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Original Article

Comparison of OHRQoL level in patients receiving implant-supported mandibular prosthesis and conventional complete mandibular prosthesis: A quasi-experimental study in Kerman, 2021

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Abstract

Background: This study compared the oral health-related quality of life (OHQoL) of edentulous patients receiving implant-retained mandibular overdentures and conventional complete dentures.

Methods: A quasi-experimental study was conducted in 2021 in Kerman, Iran, involving 40 edentulous patients who attended Kerman Dental School and private prosthodontic clinics. Half of the participants were treated with conventional mandibular complete dentures, and the other half received mandibular implant-supported overdentures. All participants completed the Oral Health Impact Profile for Edentulous Patients (OHIP-EDENT) questionnaire before treatment and three months after receiving their prostheses. Data were analyzed using the Shapiro–Wilk test, independent-samples t-test, paired-samples t-test, and one-way ANOVA, with a significance level set at $P<0.05$.

Results: The OHIP-EDENT scores significantly improved after treatment in both groups ($P<0.05$), indicating an enhanced OHQoL. However, the overdenture group demonstrated significantly higher post-treatment OHIP-EDENT scores compared to the conventional denture group ($P<0.05$). The number of implants (two, three, or four) did not significantly affect the total or domain-specific OHIP-EDENT scores ($P>0.05$). Participants with non-splinted overdentures reported less favorable outcomes in psychological distress, physical disability, handicap, and total OHIP-EDENT scores compared with those using splinted overdentures ($P<0.05$).

Conclusion: Patients treated with mandibular implant-retained overdentures reported greater satisfaction and better OHQoL than those with conventional dentures. While the number of implants did not influence outcomes, splinting the fixtures substantially improved OHQoL and overall patient satisfaction.

Keywords: Implant, Denture, Overdenture, Oral health, Quality of life

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Introduction

Tooth loss among the elderly remains a major public health concern, as it not only impairs essential functions such as chewing and speech but also affects psychological and social well-being. In recent years, dental implants have transformed the management of edentulism by improving patient satisfaction, minimizing bone resorption, and enhancing neuromuscular adaptation.[1,2] Today, osseointegrated or endosseous implants are recognized as reliable regenerative solutions and viable alternatives to conventional complete dentures.[2,3] In patients with advanced mandibular bone loss, the use of short endosseous implants combined with overdentures is often recommended as the preferred treatment modality.[4]

The World Health Organization (WHO) defines health as a state of complete physical, psychological, social, and economic well-being-not merely the absence of disease or physical defects. Any disturbance in these dimensions disrupts an individual's overall balance and leads to ill health. Based on this comprehensive definition, growing attention has been directed toward the concept of quality of life.[5] In dentistry, clinical assessments alone cannot fully reflect patients' perceived needs or the overall impact of oral conditions. To address this, measures of Oral Health–Related Quality of Life (OHRQoL) have been developed to evaluate how oral health affects individuals' satisfaction and daily functioning.[6,7] Therefore, Patient perceptions, satisfaction, and improvements in OHRQoL are now recognized as key indicators of treatment success.[8,9]

To assess OHRQoL, Slade and Spencer introduced the Oral Health Impact Profile (OHIP), a validated instrument designed to measure the influence of oral health on quality

of life in population-based studies.[10] This non-clinical indicator is now widely used alongside clinical indices to assess the functional, psychological, and social impacts of oral diseases in different populations.[11-14] Several studies conducted in various countries, including the United States, have compared OHRQoL among edentulous patients rehabilitated with conventional complete dentures and those treated with implant-supported or implant-retained mandibular prostheses.[13,15] However, in Iran, only two investigations have explored this topic-both conducted in Tehran by Azar et al[12] and Semyari et al. [16]- who compared conventional complete dentures with mandibular overdentures supported by two implants. No similar research has yet been conducted in Kerman, where cultural, socioeconomic and regional healthcare differences may influence OHRQoL outcomes. Therefore, this study aimed to compare OHRQoL among elderly edentulous patients in Kerman Dental School treated with implant-retained mandibular overdentures (splinted or non-splinted) versus conventional complete dentures.

Materials and Methods

The protocol of the present quasi-experimental study was approved by the ethics committee of Kerman University of Medical Sciences (IR.KMU.REC.1399.126).

The sample size was calculated to include 20 participants in each group (total = 40), considering an alpha level of 0.05 and a test power of 80%, using GPower software. Forty edentulous patients who visited the Kerman Dental School and private prosthodontic clinics participated in the study. The inclusion criteria were the absence of any known systemic diseases-particularly diabetes, cancer, a history of radiation therapy, or continuous use of medications such as corticosteroids, bisphosphonates, or chemotherapy drugs-as well as the absence of mental illness. The exclusion criteria included a history of previous dental implant treatment, smoking, and inability to maintain adequate oral hygiene. The informed consent was obtained from all the participants.

