Relationship Between Patients' Oral Health–Related Quality of Life, Satisfaction with Dentition, and Personality Profiles

Jumana Karasneh, BDS, PhD; Mahmoud K. Al-Omiri, BDS, PhD, FDS RCS (England); Khaled Q. Al-Hamad, BDS, MSc, MRD RCSEd; Firas A. M. Al Quran, BDS, MSc, PhD

Abstract

Aim: The aim of this study was to investigate the relationship between patients' oral health–related quality of life, satisfaction with their dentition, and their personality profiles.

Methods and Materials: Eighty-four patients (30 males and 54 females; mean age 31.9±12.7 years) seeking routine dental treatment were recruited for this study. A "Dental Impact on Daily Living" (DIDL) questionnaire was used to assess dental satisfaction and impact on daily living. An "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 using the "United Kingdom Oral Health Related Quality of Life" measure (OHQoL-U.K). A "NEO Five Factor inventory" (NEO-FFI) was used to assess personality profiles.

Results: The dentition has a measurable impact on daily living as well as with satisfaction with appearance, pain levels, oral comfort, general performance, and eating capability (p=0.000). Younger patients had more profound oral health impacts (p=0.045) and higher neuroticism scores (0.043). OHIP scores were significantly related to OHQoL-UK scores (p=0.000). DIDL scores had significant correlations with OHIP and OHQoL-UK scores (p<0.05). Significant correlations were established between neuroticism and satisfaction with oral comfort, extraversion and total satisfaction and satisfaction with general performance, and openness and satisfaction with appearance (p<0.05). OHIP and OHQoL-UK scores had no significant correlations with psychological profiles.

Conclusions: The status of the oral cavity can have a definitive impact on patients' daily living and quality of life regardless age, gender, and level of education. Patients' satisfaction with their dentition has definitive impacts on daily living, quality of life, and dental perceptions. Personality profiles (neuroticism; extraversion, and openness) may influence dental perceptions, play a significant role in shaping satisfaction with dentition, and help with the prediction of the dental impact on daily living.

Dental Impact On DAILY LIVING

Clinical Significance: Since patients' satisfaction with their dentitions impacts their daily living and quality of life while affected by their psychological profiles, this should be considered when formulating a treatment plan for management for their dentition in order to obtain patient acceptance of the proposed treatment.

Keywords: DIDL, OHIP, OHQoL-Uk, NEO-FFI, dental impact on daily living, oral health, psychology.

Citation: Karasneh J, Al-Omiri MK, Al-Hamad KQ, Al Quran FAM. Relationship Between Patients' Oral Health–Related Quality of Life, Satisfaction with Dentition, and Personality Profiles. J Contemp Dent Pract [Internet]. 2009 Nov; 10(6):049-056. Available from: http://www.thejcdp.com/journal/view/volume10-issue6-karasneh.

Introduction

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 impact 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 has been increasingly acknowledged over the last few decades and many studies


Dentist / Patient
RELATIONSHIP

have highlighted the psychosocial impact of oral conditions. Reisine[2] and Gift et al.[3] reported the loss of nearly 160 million work hours a year related to oral problems. Oral conditions might affect social functioning and behaviors such as the ability to work, school attendance, and carrying out parental or household duties.[4]

Dentofacial problems have known effects on patients' satisfaction with their dentition as it affects 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[7] concluded 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.

Various factors such as chewing ability, taste, pain, speech, and aesthetics could affect different aspects of life quality as well as satisfaction with the dentition.[5,8] Different levels of oral health status have varying impacts on people's daily living; therefore, the clinical status and psychological dimensions should be assessed whenever dental needs are assessed.[5,9] The clinician should be mindful of some patients who are not satisfied with their oral condition even if it is favorable, or of any dental treatment received regardless of the quality of care. On the other hand, some patients are satisfied with their dentition and dental treatment even when they are unfavorable because of their high level of psychogenic tolerance.[10,11]

Clinical indices that measure absence or presence of oral disease are the center of traditional methods of measuring oral health. Such methods do not identify patients' feelings of oral wellbeing and their ability to function properly. This shortcoming was the basis for the development of oral health–related quality of life measures to assess oral wellbeing and oral impacts on the quality of life.[11] Measures used to detect oral health–related quality of life provide important information about the impact of oral disease on social functioning and behaviors, the evaluation of treatment needs, assessment of clinical decisions, oral health services, as well as plans and programs directed to improve oral health.[4,12-26]

Disease-specific or generic measures are used to assess health-related quality of life. Disease-specific measures assess disease-related
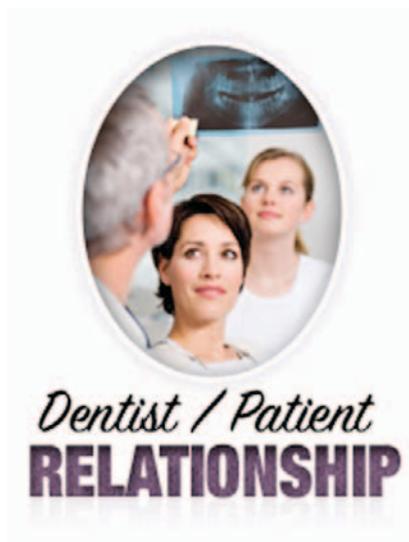
attributes and provide greater sensitivity to the clinical condition in question. Generic measures, on the other hand, are used to compare between different diseases and when the related variables are addressed. Together these measures could tackle both clinical and broader strategy questions, and identify unpredicted differences.[27]

