

Comparison of the Effects of Implant Support in Complete Dentures on Edentulous Patient Satisfaction

Ayşe Gül KILINÇ TARTAK¹, Haydar ALBAYRAK², Hasan Önder GÜMÜŞ²

¹ DDS, Dentist in Public Hospital, Nimet Bayraktar Oral & Dental Health Center, Kayseri, Turkey

Corresponding Author Email: [aysegultartak2\[at\]gmail.com](mailto:aysegultartak2[at]gmail.com)

Phone: +90 530 3993881

^{2,3} DDS, PhD, Department of Prosthodontics, Faculty of Dentistry, University of Erciyes, Kayseri, Turkey.

Abstract: *Patient satisfaction is one of the most important criteria in prosthesis usage. Some studies reported that implant-supported full dentures are more advantageous than conventional dentures in terms of both oral health and functional limitations, and also give better results in terms of patient satisfaction. In this study, using the 14-item Oral Health Impact Profile questionnaire, it was aimed to compare the quality of life in terms of oral health and patient satisfaction in patients using conventional or implant-supported full dentures, and to examine the related factors. The findings of the present study show that patients using implant-supported prostheses generally have a much better improvement in quality of life than those using conventional prosthesis in terms of all oral health and patient discomfort issues such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap.*

Keywords: Prosthesis, implant supported complete denture, conventional complete denture, OHIP

1. Introduction

Prosthesis treatment method has been applied for a long time in patients who are completely edentulous in terms of lower, upper or lower + upper teeth. The prostheses applied with the conventional method provide a significant improvement in the quality of life of the patients compared to the completely edentulous life. With the development of implant-supported complete dentures, it is aimed to increase the quality of life of edentulous patients. [1,2]

2. Literature Survey

In contrast to the problems in the proper production of conventional complete dentures, lack of stability and retention, and the continuation of bone destruction that causes these deficiencies, the inability to perform chewing function at the desired level and aesthetic appearance; implant-supported complete dentures have advantages such as increased stabilization and retention, improved occlusion, reduced anterior bone loss, reduced prosthesis volume, increased chewing efficiency and strength, improved speech function and a better aesthetic appearance. [1-3] However, psychological problems that may arise due to movement of the prosthesis, food leakage under it, continued posterior bone loss, and the patient's desire for a fixed prosthesis are among the negative aspects of implant-supported full dentures. [2-5]

Problem Definition

Patient satisfaction is one of the most important criteria in the use of prosthesis. Some studies, reported that implant-supported full dentures are more advantageous than conventional dentures in terms of both oral health and functional limitations, and also give better results in terms of patient satisfaction. [6-11] In this study, using the 14-item

Oral Health Impact Profile (OHIP-14) questionnaire, it was aimed to compare the quality of life in terms of oral health and patient satisfaction in patients using conventional or implant-supported full dentures, and to examine the related factors.

3. Methods & Approach

This questionnaire-based study was approved by the ethics committee of Erciyes University Faculty of Medicine (Approval No. 2018/311).

The study included a total of 152 patients (69 with conventional supported full dentures, and 83 with implant-supported full dentures) who applied to the Erciyes University Faculty of Dentistry, prosthetic dentistry clinic between 2019 and 2022 with the complaint of complete edentulism. After obtaining their written and signed consents, the patients were applied OHIP-14 questionnaire along with some of their sociodemographic characteristics.

Patients were applied OHIP-14 questionnaire that was developed by Slade et al. [12], consisting of two questions each and consisting of seven sections such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap, a total of 14 items. Questions were scored between 0-4 as “never”, “rare”, “sometimes”, “fairly often”, and “very often”. The total OHIP-14 score can be between 0-56, and a higher score indicates a more negative quality of life. [5]

All statistical analyzes in the study were done using SPSS 25.0 software (IBM SPSS, Chicago, IL, USA). Descriptive data are given as numbers and percentages. In terms of categorical variables, comparisons between groups were

made with Pearson's Chi Square test and Fisher's Exact Test. Whether continuous variables are suitable for normal distribution was confirmed by the Kolmogorov-Smirnov Test. The differences between the groups in terms of continuous variables were analyzed using Student's t Test, and the comparison of mean values between multiple groups by variance analysis. The relationship between continuous variables was tested using Spearman's correlation analysis. The results were evaluated within the 95% confidence interval, and $p < 0.05$ values were considered significant. Bonferroni correction was made where appropriate.

