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Original Article

Patient satisfaction, clinical outcomes and oral health-related quality of life after treatment with traditional and modified protocols for complete dentures

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Abstract *Background/purpose:* Conventional complete denture treatment course requires six appointments, but modified protocol only takes four appointments. This study compared the conventional and modified protocol for complete denture fabrication regarding patient satisfaction and clinical outcomes.
Materials and methods: A total of 24 patients accepted complete denture treatment. According to complete denture treatment protocol, these patients were divided into the conventional group (group C, n = 12) and the modified group (group M, n = 12). Group C used the conventional protocol and required six appointments. Group M used the one-appointment master impression and jaw relation record technique, and it took four appointments. Data of oral health impact profile-14 (OHIP-14), satisfaction scale and the number of recalls in the first year were collected for the statistical analysis.
Results: The mean OHIP-14 scores in group C and group M were 13.79 ± 3.81 and 15.33 ± 5.25, respectively. In terms of satisfaction, the mean scores in group C and group M were 8.33 ± 0.61 points and 8.66 ± 1.13 points, respectively. There were no statistically significant differences between the group C and M in terms of participant ratings for satisfaction and OHIP-14. At the same time, the results indicated that group M significantly reduced the number of postinsertion visits ($P < 0.05$).

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Conclusion: In terms of OHIP-14 and patients' satisfaction, the modified treatment protocol is comparable to the conventional protocol. Based on the number of recalls in the first year, the modified treatment protocol has a better clinical outcome.

Introduction

According to statistics from the Science and Technology Research Project commissioned by the Ministry of Health and Welfare, the proportion of fully edentulous patients aged over 65 years in Taiwan reached 42.3% between 2015 and 2016.[1] Fully edentulous patients experience chewing difficulty and malnutrition, and the quality of life is greatly affected. With the rise in the proportion of the elderly population, there is a need and necessity for treatment involving conventional complete dentures. Elderly patients often have problems, such as reduced mobility and poor health, and family members or caregivers have to accompany them during dental appointments. If the number of visits are reduced, not only patient could be rehabilitated as soon as possible, but also family members could save time.[2–4]

There are many different prosthetic procedures for denture fabrication, and they can be divided into the following three categories: conventional, modified, and simplified.[5–8,13,14] The conventional procedure for making complete dentures requires six visits (impressions of the preliminary cast, final impressions with border molding, recording of the jaw relationship, esthetic try-in of the anterior teeth area, try-in of wax dentures, and delivery of definite dentures).[5] If multiple treatment procedures are combined in one appointment, it is called a modified protocol. Harvey and Brada proposed a modified protocol in which the esthetic try-in step is omitted, and the final impression and recording of the jaw relationship are combined in a single visit. Thus, the complete denture can be delivered in four appointments.[7] In addition, simplified edentulous treatment has modified the denture fabrication process to three appointments by combining the preliminary impression, border molding, final impression, and recording of the jaw relationship steps in the same appointment and eliminating the esthetic try-in step.[2–4]

Although reducing the number of visits could decrease patient inconvenience, it needs to be determined whether this reduction will affect the final treatment outcome and patient satisfaction and will require more visits to adjust the dentures after delivery. Most of the literature focuses on patient satisfaction and oral health-related quality of life among different protocols.[9–12] There is still limited literature on the difference in the number of visits within 1 year after delivery among different treatment procedures. The purpose of this study was to compare the conventional and modified protocols with regard to outcomes in terms of oral health impact profile-14 (OHIP-14), satisfaction, and the number of return visits.

Material and methods

Participants and data collection

This cross-sectional study was approved by the Human Test Committee of Chi Mei Medical Center (IRB number 10707—013) and was carried out between August 2018 and July 2019. The inclusion criteria were as follows: age over 30 years, regular follow-up visits for at least 1 year, a fully edentulous ridge in the maxilla or mandible, treatment by the same prosthodontist, good physical and mental health, ability to understand questionnaire contents, and regular denture wear. The exclusion criteria were missing teeth without prosthetic treatment, implant-assisted overdenture, and inability to communicate well. Patients were called for a revision, and all participants submitted a written consent form. Reviewing the complete denture treatment protocol, the patients were divided into two groups. In the conventional group (group C, $n = 12$), the treatment protocol involved the following six visits: impressions of preliminary cast, final impression with border molding, recording of the jaw relationship, esthetic try-in of the anterior teeth area, try-in of wax dentures, and delivery of definite dentures. In the modified group (group M, $n = 12$), the treatment protocol involved the following four visits: impressions of preliminary cast; final impression with border molding, and recording of the jaw relationship in one appointment; try-in of wax-dentures; and delivery of definite dentures. In this group of study, we used the one-appointment master impression and jaw relation record technique by Harvey and Brada.[7] After preliminary impressions were completed, occlusion rims were fabricated by visible light-curing resin. At the second appointment, the occlusion rims were used to determine vertical dimension and make final impression with border molding. After the impressions were completed, final jaw relationship record was made. Both groups did not undergo a clinical remount procedure.