The literature has shown patient 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 patient satisfaction and compliance with dental status and treatment.[28] The assessment of personality characteristics might be useful in predicting patient behavior and may have an effect on the provision of therapy.[29] 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 were found to be less satisfied with their conventional complete denture prostheses.[30,31]

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, quietness, extraversion, openness, anxiety, kindliness, neuroticism, and meticulousness.[32-37] Al-Omiri et al.[35] and Al-Omiri and Abu Alhaija[36] 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.[34-37]

The literature contains many studies that explored 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 patient oral health–related quality of life, satisfaction with dentition, and personality profiles. Further evaluation and careful scientific-based evidence are required to explore whether the assessment of certain psychological traits of patients can predict their oral health–related quality of life and satisfaction with their dentitions.

This study investigates the relationships between patient satisfaction with dentition, oral health impacts, oral health–related quality of life, and psychological traits using valid and reliable socio-dental and psychological measures.

Methods and Materials

Eighty-four consecutive patients were recruited into this study that included 30 men (35.7%) and 54 women (64.3%) between 17 and 66 years of age (mean age: 31.92 years, SD: 12.7 years), who sought routine dental care at the Dental Health Teaching Center of the Jordan University of Science and Technology in Irbid, Jordan.

Recruited patients had to be 17 years of age or older for inclusion in the study 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. All clinical procedures were approved by the dean of research of the Jordan University of Science and Technology.

One investigator conducted all clinical examinations in the Oral Diagnosis Clinic, where each patient was assessed thoroughly to record the position and number of teeth. The

assessment also included patient dental and medical histories, complaints, and personal information regarding name, age, gender, education, occupation, address, and marital status. Intra-examiner reliability was performed on five duplicate clinical examinations using Kappa statistics. Kappa was 1.00, indicating substantial agreement.

Dental Impact on Daily Living Questionnaire (DIDL)

Assessment of patients' satisfaction with their dentition was carried out using the Dental Impact on Daily Living Questionnaire (DIDL) and its scale (Figure 1).[5,34,38] This questionnaire was validated for the Jordanian population in previous studies and was found to be valid and reliable.[36,37,39]

The DIDL consists of 36 items grouped into five dimensions—comfort, appearance, pain, performance, and eating restriction—and impacts for each item are scored. It measures the impact and proportional importance of each dimension (weight of the dimension) to the patient. 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. Patients responded to each item by selecting one of three response categories in the form of a Likert response format that includes agree (score +1), disagree (score −1), or neutral (score 0).

The DIDL was chosen in this study because it is an efficient tool for use by the patients and clinicians that can be completed within a relatively short time period. The items of this tool were simple and could be easily understood and scored. The literature confirms the test to be considered reliable, accurate, and reproducible.[5,34,36-39]

NEO Five Factor Inventory (NEO-FFI)

Each participant completed the NEO-FFI test to assess his/her personality profile. The test consisted of 60 questions analyzing the 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.[40] In addition, it has a good reliability and validity structure.[41,42]

The NEO-FFI test was used in this study because it measures five dimensions of personality; it is simple and can be completed in a short time; it is valid, reliable, and easy to use statistically.[34,41,42] This questionnaire was validated for the Jordanian population in previous studies and was found valid and reliable.[36,37,39]

Oral Health Impact Profile (OHIP)

The OHIP is a questionnaire founded on a conceptual oral health model outlined by Locker[43] and tailored from the WHO framework used to classify disabilities, handicaps, and impairments,[44] and it measures self-reported discomfort, disability, and dysfunction caused by oral conditions.[45] 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.[45] The OHIP is sensitive to changes;[16,46-48] is reliable;[47,49,50] and shows adequate cross-cultural consistency.[51-53]

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.[54]

A shorter version of the original OHIP[49] is the OHIP-14 that consists of 14 items and has its response categories in the form of a Likert response format that ranges from never (zero score) to very often (score 5). 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.[49,55,56]

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 colour of my teeth.
4. I am satisfied with the position of my teeth.

Pain Dimension

1. I feel spontaneous pain in my teeth.
2. I feel dental pain when eating or drinking hot or cold.
3. I changed my food because of pain.
4. I feel pain in my jaw joint.

Oral Comfort Dimension

1. I have worries with my teeth.
2. I suffer from food packing between my teeth.
3. I have halitosis and bad smelling breath.
4. I have loose teeth.
5. I am not satisfied with my gums.
6. I have bleeding gums.
7. I have sensitivity to hot or cold due to gum recession.

General Performance Dimension

1. My work capacities are affected by the appearance of my teeth.
2. My work capacities are affected by ability to eat and talk.
3. My contact with people is affected by the appearance of my teeth.
4. My contact with people is affected by my ability to eat and talk
5. My contact with people is affected by dental pain.
6. My romance is affected by dental pain.
7. My romance is affected by my ability to eat and talk.
8. My self-confidence is affected by appearance of my teeth.
9. I feel embarrassment because of my teeth.
10. My romance is affected by the appearance of my teeth.
11. I try to avoid showing my teeth when I smile.
12. I am not satisfied with my smile.
13. My work capacity is affected by pain.
14. I feel stress because of pain.
15. I sleep badly because of pain.

