

Effect of Complete Denture Therapy on Oral Health-Related Quality of Life of Edentulous Patient

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Abstract

Edentulism is one of the most important oral health challenges, which results in adverse social and psychological consequences. A conventional complete denture is utmost usually used treatment modality for these patients. A few studies assessed the quality of life of patients before as well as one month after complete denture therapy. This study aimed to assess the consequence of complete denture therapy on oral health-related quality of life of edentulous patients. This study was conducted on 43 edentulous patients in 2018-2019 who met the inclusion criteria. After obtaining their written informed consent and ethical approval from the university's medical ethics committee, patients were requested to fill out the standardized Persian version of the oral health impact profile-14 (OHIP-14) questionnaire before as well as one month after the delivery of complete denture via an interview. Data were analyzed using SPSS version 21 via the Wilcoxon and Mann Whitney U tests. The total score of quality of life (OHIP-14) of patients considerably improved after treatment ($P < 0.001$). The quality of life of patients significantly improved in all domains ($P < 0.001$) except for functional limitation ($P = 0.122$) and physical pain ($P = 0.009$) domains, which had a more favourable status before the denture delivery. The difference in OHIP-14v + total score of patients was significant regarding sex and age before ($P = 0.004$ and $P = 0.006$, respectively) and after ($P = 0.022$ and



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P=0.007, respectively) denture delivery. Edentulous patients showed an improvement in oral health related quality of life at one month after denture delivery.

Introduction

Oral health-related quality of life (OHRQOL) refers to the subjective thoughts and beliefs about oral and dental status. The OHRQOL allows a comprehensive assessment of oral health and function. It includes the clinical aspects and individual perceptions of general health affected by the oral health status. Oral health affects the function (such as biting, chewing and speech), psychological wellbeing (such as self-confidence plus satisfaction with personal appearance), social wellbeing as well as oral health-related pain and discomfort.^{1, 2} Thus, it can be used for the assessment of the efficacy of treatments as well. This index plays a key role in decision making as an adjunct to clinical examination especially in the elderly.³ Several questionnaires are available for assessment of the quality of life. The Oral Health Impact Profile (OHIP), Oral Impacts on Daily Performance also Geriatric Oral Health Assessment Index (GOHAI) are among the most commonly used questionnaires for this purpose.^{1, 4, 5} The OHIP-14 is a reliable truncated version of OHIP.⁶ The most important feature of OHIP is that it enables the measurement of patients' knowledge about the improvement or deterioration of their oral health.^{1, 7}

Edentulism results in the loss of integrity of the masticatory system and has adverse esthetic consequences.⁸⁻¹¹ It also reminds the patients about the upcoming edentulism as they age. Accordingly, edentulous patients are petrified of being seen without denture even by their closest family members.⁹⁻¹¹ Tooth loss is the most important age-related change that occurs in the elderly.¹ Despite the increasing use of dental implants, the conventional complete denture is the utmost usually used treatment modality for edentulous patients.¹² Outcome of complete denture therapy depended on the clinician clinical assessment in the past, and the patients' opinion regarding their oral health status and OHRQoL were often disregarded. Nonetheless, recent studies have focused on use of patient-centred assessment methods in studies evaluating the outcomes of preventive as well as therapeutic

programs including complete denture therapy (CDT) intended to improve oral health.¹³ It has been shown that patient satisfaction with complete denture should be evaluated based on OHRQoL.¹⁴ Moreover, it is suggested that the evaluation of OHRQoL is a determinant factor in clinical practice.¹⁵

Several studies have been conducted on the CDT on OHRQOL.¹⁶⁻²³ Studies assessing the changes in the quality of life following CDT have reported controversial results with regard to the minimum time required for improvement of OHRQOL. In general, most of the studies showed an improvement in quality of life after CDT, and most of them assessed the OHRQOL in a longer period of time after CDT.^{16, 17, 19} However, the first month after CDT (the adjustment period) is a very critical time period for the patient adaptation to his prosthesis.²⁴ If the patient is not satisfied with his prosthesis in this time period, it may result in failure. The current study is among a few that performed such an assessment before and one month after CDT by use of OHIP.¹⁵ Thus, this study aimed to assess the effect of CDT on OHRQOL of edentulous patients.