Half of the participants were assigned to receive a conventional mandibular complete denture, while the other half were planned to receive implant-supported mandibular overdentures (IOD group). For patients in the implant group, implant fixtures were placed in strategic mandibular positions as follows: two implants in regions B and D, three implants in regions B, C, and D, and four implants in regions A, B, D, and E. All implant treatments were performed by a prosthodontist.

Before and three months after receiving the prosthesis, the OHRQoL of the patients was assessed using the Oral Health Impact Profile for Edentulous Patients (OHIP-EDENT) questionnaire, which was administered by a post-graduate student of Prosthodontics (F.S.). The OHIP-EDENT comprises 19 questions. Owing to the similarity of its items to those included in the OHIP-14, OHIP-20 and the Geriatric Oral Health Assessment Index (GOHAI), the Persian translation of the OHIP-EDENT was adapted from the validated Persian versions of these two instruments[12,17,18] and subsequently reviewed and confirmed by a panel of experts in Prosthodontics and Oral and Maxillofacial Medicine.

Participants were asked to respond to 19 questions using a Likert scale ("never," "sometimes," "often"). Scoring was as follows: 0 for "never," 1 for "sometimes," and 2 for "often." The total score ranged from 0 to 38, with higher scores indicating poorer oral health-related quality of life (OHQoL). The instrument's questions were analyzed across seven domains: functional limitation (3 items), physical pain (3 items), psychological discomfort (3 items), physical disability (3 items), psychological disability (3 items), social disability (3 items), and handicap (3 items).

Data analyzed using SPSS 25.0 software. The normality of data distribution was assessed using the Shapiro–Wilk test. Participants' age and OHIP-EDENT scores between the two groups were compared using the independent-samples t-test. Additionally, within the IOD group, the OHIP-EDENT scores of participants with splinted and non-splinted overdentures were compared using the same test. The paired-samples t-test was employed to compare OHIP-EDENT scores before treatment and three months after treatment. Gender distribution between the groups was analyzed using the chi-square test. Within the IOD group, differences in OHIP-EDENT scores among participants with two, three, and four dental implants were evaluated using one-way ANOVA. A p-value less than 0.05 was considered statistically significant.

Results

Table 1 presents the demographic characteristics of the participants. The mean age of all participants was 60.4 ± 12.1 years, with those in the implant treatment group being significantly older than those in the conventional denture group ($P = 0.001$). A total of 10 males (50%) were included in the implant overdenture (IOD) group and 11 males (55%) in the conventional denture group. Most implants were splinted (75%), while five implants in the two-fixture group were non-splinted (25%). The retention components consisted of bar and clip systems in 13 participants, bar and ball systems in 2 participants, and ball attachments in 5 participants. Within the IOD group, 7 participants (35%) received two implants, 6 participants (30%) received three implants, and 7 participants (35%)

Table 1. Participants demographic variables

Variable		Implant group	Complete prosthesis group	*P* value
Age		66.65 ± 10.76	45.15 ± 10.14	0.001*
Gender	Male	10 (50%)	11 (55%)	0.752
	Female	10 (50%)	9 (45%)	

*Significant difference.

received four implants.

Table 2 summarizes the participants' total and domain-specific OHIP-EDENT scores. Both the total OHIP-EDENT scores and all domain scores significantly decreased after three months in both groups ($P<0.0001$), indicating improved oral health-related quality of life. Except for the social disability and psychological disability domains, participants in the conventional denture group exhibited significantly higher total and domain scores than those in the IOD group ($P<0.05$).

Table 3 displays the OHIP-EDENT scores of participants in the IOD group according to the number of implants (two, three, or four). Based on one-way ANOVA, neither the total OHIP-EDENT score nor the individual domain scores were significantly influenced by the number of implants, either before or after treatment ($P>0.05$).

Table 4 compares the OHIP-EDENT scores of participants in the IOD group with splinted and non-splinted overdentures. Before treatment, no significant differences were observed between the two groups ($P>0.05$). However, after three months, participants with non-splinted overdentures showed significantly higher scores in the psychological distress, physical disability, handicap, and total OHIP-EDENT scores compared to those with splinted overdentures ($P<0.05$).

Discussion

This study compared the impact of IODs and conventional complete dentures on patients' OHQoL. In addition, the influence of the number of dental implants and the type of overdenture (splinted or non-splinted) on OHIP-EDENT scores was evaluated.