Eating and Chewing Dimension

1. I am satisfied with the capacity to chew.
2. I am satisfied with chewing in general.
3. I am satisfied with the capacity to bite.
4. I am satisfied with biting in general.
5. I did not change the way of food preparation because of teeth.
6. I did not change the type of food because of teeth.

Figure 1. Dental Impact on Daily Living Questionnaire items and their respective dimensions.

United Kingdom Oral Health Related Quality of Life Measure (OHQoL-UK)

Oral health–related quality of life was assessed using the OHQoL-UK.[57] It consists of 16 items with a Likert response format that ranges 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 the quality of life).

OHQoL-UK measures additional positive aspects of patients' perception of oral health as well as the negative impacts.[57-59] It is valid, reliable and sensitive instrument to assess oral health related quality of life.[57,58]

The original English formats of both the OHIP-14 and the OHQoL-UK questionnaires were translated into the Arabic language by two expert and fluent bilingual individuals and then back-translated into English by another two individuals who were fluent in Arabic and English. Modifications to the questionnaires were made as necessary to ensure comprehension. Fifty 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 the process of completing the questionnaires was supervised by the investigator. Each patient was provided with a full explanation of the dimensions as well as the methods of scoring each questionnaire. Ten subjects answered the questionnaires twice with a one-week interval. The reliability test was carried out on all questions using the correlation coefficient. The correlation coefficients were high and ranged from 0.8 to 0.94.

Statistical Analysis

The data were analyzed using the SPSS software (Statistical Package for the Social Sciences, version 11.0, SPSS Inc., Chicago, IL, USA). The association between the variables was analyzed using the Pearson correlation test and t-test. For all statistical analyses, the significance level was set at $p \leq 0.05$.

Results

Eighty-four consecutive patients were recruited into this study that included 30 men (35.7%) and 54 women (64.3%) between 17 and 66 years of age (mean age: 31.92 years, SD: 12.7 years). The levels of patients' education ranged from secondary to postgraduate education with 30 patients (35.7%) having received a secondary education (up to level A), 13 patients (15.5%) having received a college education (up to two years after level A), 32 patients (38.1%) having received a university education, and 9 patients (10.7%) having received a higher postgraduate education.

Excluding third molars, Table 1 presents the number of missing teeth among the study sample. Thirty patients (35.7%) had no missing teeth and 54 patients (64.3%) had one to seven missing teeth. Twenty-four patients (28.6%) had missing teeth from the upper jaw, 15 patients (17.9%) had missing teeth from the lower jaw, and 15 patients (17.9%) had missing teeth from both upper and

Table 1. Distribution of missing teeth among the study sample (n=84).

Missing Teeth	Frequency (%)
0	30 (35.7)
1	25 (29.8)
2	17 (20.2)
3	5 (6)
4	4 (4.8)
6	2 (2.4)
7	1 (1.2)

Table 2. Scores of individual satisfaction dimensions (DIDL dimensions) in the study sample (n=84).

Dimension	Dissatisfied	Relatively Satisfied	Satisfied
Appearance	29 (34.5%)	15 (17.9%)	40 (47.6%)
Pain	23 (27.4%)	18 (21.4%)	43 (51.2%)
Oral comfort	29 (34.5%)	2 (2.4%)	53 (63.1%)
General performance	23 (27.4%)	3 (3.6%)	58 (69%)
Eating and chewing	21 (25%)	9 (10.7%)	54 (64.3%)

Table 3. Scores of personality domains in the study sample (n=84).

Personality Domain	Low Score	Average Score	High Score
Neuroticism	12 (14.3%)	37 (44%)	35 (41.7%)
Extraversion	10 (11.9%)	40 (47.6%)	34 (40.5%)
Openness	49 (58.3%)	33 (39.3%)	2 (2.4%)
Agreeableness	60 (71.4%)	19 (22.6%)	5 (6%)
Conscientiousness	16 (19%)	36 (42.9%)	32 (38.1%)

lower jaws. Ten patients (11.9%) had the teeth missing from the anterior area, 40 (47.6%) patients had the teeth missing from the posterior area, and 4 (4.8%) patients had the teeth missing from both anterior and posterior areas.

Total satisfaction scores of the DIDL questionnaire showed that 32.1% of patients were dissatisfied with their teeth and scored below 0, 55.2% were relatively satisfied and scored between 0 and 0.69, and 12.7% were totally satisfied with their teeth. The highest total satisfaction score was +1.0 while the lowest total satisfaction score was –0.77 (mean: 0.2; SD: 0.4). Satisfaction with each dimension of the DIDL questionnaire among the study sample is shown in Table 2.

Regarding the OHIP scores, the highest OHIP score was 43, while the lowest was 0 (mean: 16.48; SD: 10.02). Also, the highest OHQoL-UK score was 80, while the lowest score was 21 (mean: 50.44; SD: 13.52).