4. Results & Discussion

A total of 67 (44.1%) of the patients were male. The mean age was 61.1 ± 8.5 (range: 40-79) years. There were no significant differences between the patient groups with conventional and implant supported complete dentures in terms of age group, gender, marital status, education level, monthly income, smoking history and duration of prosthesis use groups ($p > 0.05$ for each) (Table 1).

Table 1: Distribution of some sociodemographic and prosthetic characteristics according to conventional and implant supported prosthesis groups

	Conventional supported complete denture		Implant supported complete denture		Total n	p
	n	%	n	%		
Age groups (year)						0.453
40-49	5	45.5	6	54.5	11	
50-59	19	36.5	33	63.5	52	
60-69	30	50	30	50	60	
70-79	15	51.7	14	48.3	29	
Gender						0.643
Male	29	43.3	38	56.7	67	
Female	40	47.1	45	52.9	85	
Marriage status						0.065
Married	69	46.6	79	53.4	148	
Single	0	0	4	100	4	
Education						0.408
Unschooling	11	47.8	12	52.2	23	
Primary / Secondary school	45	47.9	49	52.1	94	
High school	11	44	14	56	25	
University	2	33.3	4	66.7	6	
Master / PhD	0	0	4	100	4	
Income						0.182
Non / too low	44	49.4	45	50.6	89	
Low	25	43.1	33	56.9	58	
Intermediate	0	0	4	100	4	
High	0	0	1	100	1	
Working status						0.037
Working	3	20	12	80	15	
Not working	66	48.2	71	51.8	137	
Complete prosthesis location						<0.001
Bottom + top	44	66.7	22	33.3	49	
Only top	24	82.8	5	17.2	26	
Only bottom	1	1.8	56	98.2	57	
Metal base						0.004
Only bottom	68	49.3	70	50.7	138	
Only top	0	0	12	100	12	
Bottom + top	1	50	1	50	2	
Prosthesis usage duration						0.581
<6 months	32	44.4	40	55.6	72	
6 months – 1 year	21	52.5	19	47.5	40	
1–2 years	10	41.7	14	58.3	24	
2-4 years	3	27.3	8	72.7	11	
>4 years	3	60.0	2	40.0	3	
Smoking						0.876
Yes	14	46.7	16	50	53.3	
No	55	45.1	67	54.9	122	

The mean prosthesis usage duration was significantly lower in the group using conventional prosthesis ($p < 0.001$). The mean OHIP-14 total score was found to be significantly higher in the group using conventional prosthesis (8.5 ± 10.5

vs. 0.1 ± 0.9) ($p < 0.001$). The mean scores of all OHIP-14 groups in the group using conventional prostheses were significantly higher than those with implant supported prosthesis ($p < 0.05$ for each) (Table 2).

Table 2: Comparisons of mean values according to prosthesis groups, some variables and OHIP-14 scores

	Conventional supported complete denture		Implant supported complete denture		Total		p
	Mean	SD	Mean	SD	Mean	SD	
Age	61.9	8.5	60.4	8.5	61.1	8.5	0.288
Total edentulous time (years)	8.3	9.6	6.1	5.8	7.1	7.8	0.08
Prosthesis usage period (years)	1.9	0.8	3	0.9	2.5	1	<0.001
OHIP-14 total score	8.5	10.5	0.1	0.9	3.9	8.3	<0.001
OHIP-14 questions							
OHIP01 Pronunciation problem	0.7	1.1	0.3	0.7	0.5	0.9	0.008
OHIP02 Taste problem	0.6	1.1	0.2	0.6	0.4	0.9	0.010
OHIP03 Pain in the mouth	1	1.1	0.5	1	0.7	1.1	0.012
OHIP04 Eating disorder	1.1	1.2	0.5	0.9	0.8	1.1	0.001
OHIP05 Don't be ashamed	0.3	0.8	0.1	0.5	0.2	0.6	0.065
OHIP06 Irritability	0.6	1.1	0.3	0.8	0.4	0.9	0.019
OHIP07 Diet dissatisfaction	0.8	1.2	0.2	0.6	0.5	1	<0.001
OHIP08 Don't interrupt the meal	0.7	1.1	0.2	0.7	0.4	0.9	0.001
OHIP09 Difficulty in relaxation	0.8	1.1	0.3	0.9	0.5	1	0.002
OHIP10 Don't be embarrassed	0.4	0.8	0.2	0.7	0.3	0.8	0.183
OHIP11 Frustrated behavior	0.4	0.9	0.2	0.6	0.3	0.7	0.050
OHIP12 Difficulty doing business	0.4	0.8	0.1	0.6	0.2	0.7	0.066
OHIP13 Dissatisfaction with life	0.5	1	0.2	0.6	0.4	0.8	0.023
OHIP14 Inability to do all jobs	0.4	0.9	0	0.2	0.2	0.6	0.002
OHIP-14 sub-scales							
Functional limitation	0.7	1	0.3	0.6	0.4	0.8	0.004
Physical pain	1	1.1	0.5	0.8	0.7	1	0.001
Psychological discomfort	0.5	0.8	0.2	0.6	0.3	0.7	0.012
Physical disability	0.7	1.1	0.2	0.5	0.4	0.8	<0.001
Psychological disability	0.6	0.9	0.2	0.7	0.4	0.8	0.011
Social disability	0.4	0.7	0.2	0.5	0.3	0.6	0.020
Handicap	0.4	0.8	0.1	0.4	0.3	0.7	0.003

