Relationship between Oral Health-Related Quality of Life, Satisfaction, and Personality in Patients with Prosthetic Rehabilitations

Mahmoud K. AL-Omiri, BDS, PhD, FDS RCS (England), Jordanian Board[1] & Jumana Karasneh, BDS, PhD[2]

[1] Associate Professor and Consultant, Department of Prosthodontics, Faculty of Dentistry, The University of Jordan, Amman, Jordan
[2] Assistant Professor and Consultant, Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, Jordan University of Science and Technology, Irbid, Jordan

Keywords
Dental Impact on Daily Living (DIDL); Oral Health Impact Profile (OHIP); United Kingdom Oral Health-Related Quality of Life (OHQoL-UK); NEO five factor inventory (NEO-FFI); oral health; psychology.

Correspondence
Mahmoud K. AL-Omiri, Associate Professor and Consultant of Fixed & Removable Prosthodontics and Implants, Consultant of Oral and Maxillofacial Surgery and Oral Medicine, Department of Prosthodontics, Faculty of Dentistry, The University of Jordan, Amman 11942, Jordan. E-mail: alomirim@yahoo.co.uk

Accepted December 10, 2008

doi: 10.1111/j.1532-849X.2009.00518.x

Abstract

Purpose: This study investigated the relationship between oral health-related quality of life, satisfaction with dentition, and personality profiles among patients with fixed and/or removable prosthetic rehabilitations.
Materials and Methods: Thirty-seven patients (13 males, 24 females; mean age 37.6 ± 13.3 years) with fitted prosthetic rehabilitations and 37 controls who matched the patients by age and gender were recruited into the study. The Dental Impact on Daily Living (DIDL) questionnaire was used to assess dental impacts on daily living and satisfaction with the dentition. The Oral Health Impact Profile (OHIP) was used to measure self-reported discomfort, disability, and dysfunction caused by oral conditions. Oral health-related quality of life was assessed by the United Kingdom Oral Health-Related Quality of Life (OHQoL-UK) measure. Moreover, the NEO five-factor inventory was used to assess participants' personality profiles.
Results: Prosthetic factors had no relationship to the DIDL, OHIP, and OHQoL-UK scores. Patients with the least oral health impacts had better oral health-related quality of life ($p = 0.023$, $r = -0.37$), higher levels of total satisfaction, and satisfaction with appearance, pain, oral comfort, general performance, and eating ($p < 0.05$, $r = -0.79$, -0.35, -0.59, -0.56, -0.58, and -0.50, respectively). Patients with better oral health-related quality of life (QoL) had higher total satisfaction, satisfaction with oral comfort, general performance, and eating ($p < 0.05$, $r = 0.34$, 0.39, 0.33, and 0.37, respectively). Patients with lower neuroticism scores had less oral health impact ($p = 0.006$, $r = 0.44$), better oral health-related QoL ($p = 0.032$, $r = -0.35$), higher total satisfaction, satisfaction with appearance, pain, oral comfort, and eating ($p < 0.05$, $r = -0.58$, -0.35, -0.33, -0.39, and -0.35, respectively).
Conclusion: Patients' satisfaction with their dentition and prosthetic rehabilitations has positive effects on oral health-related QoL and oral health impacts and improves patients' daily living and dental perceptions. Neuroticism might influence and predict patients' satisfaction with their dentition, oral health impacts, and oral health-related QoL. Satisfaction with the dentition might predict a patient's level of neuroticism.

Among the most important goals of dental care is helping patients in their attempts to reach an acceptable level of satisfaction with their oral cavity and dentition.[1] Since they are rarely life threatening, little attention has been paid to the psychosocial impacts of oral conditions. Moreover, many researchers used to ignore effects of the oral cavity on general health status; however, the need for consideration of oral health-related quality of life (QoL) has been increasingly acknowledged over the last decades, and many studies highlight the psychosocial impacts of oral conditions. In the United States, Reisine[2] and Gift et al[3] reported the loss of nearly 160 million work hours a year owing to oral problems. Oral conditions might affect social functioning and behaviors, such as ability to work, school attendance, or carrying out parental or household duties.[4]

Dentofacial problems have known effects on patients' satisfaction with their dentition as they affect esthetics, performance, and function.[5,6] Dental professionals need an accurate perception of how patients feel about their teeth and the impact this has on their daily living. Strauss and Hunt concluded that dental disease may influence an individual's capacity to live comfortably,

enjoy life, experience relationships, be successful in employment, and possess a positive self-image.[7] Various factors, such as chewing ability, taste, pain, speech, and esthetics could affect different aspects of QoL as well as satisfaction with the dentition.[5,8] Different levels of oral status have various impacts on people's daily living; therefore, the clinical status and psychological dimensions should be assessed whenever we assess dental needs.[5,9]

Some patients are not satisfied with their oral condition or dental treatment regardless of how perfect their dental treatment. On the other hand, due to the high levels of their psychogenic tolerance, some patients are satisfied with their unfavorable dentition and dental treatment.[10,11]