Materials and Methods

This prospective (before-after) study evaluated 43 patients presented to the School of Dentistry seeking CDT during 2018-2019. The sample size (considering power at 90%) was calculated based on following formula and considering the study of Shigli *et al.*¹

$$n = (Z_{1-\alpha/2} + Z_{1-\beta})^2 (SD_{\text{after denture}}^2 + SD_{\text{before denture}}^2) / (\mu_{\text{after denture}} - \mu_{\text{before denture}})^2$$

$$n = (1.96 + 1.28)^2 (2.29^2 + 3.75^2) / (30.19 - 27.48)^2 = 28$$

$$n + 5 \times p = 28 + 5 \times 3 = 43 \text{ patient}$$

The sampling was stopped when the required sample size was reached. The study was approved by the medical ethics committee of Guilan University of Medical Sciences (IR.GUMS.REC.1396.118).

The inclusion criteria were (I) patients who had no previous history of denture use and had no systemic condition affecting their oral health and function, and (II) patients who met the class I prosthetic diagnostic criteria.²⁴ The exclusion criteria were (I) unwillingness to participate in the study, (II) mood swings affecting the questionnaire scores as in psychological conditions, which were asked from patients according to the Anamnesis method, (III) poor bone quality of the residual ridge, (IV) having complete denture of one jaw and (V) temporomandibular joint problems.

Patients signed informed consent forms prior to enrollment. The objectives of study were explained to patients as well as after obtaining their consent, their sociodemographic information including age, gender and level of education were recorded.

The OHRQOL of patients was evaluated using the Persian version of OHIP-14 questionnaire provided by Motalebnejad *et al.*²⁵ The standard Farsi version of OHIP-14 included seven domains of functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.

Patients responded to questions in the questionnaire before and one month after CDT via an interview. The questionnaire was scored using a Likert-scale scoring system. Each question was allocated a score from 0 to 4. Score 0 indicated maximum satisfaction with life while score 4 indicated the lowest level of satisfaction with life. Thus, each domain's score ranged from 0 to 8 and the total score ranged from 0 to 56. Patients responded to each question by reporting the frequency of experiencing a particular condition/problem as never (score 0), rarely (score 1), sometimes (score 2), most of the time (score 3), and almost always (score 4).

Three instructors were calibrated for the treatment protocol adopted in this study. Dental students fabricated the conventional complete dentures under the supervision of the instructors. Dentures were fabricated according to the standard protocols.²⁴ The patients were recalled 24 hours after their prosthetic delivery for assessment, and small necessary adjustments were made. The patients were requested to show up after one month for

postoperative assessment and filling out the questionnaire for the second time.

Data were analyzed using SPSS version 21. Based on the Shapiro-Wilk test, data were not normally distributed. Wilcoxon test was used to compare OHIP-14 total score and domain scores before and after CDT. Mann-Whitney U test was used to compare OHIP-14 score regarding age and sex, and Wilcoxon test was used to compare OHIP-14 score regarding education level. The level of significance was set at 0.05.

Results

The mean age of patients was 60.7±6.4 years (range 45 to 73 years). There were 31 males (72.1%) and 12 females (27.9%). The level of education of the majority of patients was below high school diploma (n=23, 53.5%); 11 (25.6%) had high school diploma and 9 (20.9%) were illiterate.

Items with the lowest frequency (rarely or never answer choices) before treatment were related to inability to perform tasks (n=33) and oral pain (n=32) while the inability to perform tasks (n=42) and dissatisfaction with life (n=42) had the lowest frequency after treatment.