SD: Standard deviation, OHIP-14: Oral Health Impact Profile-14

In the correlation analyzes, a significant inverse correlation was found between the duration of using the prosthesis and the OHIP-14 total score, functional limitation, physical pain, physical disability and psychological disability in all patients (p<0.05 for each). In the group of patients with conventionally supported dentures, only the duration of complete edentulism and functional limitation were found to be negatively correlated (p=0.046; r=-0.241), while there

were no significant correlations between OHIP-14 score and groups and other variables (p>0.05 for each). A significant inverse correlation was found between age and physical disability (p=0.040; r=-0.226) in patients with implant-supported prosthesis. and significant positive correlations were found between age and educational status (p=0.013; r=0.271), monthly income (p=0.010; r=0.282) and psychological disability (Table 3).

Table 3: Correlation analyzes between OHIP-14 groups and some sociodemographic and prosthetic features according to patient groups

		Total score	FL	PP	Ps.D	Ph.D	Ps.D	SD	H
In all groups									
Age	r	0.022	-0.017	-0.042	-0.018	-0.135	-0.042	-0.048	-0.070
	p	0.786	0.834	0.608	0.828	0.097	0.609	0.553	0.392
Total edentulous time	r	-0.159	-.193	-0.149	-0.043	-0.057	-0.092	-0.078	-0.076
	p	0.051	0.017	0.067	0.603	0.487	0.262	0.341	0.353
Prosthesis usage time	r	-.455	-.170	-.282	-0.110	-.220	-.201	-0.129	-0.079
	p	<0.001	0.036	<0.001	0.179	0.006	0.013	0.113	0.330
Education level	r	-0.004	0.024	<0.001	0.131	-0.095	0.048	0.030	0.104
	p	0.959	0.770	0.996	0.108	0.244	0.557	0.710	0.203
Income	r	0.016	0.125	0.119	.190	0.084	0.084	0.150	0.088
	p	0.841	0.125	0.143	0.019	0.302	0.306	0.065	0.280
Conventional supported complete denture									
Age	r	-0.072	0.082	-0.013	-0.012	-0.125	-0.015	-0.126	-0.085
	p	0.557	0.504	0.913	0.925	0.307	0.902	0.301	0.490
Total edentulous time	r	-0.220	-.241	-0.165	-0.065	-0.091	-0.079	-0.118	-0.122
	p	0.069	0.046	0.177	0.598	0.456	0.517	0.335	0.318
Prosthesis usage time	r	-0.156	-0.068	-0.196	-0.055	-0.095	-0.081	-0.064	-0.045
	p	0.199	0.579	0.106	0.654	0.438	0.507	0.599	0.712
Education level	r	0.032	0.040	-0.066	0.040	-0.130	-0.012	-0.040	0.060
	p	0.792	0.746	0.593	0.741	0.287	0.922	0.747	0.623