Table 3 shows the distribution of personality domains among the subjects with 14.3% of subjects showing low neuroticism scores, 44% having average scores, and 41.7% having high neuroticism scores. With regard to extraversion, 11.9% of subjects had low scores, 47.6% had average scores, and 40.5% had high extraversion scores. As for the issue of openness, 58.3% of subjects had low scores, 39.3% had average scores, and 2.4% had high openness scores. Agreeableness findings showed 71.4% of subjects had low scores, 22.6% had average scores, and 6% had high agreeableness scores. Considering conscientiousness, 19% of subjects had low scores, 42.9% had average scores, and 38.1% had high conscientiousness scores.

Correlations

Age, gender, and education levels of subjects were correlated to the scores of the DIDL, NEO-FFI, OHIP, and OHQoL-UK questionnaires (Table 4).

No statistically significant relationships were detected except a negative significant relationship between age and both the OHIP and neuroticism scores (p=0.045 and 0.043 respectively). Both genders and different levels of education were comparable in their scores of the aforementioned questionnaires (p>0.05).

Table 4. Correlations between DIDL, NEO-FFI, OHIP, and OHQoL-UK scores and age, gender, education, and number and position of missing teeth.

	Age	Gender	Education	Missing Teeth #	Missing Teeth Position
DIDL Scores: **1. Total satisfaction** R= P(2-tailed t-test)=	NS	NS	NS	NS	−0.252 0.021*
2. Appearance R= P(2-tailed t-test)=	NS	NS	NS	NS	−0.216 0.048*
3. Oral comfort R= P(2-tailed t-test)=	NS	NS	NS	NS	−0.243 0.026*
4. Other DIDL dimensions R= P(2-tailed t-test)=	NS	NS	NS	NS	NS
OHIP R= P(2-tailed t-test)=	−0.219 0.045*	NS	NS	NS	NS
OHQoL-UK R= P(2-tailed t-test)=	NS	NS	NS	NS	NS
NEO-FFI scores: **1. Neuroticism** R= P(2-tailed t-test)=	−0.221 0.043*	NS	NS	NS	NS
2. Other NEO-FFI dimensions. R= P(2-tailed t-test)=	NS	NS	NS	NS	NS

R = Pearson's correlation coefficient, * = Significant relation, NS= Not significant relation

There were significant correlations between a jaw with missing teeth and some DIDL scores, including patient total satisfaction (p=0.021) and patient satisfaction with only appearance and oral comfort (p=0.048 and 0.026 respectively). The loss of teeth from both jaws was associated with the highest dissatisfaction while the loss of teeth from the upper jaw was associated with the lowest levels of dissatisfaction. However, the number of missing teeth has no relationship with the DIDL scores (p>0.05). Also, no significant relationship was detected between the number and position of missing teeth and each of NEO-FFI, OHIP, and OHQoL-UK scores (p>0.05).

Table 5 shows correlations between DIDL, OHIP, and OHQoL-UK scores among the study population. A highly significant negative correlation was found between the OHIP and OHQoL-UK scores (p=0.000). Patients with the least oral health impacts (lowest OHIP scores) were associated with the best oral health–related quality of life (highest scores of OHQoL-UK). Patients with the worst oral health impact (highest scores of OHIP) were associated with the worst effect on quality of life (lowest scores of OHQoL-UK).

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, 0.002, 0.000, 0.000, 0.003, and

0.000 respectively). Also, a significant positive correlation was found between OHQoL-UK scores and some DIDL test scores (total satisfaction and satisfaction with appearance, pain, and eating dimensions). The best oral health–related quality of life (highest scores of OHQoL-UK) was associated with the highest levels of total satisfaction, satisfaction with appearance, pain, and eating (p=0.000, 0.002, 0.030, and 0.024 respectively).

Table 6 shows the correlations between NEO-FFI scores and each of DIDL, OHIP, and OHQoL-UK scores among the study population. No significant relationship was detected between NEO-FFI scores and each of OHIP and OHQoL-UK scores (p>0.05). Oral health impacts and oral health–related quality of life were not related to personality profiles. On the other hand, some NEO-FFI scores and some DIDL scores were significantly correlated. Neuroticism was

negatively correlated to oral comfort (p=0.006): the higher the neuroticism scores, the less the satisfaction with oral comfort. Also, extraversion was negatively correlated to total satisfaction and satisfaction with general performance (p=0.040 and 0.047 respectively): the higher the extraversion scores, the less the total satisfaction and the satisfaction with general performance. Moreover, openness was negatively correlated to appearance (p=0.039): the higher the openness scores, the less the satisfaction with appearance.

Discussion

The DIDL is a socio-dental instrument used in this study because, unlike other socio-dental 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,

Table 5. Correlations between DIDL, OHIP, and OHQoL-UK scores among the study population.

	OHIP	OHQoL-UK
DIDL Scores:		
1. Total satisfaction R=	−0.690	0.430
P(2-tailed t-test)=	0.000*	0.000*
2. Appearance R=	−0.334	0.333
P(2-tailed t-test)=	0.002*	0.002*
3. Pain R=	−0.533	0.237
P(2-tailed t-test)=	0.000*	0.030*
4. Oral comfort R=	−0.373	NS
P(2-tailed t-test)=	0.000*	
5. General performance R=	−0.320	NS
P(2-tailed t-test)=	0.003*	
6. Eating R=	−0.389	0.246
P(2-tailed t-test)=	0.000*	0.024*
OHIP scores R=	1	−0.478
P(2-tailed t-test)=	.	0.000*
OHQoL-UK scores R=	−0.478	1
P(2-tailed t-test)=	0.000*	.
R = Pearson's correlation coefficient, * = Significant relation, NS= Not significant relation.		

