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Original Article

# The Effect of Non-surgical Periodontal Treatment on the Quality of Life of Patients With Moderate to Severe Periodontitis

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**Abstract**

**Background:** Compared to other oral conditions, the effect of periodontal diseases on the quality of life (QoL) has received less attention. Hence, the present study aimed at determining changes in QoL related to oral health in patients with periodontal diseases after non-surgical periodontal therapy.

**Methods:** This clinical trial study was conducted on 60 patients with periodontal diseases (moderate to severe periodontitis) referring to the periodontics department. The Oral Health Impact Profile (OHIP) index questionnaire and OHIP-14 were completed for all patients in order to assess the effects of oral status on daily activities before and one month after scaling and root planning. Its association with the age and gender of patients was examined as well. Statistical data were analyzed using the *t* test, paired *t* test, and one-way ANOVA.

**Results:** The results revealed that the QoL of patients with periodontal diseases improved after scaling and root planning ($P=0.001$). Based on the findings, changes in QoL were not associated with the patients' gender ($P=0.001$ and $P=0.001$ for males and females, respectively) or age ($P=0.001$ and $P=0.001$ for less than or equal to 30 years and more than 30 years, respectively).

**Conclusions:** This study suggested a positive association between non-surgical treatment (NST) of periodontal disease and oral-health-related QoL.

**Keywords:** Quality of life, Scaling, Periodontal disease

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## Introduction

"Health" was defined by the World Health Organization (WHO) as "the complete physical, social, and psychological well-being and not only the absence of illness or disability" (1). It is an important part of the quality of life related to health (HRQoL) which can change patients' daily activities (2).

The number of patients who need periodontal treatment will increase during the next years (3). This will increase the need for periodontal disease treatment in dental surgeries and clinics, along with the number of supportive periodontal treatments. Although chronic and aggressive periodontal problems are not usually associated with considerable clinical symptoms in the initial stages, they can influence the quality of patients' life in advanced stages (4). Periodontal diseases can cause pain and affect patients' psychological perception (5) Different methods and instruments have been created to assess the effect of the periodontal disease (6). The Oral Health Impact Profile (OHIP) is the most commonly used instrument in this regard (6). OHIP is a questionnaire that repeatedly asks questions from patients about how a negative experience influences their daily activities. OHIP, which was originally developed and assessed by Spencer and Slade (7), has seven conceptual scales derived from an oral health model described by Locker (8), including functional limitation, handicap, psychological disability, psychological discomfort, physical disability, physical pain, and social disability. In addition to the original prescription of OHIP, different short prescriptions are published (9, 10) and translated into different languages. Actual studies show contradictory results about the effects of periodontal diseases on oral-health related quality of life(OHRQL).

The Oral Impact on Daily Performance (OIDP) is one of the indicators that may be utilized to assess Oral health -related quality of life (OHRQL) in individuals. This index represents the impact of oral health on an individual's daily performance and self-confidence, including the investigation of items in terms of physical, mental, and social performance. Oral health affects eating, talking, physical activity, smiling, brushing teeth, laughing without

embarrassment, resting, sleeping, relaxing and enjoying communication with others, confidence in accepting key roles at work, and the individual's mental state such as getting angry earlier than usual (11).

he translated and evaluated version of these questionnaires should be considered for use in a specific society. The Persian translations of the OIDP and OHIP-14 questionnaires were employed in the present study, the validity and reliability have been proven previously (12). In their study, Adulyanon et al investigated the impact of chronic periodontitis on OHRQL in 178 patients. Eighty-nine patients with chronic periodontitis and 89 periodontal healthy individuals sexually matched to patients were chosen for this purpose. Both groups completed OHIP-49 and OHQL-UK questionnaires, and their overall scores were calculated accordingly. The scores of both questionnaires in patients with periodontitis were lower than those in healthy individuals, and it was reported that patients with chronic periodontitis had a lower OHRQL compared to periodontal healthy individuals (13) Furthermore, assessing the OIDP index in patients with severe diffuse periodontitis after the surgical treatment, Adulyanon et al found that the score of this index had a considerable improvement compared to before treatment, indicating an improvement in the QoL (14).