Comparing the frequency distribution of each item before and after complete denture therapy revealed significant differences in all items except for difficulty in pronunciation and pain when eating (P<0.001). The sense of taste improved after treatment. The ratio of the number of patients with improved sense of taste to those with deteriorated sense of taste was 8:22. However, the situation was reverse for all other items since their score significantly improved after treatment compared with before.

Based on comparing the status of different domains before and after CDT, the number of patients who reported an improvement in psychological discomfort (P<0.001), physical disability (P<0.001), psychological disability (P<0.001), social disability (P<0.001) and handicap (P<0.001) was significantly higher than the number of patients who reported deterioration of the abovementioned domains. However, the change in functional limitation after treatment was not significant compared with before (P=0.122) while the status of psychical pain before

treatment was better than that after treatment (P=0.009). The total score of OHIP-14 in patients improved after treatment compared with before (P<0.001).

As shown in Table 1 (comparing the mean score of domains and the total score of OHIP-14 before and after CDT), the mean score of functional limitation and physical pain increased after treatment, which

indicated deterioration of these two domains after treatment. However, other domains significantly improved after treatment and their mean score decreased after treatment compared with before. Moreover, The Mean (\pm standard deviation) OHIP-14 total score decreased after treatment (13.63 \pm 6.78) compared with before (23.04 \pm 11.50), which indicated an improvement in quality of life after treatment.

Table 1: Comparison of the score (mean \pm standard deviation) of OHIP-14 domains and its total score before and after complete denture therapy

Score	Mean \pm SD before treatment	Mean \pm SD after treatment	P
Functional limitation	2.53 \pm 1.70	3.02 \pm 1.39	0.122
Physical pain	2.07 \pm 1.67	2.81 \pm 1.53	0.009
Psychological discomfort	4.30 \pm 2.54	2.02 \pm 1.54	0.0001
Physical disability	4.07 \pm 2.21	1.81 \pm 1.26	0.0001
Psychological disability	4.56 \pm 2.35	2.16 \pm 1.65	0.0001
Social disability	3.37 \pm 2.23	1.21 \pm 1.19	0.0001
Handicap	2.16 \pm 1.85	0.58 \pm 0.85	0.0001
OHIP-14 total score	23.07 \pm 11.50	13.63 \pm 6.78	0.0001

The difference in OHIP-14 total score was significant for gender (P=0.022) and age (P=0.007) before and after (P=0.004 for gender and P=0.006 for age) treatment such that males and those over 60 years

had significantly higher quality of life before and after treatment. However, the change in OHIP-14 score had no correlation with age, gender or level of education (P>0.05, Table 2).

Table 2: Changes in OHIP-14 score (mean \pm standard deviation) based on gender, age and level of education

		OHIP-14 score treatment score	P	OHIP-14 score after treatment	P	Change in OHIP-14 before	P
		Mean \pm SD		Mean \pm SD		Mean \pm SD	
Gender	Female	29.42 \pm 4.96	0.022	18.25 \pm 4.52	0.004	11.17 \pm 5.31	0.343
	Male	20.61 \pm 12.40		11.84 \pm 6.71		8.77 \pm 7.95	
Age group	<60 years	27.76 \pm 10.32	0.007	16.48 \pm 5.76	0.006	11.29 \pm 7.58	0.108
	>60 years	18.59 \pm 10.96		10.91 \pm 6.67		7.68 \pm 6.78	
Level of education	Illiterate	22.33 \pm 10.95	0.956	13.89 \pm 6.27	0.688	8.44 \pm 5.88	0.816
	Under high-school diploma	23.57 \pm 11.12		14.26 \pm 6.94		9.30 \pm 7.57	
	High-school diploma	22.64 \pm 13.65		12.09 \pm 7.20		10.55 \pm 8.34	

Discussion

Patient-based assessment is imperative for evaluation of health status and response to

treatment. Oral conditions have physical as well as social, financial and psychological impacts. Thus, this study assessed the opinion of patients

about their CDT to assess the possible effects of conventional denture therapy on health and different aspects of the quality of life of patients.

