



Comparing the Incidence of Disruption in Daily Activities and Quality of Life Score Associated With Oral Health in Patients With Implant Candidates Before and After Treatment

Omid Amiri Nasab¹, Mohammad Bahaodini¹, Abolfazl Mohammadbeigi², Homa Naderifar^{3*}

Abstract

Background: Changes in oral health like tooth loss can have a profound effect on the patients' quality of life. The condition of relative or complete toothlessness exerts negative effects on chewing, speech, and appearance of the individual. The high capability of dental implants in restoring the beauty and oral function of the patients has led to their widespread usage. This study aimed to compare the quality of life of the toothless patients before and after treatment with implant.

Methods: In the present study, 50 patients afflicted with complete or relative toothlessness were examined. Before completing the questionnaires, all participants were asked to complete and sign the consent form of the questionnaire from Oral Impacts on Daily Performance (OIDP). The questionnaires were completed before receiving the implant coating, and a month after the delivery of the patients' prosthesis. Finally, the data were analyzed using SPSS statistical software, ANOVA, Mann-Whitney, and McNemar.

Results: In this study, 50 patients with the mean age of 46.84 ± 11.87 years were investigated. As for the gender and marital status of the participants, 50% (25 patients) were male and 84% (42 ones) were married. According to the data obtained from the OIDP questionnaire, the most significant changes were detected in eating, smiling, laughing and showing teeth without discomfort and speaking clearly, respectively. Moreover, a significant difference was found between the total score of oral effect on daily activities and some levels included in disruption questionnaire on daily activities such as eating, speaking clearly, going out, sleeping, relaxation, smiling, enjoying communication with others, job-related activities, as well as emotional conditions (Irritability); however, no significant difference was found between cases of cleaning teeth and light physical activity.

Conclusions: According to the data from OIDP questionnaire and the study results, implant had favorable effects on the quality of life of the patients. However, long-term studies and follow-ups are necessary to determine other possible favorable effects of implant treatment.

*Correspondence to

Homa Naderifar,
Tel: +98-81-3838-0063,
Email: hnaderifar121@gmail.com

Keywords: Quality of life, Oral health, Daily activity

Received February 13, 2021

Accepted May 29, 2021

ePublished September 29, 2021



Citation: Amiri Nasab O, Bahaodini M, Mohammadbeigi A, Naderifar H. Comparing the incidence of disruption in daily activities and quality of life score associated with oral health in patients with implant candidates before and after treatment. Avicenna J Dent Res. 2021;13(3):102-108. doi: 10.34172/ajdr.2021.20.

Background

According to the standard definition offered by the World Health Organization (WHO), health is a state of full physical, mental and social well-being, and not merely the absence of illness or injury; it includes three axes of the body, the psyche and the community. Therefore, any damage to any of the three dimensions of a person's health disturbs the balance and leads to the lack of health (1).

One of the most important dimensions of the public health assessment is the investigation of dental oral health status of the individuals and its impact on their quality of life. This concept deals with how satisfied a person

Highlights

- ▶ Implant had favorable effects on the quality of life of the patients.
- ▶ Tooth loss was determined to have the greatest impact on their quality of life.
- ▶ The most significant changes were observed in cases of emotional conditions, eating, smiling, laughing and showing teeth

is with her/his dental oral status, and to what extent the performance of the person is affected or somehow disturbed by this status. To investigate the perceived needs of patients in the field of dental oral health, evaluation of oral health related quality of life (OHRQL) has evolved to

¹Department of Periodontics, School of Dentistry, Qom University of Medical Sciences, Qom, Iran. ²Department of Epidemiology, Faculty of Public Health, Qom University of Medical Sciences, Qom, Iran. ³Center of Excellence for Occupational Health, Occupational Health and Safety Research Center, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran.

complete clinical examinations (2,3).

Evaluation index of Oral Impacts on Daily Performance (OIDP) is available to assess the quality of life associated with oral health. Evaluation index of OIDP deals with investigating the effects of oral status of the individuals on their ability to do daily activities (4). This index includes investigation of 8 items covering the psychological, physical and social dimensions of life. The questionnaire includes questions about the main daily activities such as eating, speaking, cleaning natural or artificial teeth, doing light physical activity, being outdoor, sleeping, relaxing, smiling, emotional stability, enjoying the contact with others, and coping with job-related activities (5,6).