The impacts of periodontal disease and treatments on the QoL of individuals not considered in routine clinical examinations may be of great significance in treatment planning for patients. Given the importance of this study and the small number of studies conducted on this index (OIDP) in periodontal patients, the present work focused on evaluating the effects of non-surgical treatment (NST) on the QoL and mental health of patients with the periodontal disease.

## Materials and Methods

A Persian translation and approved version of the OIDP (15) and OHIP-14 (16), for the Iranian community, was used for the current study (12). A sample size of 60 people was considered according to a previous similar study (17), and all those meeting the inclusion criteria entered the study with informed consent by the easy and accessible sampling method in order to complete the sample size. To this end, patients with the periodontal disease (calculus, inflammation of gums, clinical attachment loss, and tooth mobility malodor) referring to the Periodontology Department of Hamadan School of Dental Medicine for treatment and patients diagnosed by the periodontist to have moderate-severe chronic periodontitis and prescribed NST of scaling and root planning were included in the study

### *Inclusion Criteria*

1. Presence of more than 3 sextants in the mouth with $BOP^+$ (bleeding on probing)
2. Clinical attachment level (CAL) greater than or equal to 3 mm
3. At least 2 areas with pockets above

### *Exclusion Criteria*

1. Individuals in need of phase II treatment (i.e., the periodontal surgery)
2. Those with any systemic disease, pregnancy, lactation, drug use, or smoking

A scaling treatment and planning of the two jaws in the required areas were performed by the periodontist for each patient using an ultrasonic device, and all teeth of the patient were then brushed. Subsequently, they were given strict hygiene training (Bass technique-flossing training). Before treatment, each patient completed the questionnaire with the guidance of a knowledge-aware dentist. Six questions in the OIDP questionnaire were asked about the studied different activities, and the score of each item was obtained by multiplying the high score of questions 3 and 4 and the intensity score of question 5. The OIDP score was calculated and reported in percentage by dividing the total score of all activities by the maximum obtainable score. Fourteen questions are asked from the patient in the OHIP-14 questionnaire, and each question receives a score of 0-4. In other words, the minimum score will be zero and the maximum score will be 56. Higher scores in these indices show a lower QoL, and lower scores indicate a better oral-health-related QoL (14).

After scaling, chlorhexidine mouthwash was prescribed for all patients for one week in order to reduce inflammation and the symptoms of the periodontal disease. After one month, patients were clinically examined and their periodontal status was evaluated again. The areas in need of scaling were re-cleaned, and the teeth were brushed as well. A questionnaire was then completed for each patient again.

The obtained data were analyzed by SPSS software (version 21, Chicago USA) using descriptive statistical methods and statistical tests such as *t* test, paired *t* test, and one-way ANOVA.

## Results

In the present study, 60 patients participating in phase one of periodontal treatment were examined, of which 21 (35%) and 39 (65%) cases were males and females, respectively. The mean age of all patients was 36.25 with a standard deviation (SD) of 11.15, a minimum age of 20, and a maximum age of 60 years (Table 1).

Moreover, according to the average change in the OIDP index in both gender groups, although the amount of index changes in women was slightly higher than in men, no significant difference was observed between the two genders (Table 2).

To investigate the association between changes in the OIDP index before and after treatment with patients' age,

**Table 1.** Mean and SD of the Total OIDP Index Score in Patients With Periodontitis Before and After Scaling

| OIDP Measuring Time | Mean | SD | P Value |
|---|---|---|---|
| Before scaling | 54.12 | 24.99 | <0.001 |
| After scaling | 13.94 | 13.67 | |

*Note*. SD: Standard deviation; OIDP: Oral impact on daily performance.

**Table 2.** Mean and SD of the OIDP Index Score in Patients With Periodontitis Before and After Scaling by Age Group and Gender

| | OIDP Measuring Time | Mean | SD | P Value |
|---|---|---|---|---|
| Male | Before scaling | 51.73 | 22.44 | <0.001 |
| | After scaling | 12.13 | 13.42 | |
| Female | Before scaling | 55.41 | 26.46 | <0.001 |
| | After scaling | 14.19 | 13.87 | |
| ≤30 years | Before scaling | 52.83 | 24.03 | <0.001 |
| | After scaling | 13.92 | 16.01 | |
| >30 years | Before scaling | 55.41 | 26.27 | <0.001 |
| | After scaling | 13.95 | 11.13 | |

*Note*. SD: Standard deviation; OIDP: Oral impact on daily performance.