The most important finding of this study was an improvement of quality of life of patients at one month after CDT, which was in agreement with the results of previous studies by Shigli *et al.*,¹ who used GOHAI, Ellis *et al.*,²¹ who used OHIP-20 and Sivakumar *et al.*,¹⁴ who used OHIP EDENT. Some other studies with a 6-month follow-up also showed improvement in the quality of life of patients.^{6, 26}

A statistically significant improvement was noted in psychological discomfort, physical disability, psychological disability, social disability and handicap domains. Improvement in these domains indicates that patients had significantly fewer concerns, anxiety, excitement/frustration, and embarrassment about their oral problems or denture after treatment, and their social quality of life improved. The results also revealed that the patients' irritability with friends and family decreased and in general, the patients' enjoyment of life increased. The same results were reported by Adam *et al.*²⁷ Physical pain and functional limitation were the two domains that deteriorated after treatment in our study and patients had the most serious problems in these domains after treatment; however, this deterioration was only significant for the physical pain domain. Adam *et al.*²⁷ and Perea *et al.*²⁰ reported the same results, which may be due to the presence of denture pressure points and subsequent ulceration and traumatization of tissue, which commonly occur following the use of a new denture. Changes in score of some domains 2 to 3 months after using a new denture are also expected. For instance, the physical pain probably decreases after several denture adjustment sessions and adaptation of patient to it.²⁷

The two items that significantly worsened after treatment included the second item (impaired sense of taste) and the third item (oral pain), which were expected because dentures have poor thermal conductivity^{28, 29} and probably traumatize the tissue early after delivery. In the study by Shigli *et al.*,¹ speech was the only item that deteriorated after treatment, while the change in this item was not significant after treatment in our study. Evidence shows that 2 to 4 weeks is required for correct speech and 6 to 8 weeks is required for easy

mastication after denture delivery.³⁰ Our findings and those of Shigli *et al.*,¹ in this respect may be due to the short follow-up period and these items may improve with time.

In this study, the most commonly reported problems by patients after treatment included oral pain (third item), difficult pronunciation (first item) and impaired sense of taste (second item). In the study by Adam *et al.*,²⁷ oral pain acquired the first rank in terms of patient's most common post-treatment complication. However, Perea *et al.*²⁰ reported that difficult pronunciation and impaired sense of taste were the most commonly reported complications after treatment. Knowledge in this respect can help clinicians predict the complications that may occur after denture delivery and find strategies to decrease their risk.

The current results also showed that the mean scores of patients were significantly different in terms of age such that patients <60 years reported a lower quality of life both before and after treatment but the difference in the mean scores before and after treatment was not significant. This finding highlights the fact that edentulism has a significant negative impact on the quality of life of younger individuals compared with older ones. On the other hand, one may believe that adaptation decreases with age; however, younger individuals showed higher quality of life even after treatment, which may be due to their higher level of expectation than the elderly. In a similar study, Adam *et al.*²⁷ reported that patients under the age of 60 years had a more inferior quality of life in all domains except for functional limitation, which was in agreement with our results. However, they did not report any significant difference in the mean score of domains after treatment except for psychological disability, which was more deficient in patients younger than 60 years. Some other studies did not report a correlation between the age of patients and their quality of life.^{6, 20, 31}

In the present study, the majority of patients were males (72%). Males reported a higher quality of life before and after treatment. However, the change in OHIP-14 total score after treatment compared with before was not significant based on gender. In a similar study, Petricevic *et al.*²⁶ reported that the OHRQOL in females was significantly lower than in males before treatment and remained low even

6 months after treatment, which was in line with our results. This finding can be explained by the fact that reduction or elimination of oral problems and improvement of oral health cannot significantly decrease all concerns of female patients and they still consider edentulism and use of complete denture as a type of disability, which would result in their discomfort, dissatisfaction and decreased quality of life. Moreover, in the present study, level of education of the majority of patients (53.5%) was below high-school diploma and none of them had college/university education. No significant differences were noted between the patients regarding level of education, which was in agreement with the outcomes of other studies.^{6, 20, 30}

There are some limitations for this study. The patients were edentulous for different periods of time. It may affect clinical parameters (including ridge resorption rate) and patient adaption with the complete denture. However, it was tried to control it by considering the inclusion criteria in the present

study. Another limitation was relatively small sample size.