Using this tool proves useful for investigating the oral impacts on the quality of life of the people, because it is an easy criterion to understand and is a very brief and timesaving index. The index of OIDP has been already validated in various countries including Iran (5), Tanzania (7), Korea (8), Norway (9), and England and Greece (10). The index was validated in 2007 in Iran, and was evaluated in Mashhad city (5).

Tooth loss is certainly one of the most influential disruptions which can reduce the quality of life associated with oral health. It causes gastrointestinal diseases, damages the appearance and beauty of people, and reduces the psychological and social abilities of the individuals. Also, it can have unfavorable impact on the quality of life associated with toothlessness, depending on the number of teeth and the location of the missing teeth (11).

Implant treatment includes single-unit treatment, over denture based on implant, and fixed prosthesis based on implant (12). Other positive features of the implant treatment include the prevention of continuous alveolar bone lysis, the maintenance of the ridge height and width, and the improvement of the beauty – especially in anterior regions (13). Since the effects of implant treatment on the quality of life associated with oral health of the patients have not received due research attention in Iran, the present study aimed to investigate the index in patients who had received the implant treatment and later referred to the clinics in Qom Province in order to produce a deeper insight about implant treatment.

Methods

This study is a descriptive-analytic and cross-sectional study which was conducted in dentistry clinics and offices in Qom in 2016 and 2017. Quota and random sampling methods were adopted in the study, and the minimum required sample size was 50 cases according to Fillion et al Inclusion criteria included patients receiving dental implants and having a tendency to complete the questionnaire, and exclusion criteria included partly completed questionnaires. First, the aims and method of conducting and evaluating the study were explained to all patients and they were asked to sign the ethical consent to

participate in it. Then their age, gender, level of education, occupation, and place of residence were recorded in a separate form. The questions in the questionnaire OIDP which had been translated from English to Persian were asked by a trained interviewer and were completed by selected participants who spent about 20 minutes to answer them. According to the questionnaire OIDP, the patients were asked to answer either *yes* or *no* if they faced any problems during the last 6 months. Then, the patients were asked about the regular or periodicity of oral problems and, according to their answers, question 3 or 4 was asked. When a patient confirmed the effect of a problem on an activity, its value was recorded in the severity section of the question 5. As for each effect, the amounts (quantitative data) of the period and severity section (qualitative data) were obtained (qualitative data are expressed quantitatively). Different ranks of each program are expressed entitled “the rank of OIDP” (Performance Score=Severity Score × frequency Score) which is divided into the highest possible rank and then is multiplied by 100 to obtain its percentage.

$$OIDPpercentage = \frac{Sum(multiply)}{max\ possibility\ score} \times 100$$

$$max\ possibility\ score = 11 \times 5 \times 5 = 275$$

Apart from the required therapeutic needs, the participants were asked about public health, oral health and its relation to public health, and satisfaction (pleasant) with the pain in the mouth.

The questionnaires were completed by those patients who had a history of losing at least six teeth, and had received their prostheses six months earlier. The obtained data were encoded in a general table, input into the computer after collecting information, and analyzed with SPSS statistical software after ensuring the accuracy of the data entry. When analyzing the data, first the normality of the data was evaluated and, then, ANOVA, Mann-Whitney, and McNemar tests were performed.

Results

In this study, 50 patients with the mean age of 46.84 ± 11.87 years and minimum and maximum age of 24 and 67, respectively, were examined. As for the patients' gender and marital status, 37.31% (25 patients) were male and 62.68% (42 patients) were married. In terms of their places of residence, 94% (47 people) were from Qom, 4% (2 people) were from Isfahan, and one patient was from Kashan. As for participants' occupation, 32% (16 people) were housewives and 30% (15 people) were freelancers. Tables 1-3 show the incidences of disruption in eating, speaking, cleaning natural or artificial teeth, doing light physical activity, being outdoors, sleeping, relaxation, smiling, emotional stability, enjoying the contact with others, and coping with job-related activities of the