The literature has shown that patients' satisfaction with oral status is associated with the existence of certain personality profiles. Psychological factors have been shown to have a profound role in shaping patients' satisfaction and compliance with dental status and treatment.[12]

The assessment of personality characteristics might be useful in predicting patient behavior and may have an effect on the provision of therapy.[13] This prompted dental researchers to investigate the effect of different psychological characteristics on the success and acceptance of conventional dental treatment. More neurotic, less stable, less intelligent, more self-centered, more careful patients are less satisfied with their conventional complete denture prostheses.[14,15]

Patients' satisfaction with their dentition and dental treatment could be associated with some personality traits that might be considered as predictors for such evaluation. Examples of these traits are: self-respect, self-confidence, compliance, accommodating nature, quietness, extraversion, openness, anxiety, kindliness, neuroticism, and meticulousness.[16-20] AL-Omiri et al[18] and Al-Omiri and Abu Alhaija[19] concluded that certain personality profiles, such as extraversion and neuroticism, had influential effects on patients' perception of their dentofacial appearance. Other psychological traits, such as conscientiousness, openness, and agreeableness, were also found to affect different dimensions of dental satisfaction.[18-20]

The literature contains many studies exploring the unique and vague relationship between psychological profiles and satisfaction with the dental status in many fields of dentistry. Unfortunately, the literature lacks valid studies of the relationship between patients' oral health-related QoL, satisfaction with dentition, and personality profiles in patients with prosthetic rehabilitations. Further evaluation and careful scientific-based evidence are required to explore whether the assessment of certain patients' psychological traits can predict their oral health-related QoL and satisfaction with the dentition and dental treatment.

This study investigated the relationships between patients' satisfaction with dentition and dental treatment, oral health impacts, oral health-related QoL, and psychological traits in patients with prosthetic rehabilitations using valid and reliable sociodental and psychological measures.

Materials and methods

Thirty-seven patients [13 (35.1%) men, 24 (64.9%) women] with fitted prosthetic rehabilitations, aged between 17 and 66 years old (mean age: 37.6 ± 13.3 years), who were seeking routine dental care at the Dental Health Teaching Center, Jordan University of Science and Technology, Irbid, Jordan, were recruited into this study. The prosthetic rehabilitations considered were fixed (crown, bridge, or both), removable (RPD), or fixed and removable prostheses, and were all constructed by experienced clinicians. Ten patients (11.9%) had anterior prostheses, 22 patients (26.2%) had posterior prostheses, and 5 patients (6%) had posterior and anterior prostheses. Twenty patients (23.8%) had maxillary prostheses, 8 patients (9.5%) had mandibular prostheses, and 9 patients (10.7%) had maxillary and mandibular prostheses.

Levels of patients' education ranged from secondary to postgraduate education, with 14 patients (37.8%) with secondary education (up to high school), 9 patients (24.3%) with college education (up to 2 years after high school), 8 patients (21.6%) with university education, and 6 patients (16.2%) with higher postgraduate education. To be included in the study, recruited patients had to be 17 years of age or older in order to understand and score the questionnaires, with no medical disease (including mental problems and psychological disorders) that might affect their ability to understand and/or to score the questionnaires. An invitation to participate in the study was extended to the patients. Each participant was given a brief explanation of the study and an informed consent was obtained from each subject before being recruited into the study. The clinical procedures in this study were approved by the Dean of Research, Jordan University of Science and Technology.

Each patient was assessed thoroughly to record the status and position of prosthesis and teeth. Only patients with clinically successful prostheses were included. The prosthesis was not considered successful if it had poor marginal adaptation (open margins), poor occlusion, fractured or cracked ceramic, color mismatch and/or margin discoloration, or secondary caries on its margins. Also, patients with abutment pain, tenderness, caries, sensitivity, or marked periodontal findings and those with ill-fitting, loose, or inadequately functioning prostheses were excluded from the study. The assessment also included patients' dental and medical histories, complaints, and personal information regarding name, age, sex, education, occupation, address, and marital status.

One investigator (JK) conducted all clinical examinations in the Oral Diagnosis Clinic, Dental Health Teaching Center, Jordan University of Science and Technology. Intra-examiner reliability was performed on five duplicate clinical examinations using Kappa statistics. Kappa was 1.00, indicating substantial agreement, as examination criteria were very clear and simple.

An invitation to participate in the study was also extended to the controls. Each participant was given a brief explanation of the study, and an informed consent was obtained from each subject before being recruited into the study.

Thirty seven controls [13 (35.1%) men, 24 (64.9%) women] who had no prosthetic rehabilitations were also recruited into the study and had similar age, gender, and level of education as the patients. Controls' age ranged between 17 and 66 years (mean age: 36.5 ± 13 years). They had similar age, gender, and level of education as that of the study sample. They were recruited from a Jordanian population, including university students and employees. Dental students and employees were

excluded from the study to avoid any effect of their dental background on the results. They were all clinically assessed to rule out the presence of prosthetic rehabilitations or edentulous areas. Only those who were fully dentate (excluding third molars) and had no current active dental disease or prosthetic rehabilitations were recruited into the control group. Controls, who had dental care other than routine care such as simple fillings and scaling and polishing were excluded from the study.