Within the limitations of this study, it may be concluded that according to the OHIP-14 score, the OHRQOL of patients significantly improved after complete denture therapy; the only exception was the physical pain domain.

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Conflict of Interest

The authors do not have any conflict of interest.

References

1. Shigli K., Hebbal M. Assessment of changes in oral health-related quality of life among patients with complete denture before and 1 month post-insertion using Geriatric Oral Health Assessment Index. *Gerodontology*. 2010;27(3):167-73.
2. Awad M., Locker D., Korner-Bitensky N., Feine J. Measuring the effect of intra-oral implant rehabilitation on health-related quality of life in a randomized controlled clinical trial. *J Dent Res*. 2000;79(9):1659-1663.
3. Gil-Montoya J.A., de Mello A.L.F., Barrios R., Gonzalez-Moles M.A., Bravo M. Oral health in the elderly patient and its impact on general well-being: a nonsystematic review. *Clin Interv Aging*. 2015;10:461.
4. Komagamine Y., Kanazawa M., Kaiba Y., Sato Y., Minakuchi S., Sasaki Y. Association between self-assessment of complete dentures and oral health-related quality of life. *J Oral Rehab*. 2012;39(11):847-857.
5. Viola A.P., Takamiya A.S., Monteiro D.R., Barbosa D.B. Oral health-related quality of life and satisfaction before and after treatment with complete dentures in a Dental School in Brazil. *J Prosthodont Res*. 2013;57(1):36-41.
6. Dable R.A., Nazirkar G.S., Singh S.B., Wasnik P.B. Assessment of oral health related quality of life among completely edentulous patients in Western India by using GOHAI. *J Clin Diagn Res*. 2013;7(9):2063.
7. Kurushima Y., Matsuda K-i., Enoki K., Ikebe K., Maeda Y. Does case severity make a difference to clinical improvement following complete denture treatment? *Int J Prosthodont*. 2015;28(2).
8. Jafarian M., Etebarian A. Reasons for extraction of permanent teeth in general dental practices in Tehran, Iran. *Med Princ Pract*. 2013;22(3):239-244.
9. Thorstensson H., Johansson B. Why do some people lose teeth across their lifespan whereas others retain a functional dentition into very old age? *Gerodontology*. 2010;27(1):19-25.
10. Emami E., de Souza R.F., Kabawat M., Feine J.S. The impact of edentulism on oral and general health. *Int J Dent*. 2013;2013.
11. Makhviladze G., Tsitaishvili L., Margvelashvili V., Kalandadze M. Evaluation of edentulism,