Table 6. Correlations between NEO-FFI scores and each of DIDL, OHIP, and OHQoL-UK scores among the study population.

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
DIDL Scores: **1. Total satisfaction** R= *P*(2-tailed t-test)=	NS	−0.225 0.040*	NS	NS	NS
2. Appearance R= *P*(2-tailed t-test)=	NS	NS	−0.226 0.039*	NS	NS
3. Pain R= *P*(2-tailed t-test)=	NS	NS	NS	NS	NS
4. Oral comfort R= *P*(2-tailed t-test)=	−0.295 0.006*	NS	NS	NS	NS
5. General performance R= *P*(2-tailed t-test)=	NS	−0.217 0.047*	NS	NS	NS
6. Eating R= *P*(2-tailed t-test)=	NS	NS	NS	NS	NS
OHIP scores R= *P*(2-tailed t-test)=	NS	NS	NS	NS	NS
OHQoL-UK scores R= *P*(2-tailed t-test)=	NS	NS	NS	NS	NS

R = Pearson's correlation coefficient, * = Significant relation, NS= Not significant relation.

a single impact score is given to assess total oral impact. Since there are important links between quality of life 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.[5,34,36-39]

The results showed the older the participant, the lower the scores of the OHIP (least oral health impacts). This might be explained by younger patients having more critical oral demands, being more concerned with respect to their appearance and function, and being less tolerant to changes in their dental status. Therefore, oral status impacts younger patients more than older ones.

Another finding revealed the older the patient, the lower the scores of neuroticism. This can be explained by older patients being more stable psychologically and leading a less stressful social life than younger patients.

The loss of teeth from both jaws was associated with the highest total dissatisfaction and dissatisfaction with appearance and oral comfort while the loss of teeth from the upper jaw was associated with the lowest dissatisfaction levels. This might be explained by the loss of teeth from both jaws affecting both function and appearance more than the loss of teeth from just one jaw as more opposing occlusal surfaces will be lost.

The results showed the less the oral health impacts (the lower the OHIP scores), the better the oral health–related quality of life (the higher the scores of OHQoL-UK). Also, the poorer the oral health impact (the higher the scores of OHIP), the poorer the effect on quality of life (the

Younger Patients — **HIGHER** OHIP Scores

Older Patients — **lower** OHIP Scores

lower the scores of OHQoL-UK). This finding concurs with the results of previous studies.[58]

With fewer oral health impacts (the lower the OHIP scores), higher levels of total satisfaction, satisfaction with appearance, pain tolerance, oral comfort, general performance, and eating (the higher the DIDL scores) were found. Also, the better the oral health–related quality of life (the higher the scores of OHQoL-UK), the higher the levels of total satisfaction, satisfaction with appearance, pain tolerance, and eating. This finding suggests satisfaction with the oral cavity reduces the negative impacts on patients and consequently provides patients with a better quality of life.

Significant relationships were established between NEO-FFI and DIDL scores. The higher the neuroticism scores, the less the satisfaction with oral comfort was found. Also, the higher the extraversion scores, the less the total satisfaction and the satisfaction with general performance. Moreover, the higher the openness scores, the less the satisfaction with appearance. This agreed with previous studies using the DIDL instrument and other instruments.[33-37] Psychological factors have been found to have a profound role in shaping patients' satisfaction with dental status and treatment.[28]

Patient satisfaction with his/her dentition and dental treatment could be associated with some personality traits that might be considered as predictors for such evaluation.[34-37] From the above discussion, it is clearly evident that psychological

aspects might play a vital role in dental impacts on daily living and patients' satisfaction with their dentition. Personality profiles might be used to explain the levels of patient satisfaction present among the study population as well as to predict satisfactory outcomes before commencing dental treatment, which might save time and cost if the prediction is unfavorable.[34-37] However, no significant correlations between NEO-FFI scores and each of OHIP and OHQoL-UK scores were detected. Consequently, the mutual effects of oral health impacts and oral health–related quality of life on one hand and the personality profiles on the other could not be detected in this study. This might be due to, in contrast with the DIDL instrument, the inferior sensitivity of OHIP and OHQoL-UK to variations and changes in personality profiles.

It is evident that it is of utmost importance to use valid, reliable, and comprehensive tests to study the relationship between psychological profiles and satisfaction. The DIDL test used in this study provided a more satisfactory answer for such an issue.

In this study, the number and position of missing teeth were not significantly related to patient satisfaction, oral health impacts, oral health–related quality of life, or personality profiles. This disagrees with the findings of previous studies that reported significant effects of the number of missing teeth on function and wellbeing.[60-66] However, the results agree with Rosenoer and Sheiham,[67] who reported a very poor association between satisfaction with the dentition and the number of missing posterior teeth. In this study most of the lost teeth were posterior teeth, which might explain such finding. Also, previous studies did not use an index that separates the esthetic element from chewing and occlusion, which might be the reason why they established an apparent relationship between tooth loss and oral health impacts, quality of life, and satisfaction with the dentition.