Assessment of participants' satisfaction with their dentition was carried out using the Dental Impact on Daily Living (DIDL) questionnaire and its scale (Appendix).[5] This questionnaire was validated for the Jordanian population in previous studies and was found valid and reliable.[19,20] The DIDL consists of 36 items grouped into five dimensions: comfort, appearance, pain, performance, and eating restriction; impacts for each item are scored. The DIDL measures the impact and proportional importance of each dimension (weight of the dimension) to the individual. A weight for each dimension is calculated on an individual basis by dividing the summed responses of that dimension by the total possible scale score. To construct an overall score, scores within each dimension are first calculated by multiplying the summed dimension responses by the dimension weight. Weighted dimension scores are then summed to give a DIDL score. Total score of the DIDL ranged from -1 to $+1$ in all sample individuals.

The DIDL was chosen because it is easy to use for both patients and clinicians. The items of this tool were simple and could be easily understood and scored. In addition, this test can be completed in a relatively short time period. The literature reveals that this test is considered reliable, accurate, and reproducible.[5,19,20]

Each participant completed the NEO-FFI test to assess their personality profiles. The test consisted of 60 questions analyzing five major personality dimensions: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Each dimension was assessed using 12 questions. This test is a comprehensive method of measuring personality.[21] In addition, it has a good reliability and validity structure.[22,23] The NEO-FFI test was used because it is valid, reliable, simple, needs a short duration to answer, is easy to use statistically, and measures five dimensions of personality.[22,23] This questionnaire was validated for a Jordanian population in previous studies and was found valid and reliable.[19,20]

The Oral Health Impact Profile (OHIP) is founded on a conceptual oral health model outlined by Locker[24] and tailored from the WHO framework used to classify disabilities, handicaps, and impairments.[25] It measures self-reported discomfort, disability, and dysfunction caused by oral conditions.[26] The original test consists of 49 items grouped into seven domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.[26] The OHIP is sensitive to changes,[27-30] reliable,[29,31,32] and shows adequate cross-cultural consistency.[33-35]

A key advantage of the OHIP is that its statements were not conceived by dental professionals; instead, they were derived from a representative patient cluster.[11] This increases its sensitivity to the important social impacts of oral conditions that are considered important from the patient's point of view, and makes the OHIP among the most sophisticated measures of oral health.[36] A shorter version of the original OHIP is the OHIP-14, which consists of 14 items and has its response categories in the form of a Likert response format ranging from never (zero score) to very often (score 5).[31] The possible total OHIP-14 score ranges from 0 (no oral health impact) to 56 (worst possible oral health impact). It is also possible to calculate the frequency of impacts by summing the reported negative impacts (i.e., fairly often or very often) across the 14 statements. The OHIP-14 has adequate validity and reliability.[31,37,38]

The participants' oral health-related QoL was assessed using the United Kingdom Oral Health-Related Quality of Life measure (OHQoL-UK).[39] It consists of 16 items with a Likert response format ranging from very bad effect (score 1) to very good effect (score 5). The total score ranges between 80 (best possible effect on the quality of life) and 16 (worst possible effect on quality of life). The OHQoL-UK measures additional positive aspects of individuals' perception of oral health as well as the negative impacts.[39-41] It is a valid, reliable, and sensitive instrument to assess oral health-related QoL.[39,40]

The original English formats of both the OHIP-14 and OHQoL-UK questionnaires were translated into Arabic by two expert and fluent bilingual individuals and then translated back into English by another two individuals fluent in Arabic and English. Modifications to the questionnaires were made as necessary to ensure comprehension without affecting their format. Fifty bilingual undergraduate dental students at Jordan University of Science and Technology were asked to score the original English format of both questionnaires, and then they were asked to score the translated Arabic versions. The two formats for both questionnaires were compared using the *t*-test, and no statistically significant differences were found in either case. The questionnaires were administered to the patients and controls, and the process of completing the questionnaires was supervised by the investigator. Each participant was provided with a full explanation of the dimensions as well as the methods of scoring each questionnaire. Ten subjects answered the questionnaires twice, within a 1-week interval. Reliability test was carried out on all questions using correlation coefficient. The correlation coefficients were high and ranged from 0.8 to 0.94.

Statistical analysis

The data were analyzed using SPSS (Statistical Package for the Social Sciences, version 11.0, SPSS Inc., Chicago, IL). The association between the variables was analyzed using the Pearson correlation test, and ANOVA was used to compare different groups. For all statistical analysis, the significance level was set at $p \leq 0.05$.