- influence of socio-economic, behavioural factors and general health on prosthetic status of adult population of Georgia. *Eur Sci J*. 2016;11(10).
12. Kamalakidis S.N., Anastassiadou V., Sofou A., Pissiotis A.L. Comparative study of acceptance and adaptation to new complete dentures, using two construction protocols. *J Prosthodont*. 2016;25(7):536-543.
 13. Stober T., Danner D., Lehmann F., Séché A-C., Rammelsberg P., Hassel A.J. Association between patient satisfaction with complete dentures and oral health-related quality of life: two-year longitudinal assessment. *Clin Oral Investig*. 2012;16(1):313-318.
 14. Sivakumar I., Sajjan S., Ramaraju A.V., Rao B. Changes in Oral Health-Related Quality of Life in Elderly Edentulous Patients after Complete Denture Therapy and Possible Role of their Initial Expectation: A Follow-Up Study. *J Prosthodont*. 2015;24(4):452-456.
 15. Veyrone J., Tubert-Jeannin S., Duthel C., Riordan P. Impact of new prostheses on the oral health related quality of life of edentulous patients. *Gerodontology*. 2005;22(1):3-9.
 16. Yamamoto S., Shiga H. Masticatory performance and oral health-related quality of life before and after complete denture treatment. *J Prosthodont Res*. 2018;62(3):370-374.
 17. Alshammari M., Baseer M.A., Ingle N.A., Assery M.K., Al Khadhari M.A. Oral health-related quality of life among elderly people with edentulous jaws in Hafar Al-Batin region, Saudi Arabia. *J Int Soc Prev Community Dent*. 2018;8(6):495.
 18. Erić J., Šojić L.T., Bjelović L., Tsakos G., Tihaček Šojić L. Changes in Oral Health Related Quality of Life (OHRQoL) and Satisfaction with Conventional Complete Dentures Among Elderly People. *Oral Health Prev Dent*. 2017;15(3).
 19. Kaushik K., Dhawan P., Tandan P., Jain M. Oral health-related quality of life among patients after complete denture rehabilitation: A 12-month follow-up study. *Int J Appl Basic Med Res*. 2018;8(3):169.
 20. Perea C., Suárez-García M.J., Del Río J., Torres-Lagares D., Montero J., Castillo-Oyagüe R. Oral health-related quality of life in complete denture wearers depending on their socio-demographic background, prosthetic-related factors and clinical condition. *Med Oral Patol Oral Cir Bucal*. 2013;18(3):e371.
 21. Ellis J.S., Pelekis N.D., Thomason JM. Conventional Rehabilitation of Edentulous Patients: The Impact on Oral Health-Related Quality of Life and Patient Satisfaction. *J Prosthodont*. 2007;16(1):37-42.
 22. John M.T., Slade GD., Szentpétery A., Setz J.M. Oral Health--Related Quality of Life in Patients Treated with Fixed, Removable, and Complete Dentures 1 Month and 6 to 12 Months After Treatment. *Int J Prosthodont*. 2004;17(5).
 23. Bae K., Kim C., Paik D., Kim J. A comparison of oral health related quality of life between complete and partial removable denture-wearing older adults in Korea. *J Oral Rehab*. 2006;33(5):317-22.
 24. Zarb G.A., Hobkirk J., Eckert S., Jacob R. *Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-Supported Prostheses*. 13th ed. St. Louis: Mosby; 2013.
 25. Motallebnejad M., Hadian H., Mehdizadeh S., Hajjahmadi M. Validity and reliability of the Persian version of the oral health impact profile (OHIP)-14. *Caspian J Intern Med*. 2011;2(4):314
 26. Petričević N., Renner-Sitar K. Oral health related quality of life in patients with new conventional complete dentures. *Acta stomatologica Croatica*. 2009;43(4).
 27. Adam R., Geerts G., Lalloo R. The impact of new complete dentures on oral health-related quality of life: scientific. *S Afr Dent J*. 2007;62(6):264-268.
 28. Kul E., Aladağ L.İ., Yesildal R. Evaluation of thermal conductivity and flexural strength properties of poly (methyl methacrylate) denture base material reinforced with different fillers. *J Prosthet Dent*. 2016;116(5):803-810.
 29. Messersmith P.B., Obrez A., Lindberg S. New acrylic resin composite with improved thermal diffusivity. *J Prosthet Dent*. 1998;79(3):278-284.
 30. Yen Y-Y., Lee H-E., Wu Y-M., Lan S-J., Wang W-C., Du J-K., et al. Impact of removable dentures on oral health-related quality of life

- among elderly adults in Taiwan. *BMC Oral Health*. 2015;15(1):1.
31. Chen Y-F., Yang Y-H., Chen J-H., Lee H-E., Lin Y-C., Ebinger J., *et al.* The impact of complete dentures on the oral health-related quality of life among the elderly. *J Dent Sci*. 2012;7(3):289-295.