Omar et al.[68] suggested esthetics could affect mastication and therefore there is a need to have an index that separates the esthetic element from chewing and occlusion. So, masticatory ability is influenced by factors other than just function. Consequently, many subjects with a satisfactory dental appearance and an impaired masticatory function, but who can still masticate,

do not need to have their dentition changed.[68,69] Kayser[70] concluded social functions such as communication and aesthetics were more important than chewing. Esthetics influence psychological values of humans.[71]

In this study most of the lost teeth were posterior teeth that did not affect the aesthetics of patients, and this might explain the lack of association between the number of missing teeth and scores of the used socio-dental indicators. Also, the number of missing teeth ranged between one and seven (remaining teeth are ≥ 20 teeth) and this number of missing teeth might be far less than what is needed to have a measurable relationship between tooth loss and oral health impacts, quality of life, and satisfaction with the dentition. Previous studies[60-66] were carried out on subjects with a larger number of missing teeth and reported negative association between tooth loss and quality of life when all functional, psychosocial, and economic implications were considered.[72]

Results from this study are the first examination of the relationships between oral health impacts, quality of life, satisfaction with the dentition, and psychological profiles among a Jordanian population. No reliable studies among other populations are available and investigations in this regard are required. Cultural or religious factors in different populations might affect the relationships between oral health impacts, quality of life, satisfaction with the dentition, and psychological profiles. Further studies are required to identify the potential effects of cultural or religious factors in this regard.

Conclusions

Patients' satisfaction with different aspects of their dentition has definitive impacts on oral functions including chewing, speaking, oral comfort, general performance, communication, smiling, and appearance. This in turn will affect daily living and dental perceptions of patients. Personality profiles might influence a patient's perception of his/her dentition and play a significant role in shaping the degree of satisfaction with it. Certain personality profiles—neuroticism, extraversion, and openness—might be very helpful in this regard and could be used for the assessment and prediction of a patient's satisfaction with his/

her dentition and the dental impacts it may have on daily living. Clinicians should consider this in order to provide suitable treatment for their patients to improve oral health and avoid any negative effects their dentitions might have on daily living. They also must prepare their patients socio-psychologically to accept the offered management for their dentition.

Using the DIDL measure could provide a more satisfactory answer to the effects of teeth on daily living and satisfaction with the oral cavity. Also, this instrument has strong correlations to the OHIP and OHQoL-UK and thus is capable of measuring the same dimensions that are measured by these instruments. Moreover, it seems more sensitive to the effect of variations in psychological profiles among the study population. Therefore, the use of the DIDL and a valid, reliable, and comprehensive psychological test such as the NEO-FFI is recommended to identify the relationship between personality profiles, satisfaction with the dentition, and oral health–related quality of life.

Clinical Significance

Since patients' satisfaction with their dentition impacts their daily living and quality of life while affected by their psychological profiles, this should be considered when formulating a treatment plan for management of their dentition in order to obtain patient acceptance of the proposed treatment.

References

1. Steele JG, Ayatollahi SM, Walls AW, Murray JJ. Clinical factors related to reported satisfaction with oral function amongst dentate older adults in England. Community Dent Oral Epidemiol. 1997; 25(2):143-9.
2. Reisine S. Dental disease and work loss. J Dent Res. 1984; 63(9):1158-61.
3. Gift HC, Reisine ST, Larach DC. The social impact of dental problems and visits. Am J Public Health. 1992; 82(12):1663-8.
4. Nikias MK, Sollecito WA, Fink R. An empirical approach to developing multidimensional oral status profiles. J Public Health Dent. 1978; 38(2):148-58.