Results

Total satisfaction scores of the DIDL questionnaire showed that 29.7% of patients were dissatisfied with their teeth and scored below 0; 54.1% were relatively satisfied and scored between 0 and 0.69; 6.2% were totally satisfied with their teeth. On the other hand, total satisfaction scores of the DIDL questionnaire showed that 21.6% of controls were dissatisfied with their teeth

Table 1 Scores of individual satisfaction dimensions (DIDL dimensions) in the study sample (N = 74)

	Dissatisfied		Relatively satisfied		Satisfied	
Dimension	Patients	Controls	Patients	Controls	Patients	Controls
Appearance	8 (21.6%)	14 (37.8%)	6 (16.2%)	8 (21.6%)	23 (62.2%)	15 (40.5%)
Pain	8 (21.6%)	11 (29.7%)	9 (24.3%)	5 (13.5%)	20 (54.1%)	21 (56.8%)
Oral comfort	17 (45.9%)	7 (18.9%)	1 (2.7%)	0 (0%)	19 (51.4%)	30 (81.1%)
General performance	11 (29.7%)	7 (18.9%)	1 (2.7%)	2 (5.4%)	25 (67.6%)	28 (75.7%)
Eating and chewing	9 (24.3%)	7 (18.9%)	4 (10.8%)	3 (8.1%)	24 (64.9%)	27 (73%)

and scored below 0; 64.9% were relatively satisfied and scored between 0 and 0.69, and 13.5% were totally satisfied with their teeth. Satisfaction with each dimension of the DIDL questionnaire among the study sample is shown in Table 1. The mean, standard deviations, and ranges for DIDL total scores, OHIP scores, and OHQoL-UK scores are summarized in Table 2. Table 3 shows the distribution of personality domains among patients and controls.

Comparison of groups

Using ANOVA, the DIDL total satisfaction score as well as all individual dimension satisfaction scores were not significantly different between patients and controls except that patients in the control group demonstrated more satisfaction with their oral comfort than the patient group ($p = 0.008$). Moreover, OHIP, OHQoL, and NEO-FFI scores were not significantly different between groups.

Correlations

Age, gender, and education levels of subjects were correlated to the scores of the DIDL, NEO-FFI, OHIP, and OHQoL-UK questionnaires to identify any significant relationships. Statistically significant relationships were detected between patients' gender and both the OHQoL-UK scores and extraversion scores (r = –0.36 and –0.40, respectively, and $p = 0.028$ and 0.013, respectively). Women scored lower than men on both OHQoL-UK and extraversion. Also, a negative relationship was detected between the levels of patients' education and neuroticism scores (r = –0.36, $p = 0.031$); however, among the control subjects, age, gender, and education levels had no significant correlations with the DIDL, NEO-FFI, OHIP, and OHQoL-UK scores, except a significant negative correlation between neuroticism and age (r = –0.56, $p < 0.001$). The higher the age, the lower the neuroticism scores. Prosthetic factors (position and type) had no relationship to the scores of the DIDL, OHIP, and OHQoL-UK questionnaires; however, patients with maxillary and mandibular prosthetic rehabilitations scored the lowest on neuroticism, while those with only maxillary prostheses scored the highest on neuroticism ($p = 0.039$, r = −0.34).

A significant negative correlation was found between the OHIP and OHQoL-UK scores ($p = 0.023$, r = −0.37). Patients with the least oral health impacts (lowest OHIP scores) were associated with best oral health-related QoL (highest scores of OHQoL-UK). Patients with the worst oral health impact (highest scores of OHIP) were associated with the worst effect on QoL (lowest scores of OHQoL-UK). A similar stronger significant correlation was also detected among controls ($p = 0.001$, r = −0.53).

A significant negative correlation was found between OHIP scores and all DIDL test scores (total satisfaction and satisfaction with each individual dimension). Patients with the least oral health impacts (lowest OHIP scores) were associated with the highest levels of total satisfaction and satisfaction with appearance, pain, oral comfort, general performance, and eating (p= 0.000, 0.033, 0.000, 0.000, 0.000, and 0.002, respectively; r = −0.79, –0.35, –0.59, –0.56, –0.58, and –0.50, respectively). Also, a significant positive correlation was found between OHQoL-UK scores and some DIDL test scores (total satisfaction and satisfaction with oral comfort, general performance, and eating dimensions). The best oral health-related QoL (highest scores of OHQoL-UK) was associated with the highest levels of total satisfaction, satisfaction with oral comfort, general performance, and eating ($p = 0.04$, 0.018, 0.049, and 0.022, respectively, r = 0.34, 0.39, 0.33, and 0.37, respectively). Within controls, a significant negative correlation was found between OHIP scores and total satisfaction ($p < 0.001$, r = –0.63) and satisfaction with appearance, pain, and eating ($p = 0.031$, 0.003, and 0.04, respectively; r = –0.36, –0.48, and –0.34, respectively). Subjects with the least oral health impacts (lowest OHIP scores) were associated with the highest levels of total satisfaction and satisfaction with appearance, pain, and eating. Also, a significant positive correlation was found between OHQoL-UK scores and total satisfaction ($p = 0.002$, r = 0.5) and satisfaction with appearance ($p = 0.021$,