**Table 3.** Mean and SD of Changes in the OHIP QoL Index in Patients With Periodontitis Before and After Scaling

| OHIP changes | Mean | | SD | | P Value |
|---|---|---|---|---|---|
| | Before Scaling | After Scaling | Before Scaling | After Scaling | |
| Movement limitation | 2.77 | 2.27 | 1.39 | 0.63 | <0.001 |
| Physical pain | 4.92 | 3.13 | 2.58 | 1.34 | <0.001 |
| Mental distress | 2.83 | 2.83 | 1.64 | 0.89 | <0.001 |
| Physical disability | 3.52 | 2.63 | 1.59 | 0.88 | <0.001 |
| Mental disability | 4.26 | 3.12 | 1.95 | 1.21 | <0.001 |
| Social disability | 2.82 | 2.35 | 1.26 | 0.82 | <0.001 |
| Disability | 2.78 | 2.25 | 1.13 | 0.6 | <0.001 |
| Total changes | 23.9 | 18.08 | 6.92 | 3.67 | <0.001 |

*Note*. SD: Standard deviation; OIDP: Oral impact on daily performance; QoL: Quality of life.

they were divided into two age groups (group one: less than or equal to 30 years and group two: more than 30 years) and in accordance with the results, no significant association was observed between changes in the OIDP index (Table 2).

The comparison of the OHIP-14 index in patients before and after the scaling of NST revealed a reduction, while an improvement in QoL. Based on the results, improvements were found in all seven dimensions of the questionnaire, including movement limitation, physical pain, mental distress, physical disability, mental disability, social disability, and disability (Table 3).

## Discussion

The conducted study emphasizes that periodontal problems can have a considerable effect on OH-QoL.

OHRQL is a complex and multidimensional structure that contains a set of concepts (18). Other studies have shown factors that affect the quality of patients' life. For example, a BOP reduction or tooth mobility influences patients with periodontal diseases (19,20). Moreover, the untreated dental caries and dental malocclusion demonstrated lower OHRQL proportional to their severity (2), which was not assessed in this study.

In addition to these functional limitations, the beauty problems lead to severe limitations in the quality of patients' life because of tooth loss and gingival recessions (19). In addition to periodontal treatment which leads to performance improvements (chewing and speaking), pain reduction, and gingival bleeding, some dimensions affect OHRQL, including the environment (school and job) or social and emotional states (21).

The support of the dental team to the patients can be one of the factors that can change OHRQL. This issue has not been studied yet; thus, it can be an interesting approach for future studies

The volume of the sample used in this study was small; thus, in a systematic review, the effects of periodontal diseases on the OHRQL in different studies were analyzed. Studies that had used questionnaires were deleted from the review (22). All the studies had relatively few patients, except one. Therefore, no statistically meaningful results were found regarding the effect of different types of treatments on OHRQL.

Based on the results of the current study, the mean score of the OIDP index before and after scaling and root planning was 54.24 ± 12.99 and 13.94 ± 13.6, respectively. Our results indicated a significant reduction in this indicator, while an improvement in the QoL of people after non-surgical periodontal treatment. This finding is in line with the findings of other studies (11,17,23). The percentage of the prevalence of this index can be compared to the percentage (64.9%) presented by Dorri et al (12). In the study by Graziani et al, periodontitis and its clinical consequences, such as tooth loss, had a significant negative impact on OHR-QoL, while periodontal treatment and a decrease in periodontal disease symptoms resulted in improved OHR-QoL. Moreover, the use of implants in the replacement of missing teeth had a positive impact on OHR-QoL (24). This may be well explained by the clinical and biological impacts of periodontal treatment, including decreasing inflammation and depth of gingival pockets, repairing tissue, decreasing the amount of periodontal pathogenic bacteria in individual's mouths, and eliminating bad breath. In another systematic review, Wong et al focused on 8 articles and found that periodontal disease was negatively correlated with the QoL related to oral health, although the therapeutic interventions could improve their reported QoL (25).