Table 1. Comparing the Incidences of Disruptions in Eating, Speaking Clearly, and Cleaning Teeth

		Disruption in Eating			Disruption in Speaking Clearly			Disruption in Cleaning Teeth		
		Before	After	P Value	Before	After	P Value	Before	After	P Value
		No. (%)	No. (%)		No. (%)	No. (%)		No. (%)	No. (%)	
Regularly in the last 6 months	Yes	41 (82)	4(8)	0.001	29 (58)	1(2)	0.001	10 (20)	6(12)	0.001
	No	9 (18)	46 (92)		21(42)	49(98)		40(90)	44(88)	
Regularly only in part of the last 6 months	Yes	29 (58)	2(4)	0.001	10 (20)	0	0.001	6 (12)	3(6)	0.001
	No	12 (24)	2(4)		20(40)	1(2)		4(8)	3(6)	
Repetition of the problem in the last 6 months	Less than once a month	1 (2)	0	0.001	0	0	0.001	1(2)	0	0.001
	Once a week	1 (2)	3(6)		0	0		0	1(2)	
	1-2 Times a week	1 (2)	0		1(2)	0		0	0	
	3-4 Times a week	4 (8)	0		4(8)	0		0	1(2)	
	Almost every day	24 (48)	0		13(26)	0		5(10)	2(4)	
Duration of the problem in the last 6 months	6 days to one month	2 (4)	1 (2)	0.001	1 (2)	0	0.001	0	0	0.001
	1-2 months	1(2)	0		1(2)	1(2)		3(6)	1(2)	
	2-3 months	4(8)	0		4(8)	0		1(2)	1(2)	
	Constantly in 6 months	1(2)	0		0	0		0	1(2)	
Impact of the problem on everyday life	Very low	1(2)	1(2)	0.001	1(2)		0.001	1(2)	1(2)	0.001
	Relatively low	7(14)	3(6)		5(10)	1(2)		1(2)	2(4)	
	Moderate	20(40)	0		14(28)	0		6 (12)	3(6)	
	Relatively severe	9(18)	0		4(8)	0		0	0	
	Very severe	4(8)	0		4(8)	0		2(4)	0	

participants in this study before and after the implant intervention in them based on their answers to the questionnaire.

According to Table 4, the most important cause of the disruption in job-related activities before intervention was toothlessness (tooth extraction) with 16% which was later decreased to 0% after implant intervention. The main cause of the disruption in enjoying the contact with others before intervention was also toothlessness (tooth extraction) with 44% which was then decreased to 0% after implant intervention, but inappropriate shape and size of the teeth were increased from 0% to 2% after the intervention. The number-one cause of the disruption in emotional conditions (irritability) before intervention was toothlessness (tooth extraction) with 36% which was decreased to 0% after implant intervention, but inappropriate shape and size of the teeth were increased from 0% to 2% after the intervention. The major cause of the disruption in smiling and laughing before intervention was toothlessness (tooth extraction) with 52% which was next decreased to 0% after implant intervention, but the position of teeth and inappropriate shape and size of the teeth were increased from 0% to 2% after the intervention. Also, the leading cause of the disruption in relaxation before intervention was toothlessness with 44% which was decreased to 0% after implant intervention. The primary

cause of the disruption in sleeping before intervention was toothlessness (tooth extraction) with 12% which was decreased to 0% after implant intervention. According to the chart above, moreover, the most important cause of the disruption in being outdoors before intervention was toothlessness (tooth extraction) with 28% which was decreased to 0% after implant intervention. The biggest cause of the disruption in doing light physical activity before intervention was toothlessness (tooth extraction) with 6% which was later decreased to 0% after implant intervention. Also, tooth decay with 2% before the intervention reached to 0%. The prime cause of the disruption in cleaning teeth before intervention was toothlessness (tooth extraction) with 14% which was later decreased to 0% after implant intervention but, after the intervention, the position of teeth (unshaped, spaced, and protruding teeth) was increased from 0% to 4%, and inappropriate shape and size of the teeth and undesirable dental crown and coating were increased from 0% to 2%. The chief cause of the failure in speaking clearly before intervention was also toothlessness (tooth extraction) with 38% which was decreased to 0% after implant intervention, but undesirable dental crown and coating were increased from 0% to 2% after the intervention. The leading cause of the problematic eating before intervention was toothlessness (tooth extraction) with 68% which