Table 2 Means, standard deviations, and ranges for the total DIDL, OHIP, and OHQoL-UK scores among the study population

	Patients with prosthetic rehabilitations (N = 37)		Controls matched by age and sex (N = 37)	
	Mean (SD)	Range	Mean (SD)	Range
[1]DIDL total score	0.26 (0.44)	−0.77–1	0.24 (0.36)	−0.58–0.88
[2]OHIP score	17 (8.96)	0–32	17 (8.96)	4–43
[3]OHQoL-UK score	52.97 (12.5)	32–80	49.2 (13.7)	21–73

[1]DIDL = Dental Impact on Daily Living questionnaire. Higher scores on the DIDL indicate greater satisfaction.
[2]OHIP-14 = Oral Health Impact Profile. Higher scores on the OHIP-14 indicate greater oral health impact.
[3]OHQoL-UK = United Kingdom Oral Health-Related Quality of Life. Higher scores on the OHQoL-UK indicate greater health-related quality of life.

Table 3 Scores of personality domains in the study sample (N = 74)

	Low score		Average score		High score	
Personality domain	Patients	Controls	Patients	Controls	Patients	Controls
Neuroticism	2 (5.4%)	7 (18.9%)	18 (48.6%)	15 (40.5%)	17 (45.9%)	15 (40.5%)
Extraversion	4 (10.8%)	5 (13.5%)	20 (54.1%)	18 (48.6%)	13 (35.1%)	14 (37.8%)
Openness	25 (67.6%)	20 (54.1%)	11 (29.7%)	16 (43.2%)	1 (2.7%)	1 (2.7%)
Agreeableness	24 (64.9%)	28 (75.7%)	9 (24.3%)	9 (24.3%)	4 (10.8%)	0 (0.0%)
Conscientiousness	5 (13.5%)	10 (27.0%)	17 (45.9%)	17 (46.0%)	15 (40.5%)	10 (27%)

r = 0.38). The best oral health-related QoL (highest scores of OHQoL-UK) were associated with the highest levels of total satisfaction and satisfaction with appearance.

Among the NEO-FFI scores, only neuroticism was found to have significant relationships with OHIP, OHQoL-UK, and DIDL scores among patients. Patients with the least oral health impacts (lowest OHIP scores) were associated with the lowest neuroticism scores ($p = 0.006$, r = 0.44). Also, patients with the best oral health-related QoL (highest scores of OHQoL-UK) were associated with the lowest neuroticism scores ($p = 0.032$, r = –0.35). Moreover, neuroticism was negatively correlated to DIDL scores. The higher the neuroticism scores, the less the total satisfaction ($p < 0.001$, r = –0.58) and satisfaction with appearance, pain, oral comfort, and eating ($p = 0.035$, 0.047, 0.017, and 0.033, respectively; r = –0.35, –0.33, –0.39, and –0.35, respectively).

On the other hand, no significant relationship was found between any NEO-FFI score and OHIP or OHQoL scores within controls ($p > 0.05$). Nevertheless, NEO-FFI scores had some significant correlations with DIDL scores. Extraversion had a significant positive relationship with total satisfaction ($p = 0.02$, r = 0.38) and a significant negative relationship with satisfaction with eating ($p = 0.033$, r = –0.35). The higher the extraversion scores, the higher the total satisfaction and the lower the satisfaction with eating. Openness had a significant negative relationship with satisfaction with appearance, general performance, and eating ($p = 0.015$, 0.025, and 0.019, respectively; r = –0.4, –0.37, and –0.38, respectively). The higher the openness scores, the lower the satisfaction with appearance, general performance, and eating. Furthermore, conscientiousness had a negative significant relationship with satisfaction with appearance ($p = 0.002$, r = –0.49). The higher the conscientiousness scores, the lower the satisfaction with appearance.

Discussion

A sociodental instrument, the DIDL, was used in this study, because unlike other sociodental indicators, it assesses the dental impact on daily living, the relative importance that respondents attribute to each dimension, and oral status. Additionally, as impacts seldom occur separately, a single impact score is given to assess total oral impact. Since there are important links between QoL and clinical oral status, the significant impacts should be used to assess needs. Instruments such as the OHIP do not weight dimension scores and then combine the weighted scores into a single score, as does the DIDL. Both the DIDL and OHIP allow a respondent to indicate whether a problem is entirely internal or if it has interpersonal or social impacts. The instrument has been tested for validity and reliability and thus was chosen for this study.[5,19,20]

It was found that women with prosthetic rehabilitations scored lower than men on both OHQoL-UK and extraversion. This is possibly because patients, especially women, with prosthetic rehabilitations suffered some shortcomings related to their dentition that led to some effect on their QoL and contact with people; thus they became more introverted. Women in the control group showed no difference from men in such aspects, as they had no gross oral problems.