Income	r	0.182	0.123	0.081	0.184	0.106	0.096	0.149	0.032
	p	0.134	0.315	0.510	0.131	0.388	0.431	0.221	0.793
Implant supported complete denture									
Age	r	-0.166	-0.175	-0.124	-0.090	-.226	-0.152	-0.030	-0.113
	p	0.133	0.114	0.266	0.416	0.040	0.171	0.787	0.311
Total edentulous time	r	-0.002	-0.094	-0.134	0.010	0.037	-0.107	-0.006	0.009
	p	0.983	0.396	0.228	0.932	0.743	0.334	0.959	0.932
Prosthesis usage time	r	0.139	-0.044	-0.115	0.130	-0.071	-0.032	0.053	0.123
	p	0.209	0.691	0.301	0.243	0.524	0.777	0.631	0.267
Education level	r	0.138	0.037	0.070	.271	-0.053	0.161	0.153	0.191
	p	0.214	0.739	0.529	0.013	0.635	0.147	0.166	0.084
Income	r	0.201	0.192	0.209	.282	0.116	0.142	0.215	0.201
	p	0.068	0.081	0.058	0.010	0.297	0.199	0.051	0.069

OHIP-14: Oral Health Impact Profile-14, FL: Functional limitation, PP: Physical pain, Ps.D: Psychological discomfort, Ph.D: Physical disability, Ps.D: Psychological disability, SD: Social disability, H : Handicap

Implant-supported full dentures have many advantages over conventional supported dentures. Despite these advantages, one of the most important criteria in prosthesis treatment is patient satisfaction and the patient's quality of life, and this is effective in the choice of treatment. [1,2] In this study, it was demonstrated by the OHIP-14 questionnaire that patient satisfaction and quality of life were significantly better in implant-supported prosthesis users.

In the present study, no significant difference was found between the patient groups with conventional and implant-supported complete dentures in terms of age group, gender, marital status, education level, monthly income, smoking history, and duration of prosthesis use. This indicates that analyzes in the OHIP comparisons between groups in this study seems to be reliable.

Meira et al. [7] reported in their meta-analysis that there was no significant difference between implant supported and conventional prostheses in terms of speech function. Emami et al. [8] reported in their meta-analysis that overall patient satisfaction and quality of life were better in those using implant-supported full dentures than in those using conventional prostheses, however, the superiority was not evident in some points. Sharma et al. [13] reported lower OHIP-14 scores in implant-supported prosthesis patients. Kutkut et al. [9] showed in their meta-analysis that implant-supported prostheses offered better quality of life, especially in terms of comfort, stability, speech and chewing functions in patients using implant-supported prostheses. Mishra and Chowdhary [14] found in their meta-analysis that implant-supported complete dentures provided significantly better quality of life. In some other meta-analyses, it has been reported that implant-supported full dentures provide better patient satisfaction and quality of life scores. [6,15-19] In terms of the conventional vs. implant supported-dentures, OHIP-14 total scores were found as 10.38 vs. 6.52 (18.5% vs. 11.6% based on possible full scores) by Torres et al. [11]; as 15.5 vs. 11.5 (27.7% vs. 20.5% based on possible full scores) by Koçak et al. [20]; and as 6.98 vs. 6.5 (12.5% vs. 11.6% based on possible full scores) by Geckili et al. [21], respectively. In the present study, the mean OHIP-14 total score was found to be significantly higher in the group using conventional supported prostheses (8.5 ± 10.5 vs. 0.1 ± 0.9). Considering that the highest score that can be obtained is 56, it is seen that the average of the conventional prosthesis group is 15.2% of the maximum score and is close to other studies. Although a score of only 15.2% of the highest level

of discomfort that can be felt in terms of oral health arises from prosthesis, this shows that conventional supported prostheses still significantly reduce the quality of life for the patient. In addition, this score, which is not actually high, is much higher than the average score for those using implant-supported prostheses. In patients using implant-supported prostheses, the mean total OHIP-14 score was very low as 0.1 (0.2% of possible full score). This score in the implant-supported group may have resulted from differences in the patient populations included in the studies, such as age, etc., compared to other studies. This score shows that implant supported full dentures are almost never disturbing for oral health and have almost no adverse effects on quality of life in these patients. Considering how much the quality of life has improved even with conventional prostheses of patients who have had upper, lower, or completely edentulous teeth, it can be seen that implant-supported full dentures can maximize this contribution.