Table 2. Comparing the Incidences of Disruptions in Doing Light Physical Activity, Being Outdoors, and Sleeping

		Disruption in Relaxation			Disruption in Smiling and Laughing			Disruption in Emotional Conditions (Irritability)		
		Before	After	P Value	Before	After	P Value	Before	After	P Value
		No. (%)	No. (%)		No. (%)	No. (%)		No. (%)	No. (%)	
Regularly in the last six months	Yes	5 (10)	0	0.001	34(68)	2(4)	0.001	24(48)	1(2)	0.001
	No	45(90)	50(100)		16(32)	48(96)		26(52)	49(98)	
Regularly only in part of the last six months	Yes	2(4)	0	0.001	27(54)	2(4)	0.001	16(32)	0	0.001
	No	3(6)	0		7(14)	0		8(16)	1(2)	
Repetition of the problem in the last six months	Less than once a month	0	0	0.001	0	0	0.001	1(2)	0	0.001
	Once a week	0	0		2(4)	1(2)		3(6)	0	
	1-2 Times a week	0	0		0	0		3(6)	0	
	3-4 Times a week	0	0		3(6)	0		4(8)	0	
	Almost every day	2(4)	0		23(46)	1(2)		6(12)	0	
Duration of the problem in the last six months	5 days or less	1(2)	0	0.001	1(2)	0	0.001	0	0	0.001
	6 days to one month	1(2)	0		0	0		2(4)	0	
	1-2 months	1(2)	0		4(8)	0		1(2)	0	
	2-3 months	0	0		1(2)	0		2(4)	1(2)	
	constantly in six months	0	0		0	0		1(2)	0	
Impact of the problem on everyday life	Very low	1(2)	0	0.001	1(2)	0	0.001	1(2)	0	0.001
	Relatively low	0	0		3(6)	1(2)		4(8)	0	
	Moderate	1(2)	0		14(28)	1(2)		12(24)	1(2)	
	Relatively severe	0	0		6(12)	0		2(4)	0	
	Very severe	1(2)	0		10(20)	0		5(10)	0	

Table 3. Comparing the Incidences of Disruptions in Relaxation, smiling and Laughing, and Emotional Conditions

		Disruption in Enjoying the Contact With Others			Disruption in Job-Related Activities		
		Before	After	P Value	Before	After	P Value
		No. (%)	No. (%)		No. (%)	No. (%)	
Regularly in the last six months	Yes	28(56)	1(2)	0.001	11(22)	0	0.001
	No	22(44)	49(98)		39(78)	50(100)	
Regularly only in part of the last six months	Yes	23(46)	1(2)	0.001	7(14)	0	0.001
	No	5(10)	0		4(8)	0	
Repetition of the problem in the last six months	Less than once a month	0	0	0.001	0	0	0.001
	Once a week	1(2)	0		0	0	
	1-2 Times a week	4(8)	0		0	0	
	3-4 Times a week	3(6)	1(2)		0	0	
	Almost every day	16(32)	0		8(16)	0	
Duration of the problem in the last six months	5 days or less	1(2)	0	0.001	0	0	0.001
	6 days to one month	0	0		1(2)	0	
	1-2 months	2(4)	0		1(2)	0	
	2-3 months	1(2)	0		1(2)	0	
	constantly in six months	1(2)	0		0	0	
Impact of the problem on everyday life	Very low	0	0	0.001	0	0	0.001
	Relatively low	2(4)	0		1(2)	0	
	Moderate	17(34)	1(2)		5(10)	0	
	Relatively severe	4(8)	0		1(2)	0	
	Very severe	5(10)	0		4(8)	0	