Among controls, it was found that the higher the age, the lower the neuroticism scores. This is possibly because older individuals are more stable psychologically and lead less stressful social lives than younger ones. Patients with fitted prosthetic rehabilitations showed no such tendency, and this might be because their critical oral demands and concerns in respect to their appearance and function might have masked the effects of their age on their neuroticism scores.

Also, the higher the levels of patients' education, the lower the neuroticism scores. This is possibly because highly educated patients lead less stressful lives than less educated ones; however, no such relationship was detected among controls.

An interesting finding was that prosthetic factors (position and type) had no relationship to the scores of the DIDL, OHIP, and OHQoL-UK questionnaires. This might be because prosthetic rehabilitations had restored the compromised oral status, and thus reduced the effects of oral disease on satisfaction and QoL; however, patients with maxillary and mandibular prosthetic rehabilitations scored the lowest on neuroticism, while those with only maxillary prostheses scored the highest on neuroticism. This could be because more prosthetic rehabilitations might be a sign of less general care and indifference regarding oral health and thus associated with less oral health-related levels of neuroticism.

The results of this study revealed the direct relation between OHIP scores and all DIDL test scores (total satisfaction and satisfaction with each individual dimension). Patients with the least oral health impacts were associated with the highest levels of total satisfaction and satisfaction with appearance, pain, oral comfort, general performance, and eating. Also, control subjects with the least oral health impacts were associated with the highest levels of total satisfaction and satisfaction with appearance, pain, and eating. This agrees with the fact that both instruments are sociodental indicators used to measure the impacts of oral health on individual's life.

The results of this study showed that patients with the least oral health impacts were associated with best oral health-related

QoL, while patients with the worst oral health impacts were associated with the worst effect on QoL. A similar finding was also detected among controls. This concurs with the findings of previous studies.[27,37,38,40-45]

Furthermore, some DIDL test scores (total satisfaction and satisfaction with oral comfort, general performance, and eating dimensions) were directly related to OHQoL-UK scores among patients. The best oral health-related QoL was associated with the highest levels of total satisfaction and satisfaction with oral comfort, general performance, and eating. Also, the best oral health-related QoL (highest scores of OHQoL-UK) were associated with the highest levels of total satisfaction and satisfaction with appearance. This finding confirms the results of previous studies that established the relationship between QoL and DIDL scores.[18-20] Satisfaction with the oral cavity reduces the negative impacts of the oral cavity on patients, and consequently provides the patients with better QoL. In addition, some results of this study (the direct relation between OHIP scores and all DIDL test scores as well as between OHIP and OHQoL-UK scores) support this finding.

Neuroticism (including anxiety, anger, hostility, depression, self-consciousness, impulsiveness, and vulnerability) was the only personality dimension that had significant relationships with each of OHIP, OHQoL-UK, and DIDL scores among patients. The higher the neuroticism scores, the more negative the oral health impacts, the worse the oral health-related QoL, and the lower the total satisfaction with dentition and satisfaction with appearance, pain, oral comfort, and eating; however, controls had no significant relationship between their neuroticism scores and DIDL, OHIP, or OHQoL scores. The linear regression analysis demonstrated that neuroticism could significantly predict OHIP scores, OHQoL-UK scores, total satisfaction, satisfaction with appearance, satisfaction with pain, satisfaction with oral comfort, and satisfaction with eating. Also, total satisfaction could significantly predict neuroticism.

The above findings support the results of previous studies that established a relationship between satisfaction with the dentition and personality profiles.[18-20] Patients with higher neuroticism are more self-conscious and aware of their medical health, including any problems with their oral cavity, and thus will show inferior QoL and less satisfaction with their dentition. In addition, psychological factors have a profound role in shaping patients' satisfaction with dental treatment, as patients with higher levels of neuroticism will be less satisfied with dental treatment.[12,19,20] Furthermore, dental prostheses might be a significant source of concern to patients, and thus might affect their personality profile and increase the levels of their neuroticism.[10]

From the above discussion, it is possible that some psychological aspects (neuroticism) might play some role and explain dental impacts on daily living, oral health-related QoL, and patients' satisfaction with their dentition. They might also predict satisfactory outcomes before commencing dental treatment, which might save time and cost if the prediction is not favorable.[18-20] On the other hand, satisfaction with the dentition might affect patients' levels of neuroticism and concerns. So, before starting dental treatment it might be wise to evaluate patients' personality profiles and if certain profiles, like high neuroticism, are detected, then healthcare professionals can pay more attention to patients' expectations and response to the offered treatment. They could be more cautious in providing expensive, prolonged dental treatments that might be faced with patients' rejection or dissatisfaction before carefully deciding whether to go for such kind of treatments or simply change their treatment plans to reversible or less expensive ones. Results from this study are the first into the relationships between oral health impacts, QoL, satisfaction with the dentition, and psychological profiles among the Jordanian population. It is worth mentioning that the size of the study sample is small, and this might affect the results obtained via this study; however, the study casts light on the issue of relationships between oral health impacts, QoL, satisfaction with dentition, and psychological profiles. Further investigations in this regard are required on larger samples, especially to evaluate the effects of other factors such as treatment costs in private versus university settings as well as effects of being treated by students versus experienced clinicians.