5. Leao A, Sheiham A. Relation between clinical dental status and subjective impacts on daily living. J Dent Res. 1995; 74(7):1408-13.
6. Slade GD, Spencer AJ. Social impact of oral conditions among older adults. Aust Dent J. 1994; 39(6):358-64.
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(1):105-10.
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(10):830-3, 837-8, 844.
9. Cushing AM, Sheiham A, Maizels J. Developing socio-dental indicators—the social impact of dental disease. Community Dent Health. 1986; 3(1):3-17.
10. Branchi R, Boddi V, Corti D, Hardoy MJ. Can a prosthesis cause psychological disturbances? J Oral Rehabil. 2001; 28(12):1133-8.
11. Allen PF. Assessment of oral health related quality of life. Health Qual Life Outcomes. 2003; 1:40.
12. 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(2):161-9.
13. Jokovic A, Locker D, Guyatt G. Short forms of the Child Perceptions Questionnaire for 11–14-year-old children (CPQ11–14): development and initial evaluation. Health Qual Life Outcomes. 2006; 4:4.
14. Kressin NR. Symposium on self-reported assessments of oral health outcomes. Introduction. J Dent Educ. 1996; 60(6):485-7.
15. Locker D. Applications of self-reported assessments of oral health outcomes. J Dent Educ. 1996; 60(6):494-500.
16. Slade GD. Assessing change in quality of life using the Oral Health Impact Profile. Community Dent Oral Epidemiol. 1998; 26(1):52-61.
17. Allen PF, McMillan AS. The impact of tooth loss in a denture wearing population: an assessment using the Oral Health Impact Profile. Community Dent Health. 1999; 16(3):176-80.
18. Nuttall NM, Steele JG, Pine CM, White D, Pitts NB. The impact of oral health on people in the UK in 1998. Br Dent J. 2001; 190(3):121-6.
19. Locker D, Matear D, Stephens M, Jokovic A. Oral health-related quality of life of a population of medically compromised elderly people. Community Dent Health. 2002; 19(2):90-7.
20. McGrath C, Bedi R. Measuring the impact of oral health on life quality in two national surveys—functionalist versus hermeneutic approaches. Community Dent Oral Epidemiol. 2002; 30(4):254-9.
21. John MT, LeResche L, Koepsell TD, Hujoel P, Miglioretti DL, Micheelis W. Oral health-related quality of life in Germany. Eur J Oral Sci. 2003; 111(6):483-91.
22. Heydecke G, Locker D, Awad MA, Lund JP, Feine JS. Oral and general health-related quality of life with conventional and implant dentures. Community Dent Oral Epidemiol. 2003; 31(3):161-8.
23. Needleman I, McGrath C, Floyd P, Biddle A. Impact of oral health on the life quality of periodontal patients. J Clin Periodontol. 2004; 31(6):454-7.
24. Steele JG, Sanders AE, Slade GD, Allen PF, Lahti S, Nuttall N, Spencer AJ. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two national samples. Community Dent Oral Epidemiol. 2004; 32(2):107-14.
25. John MT, Hujoel P, Miglioretti DL, LeResche L, Koepsell TD, Micheelis W. Dimensions of oral-health-related quality of life. J Dent Res. 2004; 83(12):956-60.
26. Okunseri C, Chattopadhyay A, Lugo RI, McGrath C. Pilot survey of oral health-related quality of life: a cross-sectional study of adults in Benin City, Edo State, Nigeria. BMC Oral Health. 2005; 5:7.
27. Bowling A. Measuring disease. A review of disease specific quality of life measurement scales. 2nd ed. Buckingham: Open University Press; 2001.
28. Freeman HL. Quantifying quality. Neuro Endocrinol Lett. 1999; 20(5):263.
29. Piedmont RL. The revised NEO Personality Inventory: Clinical and research applications. New York: Plenum Press; 1998.
30. Guckes AD, Smith DE, Swoope CC. Counseling and related factors influencing satisfaction with dentures. J Prosthet Dent. 1978; 39(3):259–67.
31. Reeve P, Stafford GD, Watson C, Hopkins R. The use of Cattell's personality profile in patients who have had preprosthetic surgery.

J Dent. 1982; 10(2):121–30.

32. Mehra T, Nanda RS, Sinha PK. Orthodontists' assessment and management of patient compliance. Angle Orthod. 1998; 68(2):115-22.

33. Dong H, Bogg L, Rehnberg C, Diwan V. Health financing policies. Providers' opinions and prescribing behavior in rural China. Int J Technol Assess Health Care. 1999; 15(4): 686-98.

34. Al-Omiri MK. Tooth wear impact on daily living [dissertation]. Belfast (Northern Ireland): Queen's University Belfast; 2002.

35. Al-Omiri MK, Lamey PJ, Cooper C, Clifford T. Relationship between personality and satisfaction with the dentition in tooth wear patients. Eur J Prosthodont Restor Dent. 2006; 14(4):179-84.

36. Al-Omiri MK, Abu Alhaija ES. Factors affecting patient satisfaction after orthodontic treatment. Angle Orthod. 2006; 76(3):422-31.

37. 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.

38. Leao A. The development of measures of dental impacts on daily living [dissertation]. London: London University; 1993.

39. Abu Hantash RO. Personality and satisfaction with dental implants [MSc thesis]. Jordan: Jordan University of Science and Technology; 2004.

40. Costa PT Jr, McCrae RR. Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual. Florida: PAR Psychological Assessment Resources Inc; 1992.

41. Saucier G. Replicable item-cluster subcomponents in the NEO Five-Factor Inventory. J Pers Assess. 1998; 70(2):263–76.

42. Kline P. The handbook of psychological testing. 2nd ed. London: Routledge; 2000.

43. Locker D. Measuring oral health: a conceptual framework. Community Dent Health. 1988; 5(1):3-18.

44. WHO. International classification of impairments, disabilities and handicaps. Geneva: World Health Organization; 1980.

45. Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. Community Dent Health. 1994; 11(1):3-11.

46. Heydecke G, Locker D, Awad MA, Lund JP, Feine JS. Oral and general health-related quality of life with conventional and implant dentures. Community Dent Oral Epidemiol. 2003; 31(3):161-8.

47. Locker D, Jokovic A, Clarke M. Assessing the responsiveness of measures of oral health-related quality of life. Community Dent Oral Epidemiol. 2004; 32(1):10-8.

48. 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(3):175-82.

49. Slade GD. Derivation and validation of a short-form oral health impact profile. Community Dent Oral Epidemiol. 1997; 25(4):284-90.

50. 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(4):306-11.

51. Allison P, Locker D, Jokovic A, Slade G. A cross-cultural study of oral health values. J Dent Res. 1999; 78(2):643-9.