Table 4. The Frequency List of Oral Problems

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
Eating	B	-	4	4	68	-	-	-	-	2	2	2	-	-	-	-	-	2	-	-	-	-	-	4
	A	-	0	0	4	-	-	-	-	0	0	0	-	-	-	-	-	4	-	-	-	-	-	0
Speaking clearly	B	-	-	6	38	2	-	-	-	2	-	2	-	-	-	-	-	0	2	-	-	-	-	2
	A	-	-	0	0	0	-	-	-	0	-	0	-	-	-	-	-	2	0	-	-	-	-	0
Cleaning teeth	B	-	2	2	14	-	-	4	2	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	A	-	2	0	0	-	-	0	0	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-
Light physical activities	B	-	2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Being outdoors	B	-	2	8	28	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	-	0	0	0	0	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sleeping	B	-	2	-	12	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
	A	-	0	-	0	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-
Relaxation	B	-	-	2	4	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-
	A	-	-	0	0	-	-	-	-	0	-	-	-	-	-	-	-	-	0	-	-	-	-	-
Smiling and laughing	B	-	2	10	52	2	-	0	0	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
	A	-	0	0	0	0	-	2	2	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-
Emotional conditions (irritability)	B	-	-	10	36	2	-	-	0	2	-	2	-	-	-	-	-	-	2	-	-	-	2	-
	A	-	-	0	0	0	-	-	0	0	-	0	-	-	-	-	-	-	0	-	-	-	0	-
Enjoying the contact	B	-	-	8	44	-	-	-	0	2	-	2	-	-	-	-	-	-	2	-	-	-	4	-
	A	-	-	0	0	-	-	-	2	0	-	0	-	-	-	-	-	-	0	-	-	-	0	-
Job-related activities	B	-	-	4	16	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
	A	-	-	0	0	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-

a: Before & after (percent); b: Tooth sensitivity; c: Tooth Decay; d: Tooth fracture; e: Tooth loss; f: Tooth loose; g: Tooth discoloration; h: Position of teeth; i: Inappropriate shape & size; j: Gingival bleeding; k: Gingival swelling; l: Gingival lysis; m: Dental plaque; n: Oral mucosal ulceration; o: Bad breath; p: Oral and facial deformities; q: presence of sound in the joints; r: undesirable dental crown and coating; s: Inappropriate artificial or loose teeth; t: Orthodontic plaque; u: Tooth erosion; v: Toothache; w: Other reasons; x: I don't know.

was decreased to 4% after implant intervention, but inappropriate or loose teeth was increased from 2% to 4% after the intervention.

Comparing the percentages of scores for OIDP of our study participants before and after implant intervention revealed a significant difference where the percentage of score changes of OIDP decreased from 23.43±14.95 to 18.49±14.53. Moreover, a significant difference was found between the total score of OIDP and some levels of the disruption questionnaire in daily activities including eating, speaking clearly, being outdoors, sleeping, relaxation, smiling, emotional conditions (irritability), enjoying the contact with others, and job-related activities; but no significant difference was detected in cases of cleaning teeth and light physical activities (Table 5).

Discussion

According to our study findings and the data from questions regarding the quality of life, a statistically significant difference was found between the mean scores for most indicators of quality of life before and after implant treatment; that is, our study results revealed a significant improvement in the patients' quality of life.

According to the data from the questionnaire, there was

a significant difference between the total score of OIDP and some levels of the questionnaire. the most significant changes were observed in cases of emotional conditions, eating, smiling, laughing and showing teeth without discomfort, speaking clearly, enjoying the contact with others, being outdoors, job-related activities, sleeping, and relaxation, respectively. These changes were indicative of a significant difference in the given items. The least significant changes were associated with cleaning teeth and doing light physical activity.

Most oral problems having been reported before treatment of the patients were tooth extraction and tooth fracture. Furthermore, the most oral problems having been reported after treatment of the patients included inappropriate position (unshaped, spaced, and protruding teeth) and shape and size of the teeth.