Conclusion

Within the limitations of this study; the following conclusions can be drawn:

1. Patients' satisfaction with different aspects of their dentition and prosthetic rehabilitations might have positive effects on patients' oral health-related QoL and oral health impacts. This in turn might improve patients' daily living and dental perceptions.
2. Personality profiles might influence patients' perception of their dentition and might affect patients' satisfaction with their dentition, oral health impacts, and oral health-related QoL. Certain personality profiles, neuroticism in this study, might be used for the assessment and prediction of patients' satisfaction with their dentition, oral health impacts, and QoL.
3. Professionals might consider this, to produce suitable treatment for their patients, thus avoiding the negative effects of prosthetic rehabilitations on these aspects (i.e., neuroticism). They might also consider preparing their patients sociopsychologically to accept the offered management for their dentition.

Acknowledgments

The authors wish to thank Mrs. M. AbdelAziz for all her help during the preparation of this article. The authors also wish to thank Jordan University of Science and Technology for making this study possible.

Appendix: Dental impact on daily living (DIDL) questionnaire items and their respective dimensions

Appearance dimension

1. I am satisfied with my teeth in general.
2. I am satisfied with the appearance of my teeth.
3. I am satisfied with the color of my teeth.
4. I am satisfied with the position of my teeth.

Pain dimension

5. I feel spontaneous pain in my teeth.
6. I feel dental pain when eating or drinking hot or cold.
7. I changed my food because of pain.
8. I feel pain in my jaw joint.

Oral comfort dimension

9. I have worries with my teeth.
10. I suffer from food packing between my teeth.
11. I have halitosis and bad smelling breath.
12. I have loose teeth.
13. I am not satisfied with my gums.
14. I have bleeding gums.
15. I have sensitivity to hot or cold due to gum recession.

General performance dimension

16. My work is affected by the appearance of my teeth.
17. My work is affected by ability to eat and talk.
18. My contact with people is affected by the appearance of my teeth.
19. My contact with people is affected by my ability to eat and talk.
20. My contact with people is affected by dental pain.
21. My romance is affected by dental pain.
22. My romance is affected by my ability to eat and talk.
23. My self-confidence is affected by appearance of my teeth.
24. I feel embarrassment because of my teeth.
25. My romance is affected by the appearance of my teeth.
26. I try to avoid showing my teeth when I smile.
27. I am not satisfied with my smile.
28. My work is affected by pain.
29. I feel stress because of pain.
30. I sleep badly because of pain.

Eating and chewing dimension

31. I am satisfied with the capacity to chew.
32. I am satisfied with chewing in general.
33. I am satisfied with the capacity to bite.
34. I am satisfied with biting in general.
35. I did not change the way of food preparation because of teeth.
36. I did not change the type of food because of teeth.