The data also collected from these patients included follow-up period, gender, systemic diseases, denture-wearing habits, and opposing dentition records.

Oral health impact profile-14

This questionnaire survey was used to investigate the patients' oral health-related quality of life after receiving complete dentures. This questionnaire is composed of 14 questions (7 classifications: function limits, physical pain, psychological discomfort, physical limitations, psychological limitations, social limitations, and disability), which

represent different categories of oral function and quality of life. Patients were asked to consider questions, such as speech function, taste, discomfort during chewing, and dentures. The answers were on a Likert scale from 0 to 4 (0, no; 1, almost none; 2, occasional; 3, regular; and 4, very frequent), with a total score between 0 and 56 points.

Satisfaction scale

A visual analog scale from 0 to 10 was used to investigate patients' satisfaction with the complete denture and prothesis fabrication process. A higher score indicates a higher level of satisfaction.

Recalls in the first year

The number of return visits were recorded at 3, 6, and 12 months following denture delivery in the first year.

Statistical analysis

The collected data were analyzed using IBM SPSS Statistics 25 software (IBM Corp., Armonk, NY, USA). A Mann–Whitney *U* test was used to assess whether there were statistical differences between the two groups.

Results

The mean ages of patients in group C and group M were 64.41 ± 11.38 years and 72.16 ± 8.78 years, respectively (Table 1).

In terms of denture-wearing habits, 75% of the participants in both groups had a habit of wearing dentures for a long time. With regard to the other 25%, dentures were mainly used when eating or going out in group C and when eating in group M (Table 2).

The mean total OHIP-14 scores in group C and group M were 13.79 ± 3.81 and 15.33 ± 5.25, respectively. In group M, poor performance was noted in five classifications (physical pain, psychological discomfort, psychological limitation, social limitation, and disability), as well as the total score (Table 3). However, there were no statistically significant differences between the two groups in terms of the seven classification assessments or the total score ($P = 0.843$).

Table 1 Characteristics of the study population (n = 12 in each group).

	Group C	Group M
Age (years), mean ± SD	64.41 ± 11.38	72.16 ± 8.78
Sex, n (%)		
Male	6 (50%)	3 (25%)
Female	6 (50%)	9 (75%)
Disease, n (%)		
Hypertension	5 (41.6%)	6 (50%)
Heart disease	3 (25%)	3 (25%)
Diabetes mellitus	3 (25%)	2 (16.6%)
Others	1 (8.3%)	2 (16.6%)

Table 2 Wearing habits for complete dentures.

	Group C	Group M
Eating only, n (%)	0 (0%)	3 (25%)
Eating and social contact, n (%)	3 (25%)	0 (0%)
Most of the time, n (%)	9 (75%)	9 (75%)

Table 3 Quality of life.

OHIP-14	Group C	Group M	P value
Functional limitation	2.00 ± 0.95	1.75 ± 1.06	0.443
Physical pain	2.71 ± 1.36	2.75 ± 1.14	0.932
Physical discomfort	1.75 ± 0.87	2.83 ± 1.29	0.514
Physical disability	2.67 ± 1.83	2.50 ± 1.78	0.843
Psychological disability	1.75 ± 0.75	2.98 ± 1.38	0.843
Social disability	1.50 ± 0.80	1.85 ± 1.08	0.932
Handicap	1.50 ± 0.90	1.83 ± 1.15	0.932
Total score	13.79 ± 3.81	15.33 ± 5.25	0.843

Data are presented as mean ± standard deviation.
Abbreviation: OHIP-14, oral health impact profile-14.

In terms of satisfaction, the mean scores in group C and group M were 8.33 ± 0.61 points and 8.66 ± 1.13 points, respectively (Table 4). There was no statistically significant difference in the score between the two groups ($P = 0.932$).

In the first year, the cumulative number of return visits in group C and group M were 4.16 ± 0.83 and 2.83 ± 1.46 at 3 months, 5.58 ± 1.72 and 3.66 ± 1.87 at 6 months, and 7.41 ± 1.92 and 4.75 ± 2.34 at 12 months, respectively (Table 5). Group C had more return visits than group M, and there was a statistically significant difference between the two groups ($P < 0.05$).