According to the patients' self-declarations, tooth loss was determined to have the greatest impact on their quality of life. This finding was consistent with the results from a study by Patel et al (14) on the association between oral health and quality of life before and after implant treatment, where they indicated that implant treatment had a positive impact on both oral health and quality of life. Our finding was also consistent with the results

Table 5. Comparing the Score and the Percentage of Score for Oral Impacts on Daily Performance (OIDP) of the Study Participants Before and After Implant Intervention

Variable	Before implant	After implant	P value
Percentage of score changes	23.43±19.95	18.49±14.53	0.001
Total score	74.40±32.62	37.4±12.2	0.001
Eating	34.12±25.8	99.0±28.0	0.001
Speaking clearly	68.8±10.30	85.0±12.0	0.001
Cleaning teeth	49.5±36.2	44.3±10.1	0.001
Light physical activities	82.0±30.0	0	0.001
Being outdoors	76.5±28.8	0	0.001
Sleeping	94.1±83.5	60.0±42.0	0.001
Relaxing	32.1±11.5	0	0.001
Smiling	96.10±41.9	63.1±32.0	0.001
Emotional conditions (irritability)	81.5±2.36	0	0.001
Enjoying	40.8±39.8	70.1±24.0	0.001
Job-related activities	92.7±78.3	0	0.001

from another study by Fernandez et al (12) investigating the relationship between quality of life and oral health in the patients with relative toothless before and after implant treatment since both studies reported significant changes in all patients. Moreover, our study showed that the treatment of fixed prosthesis based on implant had a positive impact on the quality of life associated with oral health.

In the study by Goiato et al (15) aiming to evaluate the quality of life and satisfaction in patients with partial prosthesis based on implant, the patients expressed a higher level of satisfaction and quality of life for most cases.

The results from a study by Swelem et al (16) showed that physiological disorders had the most negative effect on the quality of life regarding oral health, while functional limitations had the least negative effect. According to our study results, the most significant changes were also found in emotional conditions, which was in agreement with the findings from the given study.

Fillion et al (17) conducted a study to investigate the desirable effects of implant placement on the quality of life concerning oral health of patients in three functional areas including psychological, discomfort, and pain. After the treatment, there was a significant difference in functional areas of psychological, discomfort, and pain. Their study result showed that the patients had a higher level of satisfaction and quality of life for most cases, which was in line with our study finding.

In a study by Felix-Berretin et al (18), significant improvements were discovered in the quality of life associated with eating, speaking and communicating with others after implant placement, which were in agreement with our study results; however, no change was observed in

the quality of life in terms of the teeth and cleaning them, emotional communication, and doing daily activities and physical activities. The most significant changes in our study were detected in emotional conditions and irritability, and the least significant changes were found in cleaning teeth and light physical activities.

This study faced some limitations including some patients unwillingness to participate in the study, the failure to receive prosthetic treatment of the patients after implant placement, and the lack of access to some patients to complete the questionnaire at follow-up stage. It is recommended that the changes in quality of life based on the implant type and prosthesis type received by the patients be investigated.

Conclusions

According to the data from OIDP questionnaires and our study findings, it was concluded that the implant had favorable effects on the quality of life of the patients. However, long-term studies and follow-ups are necessary to further investigate and determine other possible favorable effects of implant treatment.

Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

Ethical Statement

The Research Ethics Committee of Qom University approved this study (code: IR.MUQ.REC.1395.58).

Authors' Contribution

OAN and MB contributed to the design and implementation of the research, AM contributed to the analysis of the results and, HN wrote the article.

References

1. Mohebbi S, Sheikhzadeh S, Bayanzadeh M, Batebizadeh A. Oral impact on daily performance (OIDP) index in patients attending patients clinic at dentistry school of Tehran University of Medical Sciences. *Journal of Dental Medicine*. 2012;25(2):135-41. [Persian].
2. Allen PE. Assessment of oral health related quality of life. *Health Qual Life Outcomes*. 2003;1:40. doi: 10.1186/1477-7525-1-40.
3. Abu Hantash RO, Al-Omiri MK, Al-Wahadni AM. Psychological impact on implant patients' oral health-related quality of life. *Clin Oral Implants Res*. 2006;17(2):116-23. doi: 10.1111/j.1600-0501.2005.01219.x.
4. Sargozaie N, Moeintaghavi A, Shojaie H. Comparing the quality of life of patients requesting dental implants before and after implant. *Open Dent J*. 2017;11:485-91. doi: 10.2174/1874210601711010485.
5. Dorri M, Sheiham A, Tsakos G. Validation of a Persian version of the OIDP index. *BMC Oral Health*. 2007;7:2. doi: 10.1186/1472-6831-7-2.
6. Eitner S, Wichmann M, Schlegel KA, Kollmannsberger JE, Nickenig HJ. Oral health-related quality of life and implant therapy: an evaluation of preoperative, intermediate, and