Geckili et al. [21] found the mean physical pain score of OHIP-14 to be higher in patients using conventional full dentures than those using implant-supported prosthesis, and they did not detect any significant difference in terms of other OHIP-14 scores. Koçak et al. [20] found the OHIP-14 total score, physical pain, physical disability, psychological disability and social disability scores to be significantly higher in the conventional prosthesis group. Torres et al. [11] reported that OHIP-14 total, functional limitation, physical pain, physical limitation, and psychological limitation scores were lower in implant-supported prosthesis patients. Keenan et al. [22] in their study with OHIP-49, they found that patient satisfaction was higher in most of the questionnaire subgroups in those using implant-supported prostheses. Egado-Moreno et al. [10] reported in their meta-analysis that implant-supported full dentures provided higher patient satisfaction than conventional prostheses in terms of comfort, speech, chewing and stability, but there is no difference in aesthetics and hygiene. In the present study, the mean scores of all OHIP-14 groups in the group using conventional supported prosthesis were found to be significantly higher than those with implant supported prosthesis. This finding shows that the advantage of implant supported full dentures over conventional supported dentures is not unidirectional, but provides a significant improvement in quality of life in terms of all oral health and patient discomfort issues such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap.

However, considering the results of other studies, it can be thought that the superiority of implant-supported prostheses may not be clear at some points within the scope of the OHIP-14 questionnaire, and larger studies may illuminate these issues better.

Koçak et al. [20] found an inverse correlation between the duration of prosthesis use and the OHIP-14 total score, psychological discomfort, and psychological disability subgroup scores. Machuca et al. [23] and Coltro et al. [24] also showed that OHIP scores decreased significantly and inversely with the duration of prosthesis use, and patient satisfaction and quality of life increased. Similarly, in the present study, a significant inverse correlation was found between the duration of using the prosthesis and the OHIP-14 total score, functional limitation, physical pain, physical disability, and psychological disability in all patients, regardless of the type of prosthesis. These findings show that when the prosthesis is first started to be used, physical discomfort such as limitation, pain and inadequacy, as well as the feeling of psychological discomfort associated with these, are experienced more intensely.

In the present study, a significant inverse correlation was found only between the duration of being completely edentulous and functional limitation in the patient group with conventional supported dentures, this correlation was not detected in the implant supported prosthesis group. These findings indicate that patients who have not been completely edentulous for a long time and who use conventional prostheses continue to suffer from discomfort in terms of physical limitations, perhaps due to the fact that they have not been fully accustomed to this situation or have not yet accepted this situation sufficiently. This negative situation is not seen in those who use implant-supported prostheses.

Torres et al. [11] could not find a relationship between age and OHIP-14 scores. Koçak et al. [21] found an inverse correlation between age and total OHIP-14 score, and stated that general patient satisfaction increased as age increased. In the present study, an inverse correlation was found between age and physical disability in patients with implant-supported prostheses. This finding shows that OHIP-14 scores decrease as they get used to the prosthesis, which is related to the fact that older people have been using prostheses for a longer period of time. This finding may also indicate that physical inadequacy is accepted as the age progresses, and that it takes time for patients who had to use prostheses at younger ages to accept this. Torres et al. [11] found that the level of education significantly affected the OHIP-14 score in their implant-supported patients. In the present study, a positive and significant correlation was found between educational status, monthly income and psychological disability in the implant supported prosthesis group. This finding shows that those with higher education level and/or monthly income may have higher expectations about prosthesis and thus may have decreased satisfaction, moreover, they feel more psychological discomfort due to having to use prosthesis, and in general, patients who start using prostheses should be supported in terms of psychological rehabilitation.

In the present study, mean prosthesis usage time was found to be significantly lower in the group using conventional supported prosthesis. This finding may indicate that patients using conventional prostheses have switched to implant-supported prosthesis treatment due to reasons such as not meeting their expectations fully or the treatment not progressing at the desired level. And it may be that they turned to that treatment protocol with the development of their awareness about implant supported full dentures during their treatment. In order to better demonstrate this situation, more extensive and further studies are needed.

5. Conclusion

Within the limitations of this study, it can be said that patients using implant-supported prostheses generally have a much better improvement in quality of life than those using conventional prosthesis in terms of all oral health and patient discomfort issues such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap.

6. Future Scope

There have been some limitations in the present study. In the study, the low number of patients who answered the questions with high scores due to the fact that prosthetic-related disorders were not high in both groups (especially in the group using implant-supported prostheses), limited the statistical clarity of risk factors for high-level disorders. An attempt was made to keep this restriction low by keeping the number of participants high. As a future scope, patients using complete prosthesis should be closely monitored for a better satisfaction.

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