The findings revealed that patients rehabilitated with

Table 2. Comparing the average OHIP-EDENT score between the groups

Domain	Questionnaire completion time	Complete denture	Overdenture	*P* value
		Mean (SD)	Mean (SD)	
Performance	Before treatment	3.28 (1.67)	4.26 (1.45)	0.063
	After 3 months	0.61(0.85)	1.84 (1.17)	<0.0001*
	P value	<0.0001*	<0.0001*	
Mental Distress	Before treatment	2.5 (1.28)	2.8 (1.36)	0.447
	After 3 months	0.45 (0.69)	1.1 (0.91)	0.015*
	P value	<0.0001*	<0.0001*	
Physical Pain	Before treatment	3.79 (2.07)	4.5 (1.87)	0.214
	After 3 months	0.53 (0.84)	1.43 (0.85)	0.003*
	P value	<0.0001*	<0.0001*	
Physical Disability	Before treatment	3.1 (1.97)	4.05 (1.82)	0.122
	After 3 months	1 (0.92)	1.65 (0.99)	0.038*
	P value	<0.0001*	<0.0001*	
Mental Disability	Before treatment	2 (0.92)	2.83(1.1)	0.012*
	After 3 months	0.45 (0.6)	0.83 (0.86)	0.1
	P value	<0.0001*	<0.0001*	
Social Disability	Before treatment	2.6 (1.54)	3 (1.59)	0.423
	After 3 months	0.5 (0.61)	0.85 (0.88)	0.151
	P value	<0.0001*	<0.0001*	
Handicap	Before treatment	1.95 (0.19)	2.35 (1.27)	0.31
	After 3 months	0.15 (0.37)	0.6 (0.82)	0.034*
	P value	<0.0001*	<0.0001*	
Total score	Before treatment	18.17 (7.24)	22.92 (8.91)	0.065
	After 3 months	3.67 (3.25)	7.46 (4.16)	<0.0001*
	P value	<0.0001*	<0.0001*	

*Significant difference.

Table 3. Comparing the average OHIP-EDENT score according to the number of dental implants in the IOD group

Domain	Questionnaire completion time	Number of implants			*P* value
		2	3	4	
Performance	Before treatment	3.33 (2.16)	3 (1.55)	3 (1.52)	0.884
	After 3 months	0.84 (1.07)	0.5 (0.84)	0.43 (0.53)	0.385
Mental Distress	Before treatment	2.14 (1.35)	2.33 (1.37)	3 (1.15)	0.446
	After 3 months	0.71 (0.49)	0.5 (0.84)	0.14 (0.38)	0.743
Physical Pain	Before treatment	2.83 (2.79)	3.5 (1.83)	4.86 (1.57)	0.202
	After 3 months	0.71 (0.95)	0.67 (0.103)	0.14 (0.38)	0.608
Physical Disability	Before treatment	3.71 (2.06)	1.83 (1.94)	3.57 (1.62)	0.172
	After 3 months	1.43 (1.27)	0.83 (0.75)	0.71 (0.49)	0.317
Mental Disability	Before treatment	2.14 (0.9)	1.5 (0.84)	2.29 (0.95)	0.282
	After 3 months	0.71 (0.49)	0.5 (0.84)	0.14(0.38)	0.21
Social Disability	Before treatment	2.43 (1.72)	2.67 (1.21)	2.71 (1.8)	0.94
	After 3 months	0.71 (0.76)	0.5 (0.55)	0.29 (0.49)	0.441
Handicap	Before treatment	1.86 (1.46)	2.33 (0.82)	1.71 (1.25)	0.64
	After 3 months	0.29 (0.49)	0.17 (0.41)	0.0 (0.0)	0.361
Total score		17.67 (9.85)	0.836	5.29 (4.35)	0.136

Table 4. Comparing the average OHIP-EDENT score in the IOD group with splint of non-splint overdenture.

Domain	Questionnaire completion time	Overdenture type		*P* value
		Non-splint	Splint	
		Mean (SD)	Mean (SD)	
Performance score	Before treatment	4 (2.16)	3.07 (1.54)	0.343
	After 3 months	1 (1.22)	0.46 (0.64)	0.327
Mental distress score	Before treatment	2.8 (1.3)	2.4 (1.3)	0.559
	After 3 months	1 (1)	0.26 (0.45)	0.012*
Physical pain score	Before treatment	4 (3.08)	3.71 (1.73)	0.8
	After 3 months	1.2 (0.83)	0.26 (0.70)	0.499
Physical disability score	Before treatment	4.4 (2.07)	2.67 (1.8)	0.089
	After 3 months	1.8 (1.30)	0.73 (0.59)	0.014*
Mental disability score	Before treatment	2.4 (1.34)	1.87 (0.74)	0.437
	After 3 months	0.8 (0.44)	0.33 (0.61)	0.344
Social score	Before treatment	3.6 (2.3)	2.27 (1.1)	0.093
	After 3 months	0.8 (0.83)	0.4 (0.50)	0.182
Paralysis score	Before treatment	2.8 (1.1)	1.67 (1.11)	0.063
	After 3 months	0.67 (0.25)	0.4 (0.58)	0.003*
Total score	Before treatment	23.2 (9.44)	17.2 (6.18)	0.116
	After 3 months	7 (0.062)	2.53 (1.68)	0.01*