52. McMillan AS, Wong MC, Lo EC, Allen PF. The impact of oral disease among the institutionalized and non-institutionalized elderly in Hong Kong. J Oral Rehabil. 2003; 30(1): 46–54.

53. Lopez R, Baelum V. Spanish version of the Oral Health Impact Profile (OHIP-Sp). BMC Oral Health. 2006; 6:11.

54. Locker D. Issues in measuring change in self-perceived oral health status. Community Dent Oral Epidemiol. 1998; 26(1):41-7.

55. Allen F, 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(5):446-50.

56. 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.

57. McGrath C, Bedi R. An evaluation of a new measure of oral health related quality of life—OHQoL-UK (W). Community Dent Health. 2001; 18(3):138-43.

58. McGrath C, Comfort MB, Lo EC, Luo Y. Patient-centred outcome measures in oral surgery: validity and sensitivity. Br J Oral and Maxillofac Surg. 2003; 41(1):43-7.

59. John MT, Slade GD, Szentpétery A, Setz JM. Oral health-related quality of life in patients treated with fixed, removable, and complete denture 1 month and 6 to 12 months after treatment. Int J Prosthodont. 2004; 17(5):503-11.

60. Agerberg G, Carlsson GE. Symptoms of functional disturbances of the masticatory system. A comparison of frequencies in a population sample and in a group of patients. Acta Odontol Scand. 1975; 33(4):183-90.

61. Wayler AH, Chauncey HH. Impact of complete dentures and impaired natural dentition on masticatory performance and food choice in healthy aging men. J Prosthet Dent. 1983; 49(3):427-33.

62. Carlsson GE. Masticatory efficiency: the effect of age, the loss of teeth and prosthetic rehabilitation. Int Dent J. 1984; 34(@):93-7.

63. Agerberg G. Mandibular function and dysfunction in complete denture wearers— a literature review. J Oral Rehabil. 1988; 15(3):237-49.

64. Witter DJ, Cramwinckel AB, Van Rossum GM, Käyser AF. Shortened dental arches and masticatory ability. J Dent. 1990; 18(4):185-9.

65. Witter DJ, Van Elteren P, Käyser AF, Van Rossum GM. Oral comfort in shortened dental arches. J Oral Rehabil. 1990; 17(2):137-43.

66. Locker D. The burden of oral disorders in a population of older adults. Community Dent Health. 1992; 9(2):109-24.

67. Rosenoer LM, Sheiham A. Dental impacts on daily life and satisfaction with teeth in relation to dental status in adults. J Oral Rehabil. 1995; 22(7):469-80.

68. Omar SM, McEwen JD, Ogston SA. A test for occlusal function. The value of a masticatory efficiency test in the assessment of occlusal function. Br J Orthodont. 1987; 14(2):85-90.

69. Elias AC, Sheiham A. The relationship between satisfaction with mouth and number and position of teeth. J Oral Rehabil. 1998; 25(9):649–61.

70. Käyser AF. How much reduction of the dental arch is functionally acceptable for the ageing patient? Int Dent J. 1990; 40(3):183-8.

71. Schuurs AH, Duivenvoorden HJ, Thoden van Velzen SK, Verhage F, Makkes PC. Value of the teeth. Community Dent Oral Epidemiol. 1990; 18(1):22-6.

72. Casanova-Rosado JF, Medina-Solis CE, Vallejos-Sánchez AA, Casanova-Rosado AJ, Maupomé G, Avila-Burgos L. Lifestyle and psychosocial factors associated with tooth loss in Mexican adolescents and young adults. J Contemp Dent Pract. 2005; 6(3):70-7.

About the Authors

Jumana Karasneh, BDS, PhD

Dr. Karasneh is an Assistant Professor and Consultant in the Department of Oral Surgery and Oral Medicine of the Faculty of Dentistry at the Jordan University of Science and Technology in Irbid, Jordan.

Mahmoud K. Al-Omiri, BDS, PhD, FDS RCS (England), Jordanian Board (Corresponding Author)

Dr. Al-Omiri is an Associate Professor and Consultant in Fixed and Removable Prosthodontics and Implants and a Consultant in Oral and Maxillofacial Surgery and Oral Medicine in the Department of Prosthodontics of the Faculty of Dentistry at the University of Jordan in Amman, Jordan. He serves as the president of IADR–Jordanian Section (2009–2010) and the secretary of the Jordanian Society of Prosthodontics and is a member of the British Society for the Study of Prosthetic Dentistry (BSSPD). His research interests include dental implants, oral health, tooth wear, endodontic posts, and esthetic dentistry.

e-mail: alomirim@yahoo.co.uk

Khaled Q Al-Hamad, BDS, MSc, MRD RCSEd

Dr. Al-Hamad is an Assistant Professor in the Department of Prosthodontics of the Faculty of Dentistry at the Jordan University of Science and Technology in Irbid, Jordan.

Firas A. M. Al Quran, BDS, MSc, PhD

Dr. Al Quran is an Associate Professor in the Department of Prosthodontics of the Faculty of Dentistry and head, Department of the Allied Dental Sciences of the Faculty of Dentistry at the Jordan University of Science and Technology in Irbin, Jordan.

Acknowledgement