or their perception of how others manage their complete dentures.

Analysis of patients' satisfaction with dentures and/or the impact dentures have on their oral health-related quality of life is perhaps related more to the extent of their acceptance of denture limitations than it is to the technical correctness of their dentures. What one patient accepts as a normal level of discomfort or handicap, may to another be unbearable. Ultimately, both groups reported improvements in their perception of their oral condition as recorded by the posttreatment satisfaction and OHIP scores. While both techniques offer improvements for deficient aspects of the patients' current dentures, they were both unable to alter the patients' level of acceptance of the generic shortcomings of complete dentures.

Conclusions

One month after delivery, the edentulous patients in this study who received maxillary and mandibular complete dentures using either conventional or duplication techniques showed similar improvements in terms of overall patient satisfaction and oral health-related quality of life. These improvements were statistically significant for some domains and varied depending on the technique used for construction of the new dentures.

Patients' reported satisfaction with their dentures and the impact dentures had on their quality of life might not be useful measures for determining the most appropriate technique for providing new dentures.

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