In the present study, the OHIP-14 QoL index in patients with periodontitis was 23.9 ± 6.92 and 18.08 ± 3.67 before and after scaling and root planning, respectively, indicating reduced index and increased QoL. After periodontal treatment, all seven dimensions (i.e., movement limitation, physical pain, mental distress, physical disability, mental disability, social disability, and disability) were declined, highlighting a better patient performance and higher QoL. This issue has been investigated and proved by studies with various designs and using various questionnaires to assess the oral-health-related QoL (26-29). Non-surgical periodontal treatment improves OHR-QoL in terms of OHIP-14 scores, while supplementary surgical periodontal therapy is not necessary (30). In a cross-sectional study by Collins et al on 1821 cases, the OHIP-14 standard

questionnaires were employed to collect information. Smokers and those only referring to the dentist if they had problems had a higher odds ratio and a better chance of having a higher OHIP score and lower QoL compared to those who were examined by a dentist once a year and never practiced smoking (31). In the study by Peikert et al, 172 patients with periodontal disease were evaluated using the standard OHIP-G14 scale 6-8 weeks after the non-surgical phase. The mean score of OHIP significantly improved after the NST. In addition, a significant negative association was found between the severity of periodontitis and OHR-QoL (29), which conforms to the findings of our study, indicating the effective role of non-surgical periodontal treatment (i.e., NST) and the significance of maintenance therapy in patients' health and QoL. NST improves the oral-health-related QoL within a short time and its results remain stable for 3 months (32).

In the current study, QoL index changes were also examined in terms of gender. According to the findings, the mean score of the OIDP index in men and women was 51.73 ± 73.44 and 12.13 ± 13.42, as well as 55.41 ± 26.46 and 14.13 ± 91.87 before and after treatment, respectively, suggesting a slightly higher rate of OIDP changes in women. Nevertheless, this difference was not statistically significant.

Our study results are in conformity with those of a large cross-sectional study conducted by John et al in Germany (33). Their study consisted of a study group of 2050 people and aimed at investigating the relationship between the denture status, demographic factors, and OH-QoL using OHIP-G49 Die Questionnaire. After multivariable analysis, they found no differences in terms of gender. As regards the effect of prosthetic conditions on OH-QoL, they reported that people with removable prosthesis had an average OHIPG49 score of 7.5 degrees higher compared to people without prosthesis.

It seems that this small difference in the numbers of these significant changes between males and females is related to the higher sensitivity of women to this issue and their greater accuracy in filling out the questionnaire, along with observing health. Regarding the association between age and QoL, similar results were found, which is in line with those of Durham et al (34). Therefore, there was no significant difference between the two studied age groups in the mean changes of the OIDP index.

In line with many other studies in this field, the most common problems reported by patients in this study were tooth cleaning and eating disorders (12,35), from which the second one has largely been eliminated after phase one of treatment and oral health training. Toothache was the most common cause of dental problems in eating reported by patients, which is consistent with the findings of Kida et al in the Thai population (35).

### *Limitations*

The volume of the sample used in this study was small, and there was a lack of timely referral of people for follow-up treatment. Finally, some patients needed surgical treatment in addition to the NST.

### *Suggestions*

- Using a large volume of samples in future studies;
- Evaluating the QoL related to oral health for surgical treatment.

## Conclusions

The findings of this study showed that NST is positively correlated with the QoL related to the oral health of the patients. Therefore, it seems that this relationship depends on the severity of the disease, care, and the method of treatment.

#### Authors' Contribution

LG and MH contributed in to the design and implementation of the reserch. MP contributed in to the design and implementation of the reserch and wrote the article (corresponding author). MFanalysis of the result SH assistance in collecting information

#### Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

#### Ethical Statement

This clinical study was approved by the University Ethics Committee (IR.UMSHA.REC.1399.325) and registered by the *Iranian Registry of Clinical Trials website* (identifier: IRCT20120215009014n370) and conducted based on the Declaration of Helsinki. An informed consent form was taken from all patients participating in this project.

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