- post-treatment assessments of patients and physicians. *J Craniomaxillofac Surg.* 2012;40(1):20-3. doi: 10.1016/j.jcms.2011.03.001.
7. Kida IA, Astrøm AN, Strand GV, Masalu JR, Tsakos G. Psychometric properties and the prevalence, intensity and causes of oral impacts on daily performance (OIDP) in a population of older Tanzanians. *Health Qual Life Outcomes.* 2006;4:56. doi: 10.1186/1477-7525-4-56.
 8. Jung SH, Ryu JI, Tsakos G, Sheiham A. A Korean version of the oral impacts on daily performances (OIDP) scale in elderly populations: validity, reliability and prevalence. *Health Qual Life Outcomes.* 2008;6:17. doi: 10.1186/1477-7525-6-17.
 9. Astrøm AN, Haugejorden O, Skaret E, Trovik TA, Klock KS. Oral impacts on daily performance in Norwegian adults: validity, reliability and prevalence estimates. *Eur J Oral Sci.* 2005;113(4):289-96. doi: 10.1111/j.1600-0722.2005.00225.x.
 10. Tsakos G, Marcenes W, Sheiham A. Evaluation of a modified version of the index of oral impacts on daily performances (OIDP) in elderly populations in two European countries. *Gerodontology.* 2001;18(2):121-30. doi: 10.1111/j.1741-2358.2001.00121.x.
 11. Takemae R, Uemura T, Okamoto H, Matsui T, Yoshida M, Fukazawa S, et al. Changes in mental health and quality of life with dental implants as evaluated by General Health Questionnaire (GHQ) and Health Utilities Index (HUI). *Environ Health Prev Med.* 2012;17(6):463-73. doi: 10.1007/s12199-012-0275-9.
 12. Fernandez-Estevan L, Selva-Otaola E, Montero J, Sola-Ruiz F. Oral health-related quality of life of implant-supported overdentures versus conventional complete prostheses: retrospective study of a cohort of edentulous patients. *Med Oral Patol Oral Cir Bucal.* 2015;20(4):e450-8. doi: 10.4317/medoral.20498.
 13. Annibaldi S, Vestri AR, Pilotto A, La Monaca G, Di Carlo S, Cristalli MP. Patient satisfaction with oral implant rehabilitation: evaluation of responses to a questionnaire. *Ann Stomatol (Roma).* 2010;1(3-4):2-8.
 14. Patel N, Vijayanarayanan RP, Pachter D, Coulthard P. Oral health-related quality of life: pre- and post-dental implant treatment. *Oral Surg.* 2015;8(1):18-22. doi: 10.1111/ors.12106.
 15. Goiato MC, Torcato LB, Dos Santos DM, Moreno A, Antenucci RM, de Carvalho Dekon SF. Quality of life and satisfaction of patients wearing implant-supported fixed partial denture: a cross-sectional survey of patients from Araçatuba city, Brazil. *Clin Oral Implants Res.* 2015;26(6):701-8. doi: 10.1111/clr.12372.
 16. Swelem AA, Gurevich KG, Fabrikant EG, Hassan MH, Aqou S. Oral health-related quality of life in partially edentulous patients treated with removable, fixed, fixed-removable, and implant-supported prostheses. *Int J Prosthodont.* 2014;27(4):338-47. doi: 10.11607/ijp.3692.
 17. Fillion M, Aubazac D, Bessadet M, Allègre M, Nicolas E. The impact of implant treatment on oral health related quality of life in a private dental practice: a prospective cohort study. *Health Qual Life Outcomes.* 2013;11:197. doi: 10.1186/1477-7525-11-197.
 18. Berretin-Felix G, Nary Filho H, Padovani CR, Machado WM. A longitudinal study of quality of life of elderly with mandibular implant-supported fixed prostheses. *Clin Oral Implants Res.* 2008;19(7):704-8. doi: 10.1111/j.1600-0501.2007.01451.x.

© 2021 The Author(s); Published by Hamadan University of Medical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.