References

1. Steele JG, Ayatollahi SM, Walls AW, et al: Clinical factors related to reported satisfaction with oral function amongst dentate older adults in England. Community Dent Oral Epidemiol 1997;25:143-149
2. Reisine S: Dental disease and work loss. J Dent Res 1984;63:1158-1161
3. Gift H, Reisine S, Larach D: The social impact of dental problems and visits. Am J Public Health 1992;82:1163-1168
4. Nikias M, Sollecito M, Fink R: An empirical approach to developing multi dimensional oral status profiles. J Public Health Dent 1978;38:148-158
5. Leao A, Sheiham A: Relation between clinical dental status and subjective impacts on daily living. J Dent Res 1995;74:1408-1413
6. Slade GD, Spencer AJ: Social impact of oral conditions among older adults. Aust Dent J 1994;39:358-364
7. Strauss RP, Hunt RJ: Understanding the value of teeth to older adults: influences on the quality of life. J Am Dent Assoc 1993;124:105-110
8. Locker D, Slade G: Oral health and the quality of life among older adults: the oral health impact profile. J Can Dent Assoc 1993;59:830-838, 844
9. Cushing AM, Sheiham A, Maizels J: Developing socio-dental indicators–the social impact of dental disease. Community Dent Health 1986;3:3-17
10. Branchi R, Boddi V, Corti D, et al: Can a prosthesis cause psychological disturbances? J Oral Rehabil 2001;28:1133-1138
11. Allen PF: Assessment of oral health related quality of life. Health Qual Life Outcomes 2003;1:40
12. Freeman HL: Quantifying quality. Neuroendocrinology Letters 1999;20:263
13. Piedmont RL: The Revised NEO Personality Inventory: Clinical and Research Applications. New York, Plenum, 1998, pp. 1-20
14. Guckes AD, Smith DE, Swoope CC: Counseling and related factors influencing satisfaction with dentures. J Prosthet Dent 1978;39:259-267
15. Reeve P, Stafford GD, Watson C, et al: The use of Cattell's personality profile in patients who have had preprosthetic surgery. J Dent 1982;10:121-130
16. Mehra T, Nanda RS, Sinha PK: Orthodontists' assessment and management of patient compliance. Angle Orthod 1998;68:115-122
17. Dong H, Bogg L, Rehnberg C, et al: Health financing policies. Providers' opinions and prescribing behavior in rural China. Int J Technol Assess Health Care 1999;15:686-698
18. AL-Omiri MK, Lamey PJ, Cooper C, et al: Relationship between personality and satisfaction with the dentition in tooth wear patients. Eur J Prosthodont Restor Dent 2006;14:179-184
19. Al-Omiri MK, Abu Alhaija ES: Factors affecting patient satisfaction after orthodontic treatment. Angle Orthod 2006;76:422-431
20. Abu Hantash RO, AL-Omiri MK, AL-Wahadni AM: Psychological impact on implant patients' oral health related quality of life. Clin Oral Impl Res 2006;17:116-123
21. Costa PT Jr, McCrae RR: Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual. Lutz, FL, Psychological Assessment Resources, 1992, pp. 1-55
22. Saucier G. Replicable item-cluster subcomponents in the NEO Five-Factor Inventory. J Pers Assess 1998;70:263-276
23. Kline P: The Handbook of Psychological Testing (ed 2). London, Routledge, 2000, pp. 489-538
24. Locker D: Measuring oral health: a conceptual framework. Community Dent Health 1988;5:3-18
25. WHO: International Classification of Impairments, Disabilities and Handicaps. A manual of classification relating to the consequences of disease. Geneva, WHO, 1980, pp. 45-185
26. Slade GD, Spencer AJ: Development and evaluation of the oral health impact profile. Community Dent Health 1994;11:3-11
27. Slade GD: Assessing change in quality of life using the oral health impact profile. Community Dent Oral Epidemiol 1998;26:52-61

28. Heydecke G, Locker D, Awad MA, et al: Oral and general health related quality of life with conventional and implant dentures. Community Dent Oral Epidemiol 2003;31:161-168
29. Locker D, Jokovic A, Clarke M: Assessing the responsiveness of measures of oral health-related quality of life. Community Dent Oral Epidemiol 2004;32:10-18
30. Allen PF, McMillan AS, Locker D: An assessment of sensitivity to change of the Oral Health Impact Profile in a clinical trial. Community Dent Oral Epidemiol 2001;29:175-182
31. Slade GD: Derivation and validation of a short-form Oral Health Impact Profile. Community Dent Oral Epidemiol 1997;25:284-290
32. Soe KK, Gelbier S, Robinson PG: Reliability and validity of two oral health related quality of life measures in Myanmar adolescents. Community Dent Health 2004;21:306-311
33. Allison P, Locker D, Jokovic A, et al: A cross-cultural study of oral health values. J Dent Res 1999;78:643-649
34. McMillan AS, Wong MCM, Lo ECM, et al: The impact of oral disease among the institutionalized and non-institutionalized elderly in Hong Kong. J Oral Rehabil 2003;30:46-54
35. Lopez R, Baelum V: Spanish version of the Oral Health Impact Profile (OHIP-Sp). BMC Oral Health 2006;6:11
36. Locker D: Issues in measuring change in self-perceived oral health status. Comm Dent Oral Epidemiol 1998;26:41-47
37. Allen PF, Locker D: A modified short version of the Oral Health Impact Profile for assessing health related quality of life in edentulous adults. Int J Prosthodont 2002;15:446-450
38. Brennan DS, Spencer AJ: Dimensions of oral health related quality of life measured by EQ-5D+ and OHIP-14. Health Qual Life Outcomes 2004;2:35
39. McGrath C, Bedi R: An evaluation of a new measure of oral health related quality of life OHQoL-U.K (W). Community Dent Health 2001;18:138-143
40. McGrath C, Comfort MB, Lo ECM, et al: Patient centred outcome measures in oral surgery: validity and sensitivity. Br J Oral and Maxillofac Surg 2003;41:43-47
41. John MT, Slade GD, Szentpetery A, et al: Oral health related quality of life in patients treated with fixed, removable, and complete denture 1 month and 6–12 months after treatment. Int J Prosthodont 2004;17:503-511
42. Gherunpong S, Tsakos G, Sheiham A: Developing and evaluating an oral health-related quality of life index for children: the CHILD-OIDP. Community Dent Health 2004;21:161-169
43. John MT, LeResche L, Koepsell TD, et al: Oral health-related quality of life in Germany. Eur J Oral Sci 2003;111:483-491
44. Needleman I, McGrath C, Floyd P, et al: Impact of oral health on the life quality of periodontal patients. J Clin Periodontol 2004;31:454-457
45. John MT, Hujoel P, Miglioretti DL, et al: Dimensions of oral-health-related quality of life. J Dent Res 2004;83:956-960