* *Significant difference.

conventional complete dentures had significantly lower OHQoL compared to those who received IODs. In a systematic review by Kutkut et al. [19], patients treated with mandibular non-splinted IODs demonstrated significantly improved OHRQoL compared with those using conventional dentures, consistent with the present results. Similarly, Sivaramakrishnan and Sridharan [20] reported significantly greater patient satisfaction in IOD users, as measured by OHIP instruments. In line with these findings, Azar et al. [12] found that patients with mandibular overdentures supported by two implants experienced significantly higher OHRQoL than those with conventional dentures. The improved outcomes in IOD users can be attributed to several factors, including reduced bone resorption, improved prosthesis stability, enhanced appearance and masticatory performance, and less coverage of soft tissues, which in turn reduces the gag reflex. However, IODs are associated with higher costs and an increased risk of peri-implant mucositis and peri-implantitis.[14]

In the present study, there was no significant relationship between the number of fixtures used in the implant treatment plan and OHIP-EDENT scores. Conversely, Küçükkurt et al. [21] reported that patients receiving four implant-supported overdentures with bar attachments exhibited higher satisfaction levels. However, when locator or ball attachments were used, the number of implants did not influence satisfaction. Karbach et al. [22] found that patients with IODs supported by four implants had significantly higher OHQoL than those with two implants. Similarly, Passia et al. [23] observed improvements in OHRQoL after placement of one, two, or three implants, with the highest satisfaction achieved with two implants. Sagheb et al. [24] further demonstrated that both masticatory performance and OHRQoL improved as the number of implants with locator attachments increased from one to three. The discrepancies among studies may be attributed to heterogeneity in cultural background, sample size, follow-up duration, and prosthesis design.

Participants with splinted IODs in the current study demonstrated significantly higher OHQoL, particularly in the domains of psychological distress, physical disability, handicap, and total OHIP-EDENT score, compared to those with non-splinted IODs. This improvement may be related to the greater prosthesis stability offered by splinted designs. Over time, the wear of plastic retention caps can decrease the retention of non-splinted overdentures. In contrast, the presence of a bar component in splinted systems may maintain stability, thereby reduce prosthesis movement and enhance patients' self-confidence in social interactions. In contrast to these findings, Di Francesco et al. [25] reported no significant difference in patient satisfaction between splinted and non-splinted designs in maxillary IODs supported by four implants. Likewise, Ortensi et al. [26] found no statistically significant differences in survival or overall success rates between splinted and non-splinted IODs, although their study did not distinguish between mandibular and maxillary overdentures or assess patient satisfaction directly. It is well established that movement in mandibular prostheses tends to concern patients more frequently;[13] therefore, the present findings suggest that splinting implants in the mandible may enhance overall satisfaction.

In this study, OHQoL was measured using the OHIP-EDENT questionnaire. The tools used to assess OHQoL vary across studies, and cultural factors also influence quality of life perceptions. Most previous studies have employed OHIP-14, OHIP-20, or OHIP-49 instruments.[12, 27] However, the OHIP-EDENT is considered more appropriate for the elderly edentulous population.[27]

The present study had several limitations. Participants were recruited from patients attending ****** Dental School and some private dental offices, which may limit the generalizability of the findings to broader populations. In addition, comparisons of OHQoL among patients with different numbers of implant fixtures and types of overdentures were conducted with a relatively small sample size, potentially affecting the statistical power of the analyses. Moreover, socioeconomic variables such as education level, income, and place of residence were not recorded.

Future studies should therefore include larger and more diverse samples, ideally through multicenter collaborations, to enhance external validity. Longer follow-up periods are also recommended to assess the long-

term stability of clinical and patient-reported outcomes. Additionally, incorporating socioeconomic indicators in future research would allow a more comprehensive understanding of the factors influencing OHQoL among edentulous patients.

Conclusion

The findings indicated that patient satisfaction was higher among those who received mandibular implant-retained overdentures. The number of fixtures (two, three, or four) did not significantly influence OHQoL among participants with overdentures. However, splinting the fixtures led to notable improvements in OHQoL, particularly in the domains of psychological distress, physical disability, handicap, and the total OHIP-EDENT score. These findings should be confirmed in future studies with larger and more diverse sample populations.

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Authors' Contribution

Conceptualization: Sina Safari, Nader Navabi.
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Competing Interests

The authors declare no conflict of interest.

Data Availability Statement

Data will be available upon request to the corresponding author.

Ethical Approval

The ethics committee of Kerman University of Medical Sciences approved the protocol of this study (Code: IR.KMU.REC.1399.126).

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