Discussion

According to the results of this study, there was no statistically significant difference between group C and group M in the OHIP-14 and satisfaction scores. Group M had significantly fewer return visits than group C in the first year of denture delivery.

The protocol adopted by group M in this study is based on Harvey and Brada's technique, combining the final impression and recording of the jaw relationship in one appointment. It can reduce the number of visits, but the accumulative chair time for denture fabrication was not significantly different between the two groups.[7] Nevertheless, elderly patients often need family members to accompany them during dental appointments. If the

Table 4 Patient satisfaction after complete denture therapy.

	Group C	Group M	P value
Satisfaction	8.33 ± 0.61	8.66 ± 1.13	0.932

Data are presented as mean ± standard deviation.

Table 5 Return visits in the first year after denture delivery.

After delivery	Group C	Group M	P value
0–3 months	4.16 ± 0.83	2.83 ± 1.46	0.014*
0–6 months	5.58 ± 1.72	3.66 ± 1.87	0.024*
0–12 months	7.41 ± 1.92	4.75 ± 2.34	0.014*

Data are presented as mean ± standard deviation.
*indicates a significant difference in the number of return visits ($P < 0.05$).

number of visits are reduced, inconvenience, transportation fee, and the risk of infection with an epidemic disease could be decreased.

Ceruti et al. compared simplified edentulous treatment (SET) with conventional procedures and found no significant difference in satisfaction between them, but SET had significantly less overall treatment time.[4] SET combines the first three steps of the conventional protocol into one appointment, and it can complete the treatment in only three visits. When compared with group M that had four visits, it is not necessary to obtain a study cast.

However, no matter which treatment protocol is used, initial consultations, explanation, and clinical oral examination are necessary when treating edentulous patients. Therefore, the treatment course for SET is practically four visits. In this study, for group M, the examination visit was used to pour the study model at the same time, and the total treatment visits was also four.

According to the OHIP-14 results in this study, group M had poorer performance in five classifications out of seven classifications as compared with group C. This could be due to a difference in mean age between the two groups. However, there were no statistically significant differences in OHIP-14 and satisfaction scores, indicating that after the appropriate clinical operation, results similar to those in group C can be obtained.

This study also compared the difference in cumulative return visits within 1 year between the two groups. Group M had fewer visits at 3, 6, and 12 months as compared with group C. Most complaints in both groups were associated with sore spots caused by dentures, which may have been caused by occlusion errors. Occlusion errors may be due to warping of the record bases, issues with fitting of the record bases in the master cast, and recording errors of the jaw relationship.[15,16] With the combined procedure of final impression and jaw relation record, fitting of the record bases in the master cast can be ignored, because the master cast is poured after the interocclusal records and master impressions are completed.[7]

Another possible reason for fewer return visits in group M is that the impression material improved the stability of the base plate, so the error of the jaw relationship was less. Although we could correct errors of the maxillomandibular relationship at the try-in wax denture appointment, it is still difficult to be aware of minor errors in occlusion. Because edentulous ridges are covered by mucosa, which are displaceable and resilient, wax dentures might settle into the tissues and minor occlusal errors might not be detected during the treatment procedure. However, literature on the comparison of the number of return visits among different treatment methods is still limited.

According to a systematic review by Verhaeghe et al., clinical remount is recommended when comparing cumulative return visits. A clinical remount can help patients adapt to new dentures and reduce return visits.[17] In this study, both groups did not undergo the clinical remount procedure in order to decrease chair time or prevent an additional appointment. However, there may be other factors affecting return visits, such as the degree of ridge resorption, duration of wearing dentures, soft tissue quality, and saliva secretion.[16] Therefore, subsequent studies involving the cumulative number of follow-up visits could focus on these factors.

There are some limitations inherent to this research. The total number of participants in our study was low at only 24, which is because of the inclusion of cases completed by one operator. The education level and distribution of the subjects were not investigated, and the OHIP-14 results before the start of treatment were not compared to the final treatment results. Both these factors may affect the results of the OHIP-14 questionnaire. Moreover, factors, such as convenience and place of residence of the participants, may affect the cumulative number of return visits within a year. There is no assessment instrument to analyze the accumulative time of denture fabrication for comparison with the number of visits to determine the most appropriate approach for elderly patients.

In conclusion, the modified treatment protocol has oral health-related quality of life, and overall satisfaction results similar to those with the conventional treatment protocol, and the modified treatment protocol has fewer return visits within a year. Therefore, after the appropriate clinical operation, the modified treatment protocol could be adopted in daily practice.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

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