Prosthetic rehabilitations are lengthy and expensive, and before proceeding, patient satisfaction with and acceptance of this treatment option should be secured.¹⁻⁸ Satisfaction with dental prostheses has been extensively investigated.¹⁻¹⁷ Fixed dental prostheses were found to be more satisfactory for patients than removable prosthodontic rehabilitations.⁵,⁹,¹⁰,¹⁴⁻¹⁶ Also, fixed prostheses were associated with better esthetics and function than removable prostheses.

Oral health-related quality of life has been associated with treatment satisfaction¹⁸ and general health-related quality of life.¹⁹ In addition, oral health conditions affect a patient’s daily living; consequently, the assessment of oral needs should be considered together with clinical status and psychological factors.²⁰,²¹ Some researchers, however, have demonstrated that clinically successful and adequate dental prostheses may not please all patients.⁶,¹⁰,²¹ An explanation for this finding may be underlying personality patterns or traits that could influence a patient’s perception of their oral health and/or prosthodontic rehabilitation.⁵,⁶,¹⁶,¹⁸,²²,²³

Satisfaction with and perception of dental status and prosthodontic rehabilitation have been associated with personality traits and trends, including neuroticism.

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ABSTRACT

Statement of problem. Personality profiles may affect the impact of dental treatment on daily living and patient satisfaction.

Purpose. The purpose of this clinical trial was to evaluate the impact of maxillary anterior fixed prosthodontic rehabilitation on daily living and the satisfaction of patients and to investigate its relationship with personality profiles.

Material and methods. Fifty-nine participants (25 men and 34 women; mean age 32.4 ±6.9 years) received maxillary anterior partial fixed dental prostheses. The clinical success of the prostheses was evaluated following specific criteria. The Dental Impact on Daily Living (DIDL) questionnaire was used to measure satisfaction with the prostheses and their impact on daily living. The Neuroticism-Extraversion-Openness Five-Factor Inventory (NEO-FFI) was used to measure patients’ personality profiles. The paired sample t test was used to compare satisfaction and personality scores before and after treatment (α=.05).

Results. Participants’ total satisfaction and their satisfaction with appearance, pain tolerance, oral comfort, general performance, and eating improved after treatment (P<.05). Before treatment, women were less satisfied with general performance (P=.047) and scored higher on the Neuroticism score (P=.039); however, after treatment, women were more satisfied with appearance (P=.004). Age and sex had no significant correlation with personality profiles after treatment. Before treatment, Neuroticism, Openness, and Conscientiousness scores were associated with dental satisfaction and impact on daily life (P<.05). After treatment, Neuroticism, Openness, and Extraversion scores were associated with dental satisfaction and impact on daily life (P<.05).

Conclusions. Patient satisfaction with their oral condition improved after partial fixed dental prosthodontic rehabilitation in the maxillary anterior esthetic zone. Psychological profiles (Neuroticism, Extraversion, Openness, and Conscientiousness) may be involved in and explain the impact on daily living and the degree of patient satisfaction with their prostheses. (J Prosthet Dent 2016;115:170-176)
extraversion, openness, and conscientiousness.\textsuperscript{1-6,8,11,20-23} Other studies did not establish this relationship.\textsuperscript{12,13,24-26} This controversy continues to the present day and evidence-based knowledge in this field remains inconclusive.

Many previous investigations used unreliable tests to evaluate personality traits and satisfaction. To evaluate adequately the relationship between satisfaction and personality, valid and reliable measures should be used carefully.\textsuperscript{2-6,8} Given that relationships between personality traits and satisfaction with other dental treatments (including removable and implant-supported prosthesis) have been established,\textsuperscript{3,5,6,8,27} investigating this relationship for maxillary anterior prosthetic rehabilitations may help identify the best treatment options.

The purpose of this study was to measure the relationship between patient personality profiles and the impact of fixed partial prosthodontic rehabilitations in the maxillary anterior esthetic zone on daily living and dental satisfaction. The null hypothesis was that no relationship would be found between personality profiles, dental satisfaction, and the impact of fixed partial prosthodontic rehabilitation in the maxillary anterior esthetic zone on daily living.

\section*{MATERIAL AND METHODS}

Fifty-nine participants who attended dental clinics to replace their missing maxillary anterior teeth and were scheduled to receive partial fixed prosthetic rehabilitations were recruited into this study. Patients were included if they were over 18 years of age, had received no previous fixed or removable prosthesis in the maxillary anterior area, and had no clinical problems or failures during the study. Participants should have received no previous prosthesis for treatment of tooth loss and should have lost their teeth less than 3 months before being recruited. Also, participants should not have been lacking in mental capacity and have no severe medical illness that might affect their ability to understand/completely the questionnaires or to cooperate with the investigator. Patients informed consent was obtained before proceeding. The study was ethically approved by Dean of Research, Aljouf University (Sakaka, KSA, reference number 34-205).

Two previously published and widely used questionnaires were used in this study. The Neuroticism-Extraversion-Openness Five-Factor Inventory (NEO-FFI),\textsuperscript{28} was used to assess the patients’ personality factors. The score for each of the 5 personality dimensions of NEO-FFI test ranges from 0 to 48. Participants responded to each item by selecting 1 of 5 response categories using the Likert response format, which is strongly agree, agree, neutral, disagree, or strongly disagree.

The second questionnaire, the Dental Impact on Daily Living (DIDL) questionnaire,\textsuperscript{1,21} was used to assess patient satisfaction with their dentition and/or dental prosthesis. The total score of the DIDL ranges from \(-1\) to \(+1\). Participants responded to each item by selecting 1 of 3 responses in the Likert response format, that is, agree, disagree, or neutral.

In contrast with other sociodental indicators, the DIDL evaluates the dental impact on daily living, relative weight that respondents allocate to each dimension, and various facets of oral status. In addition, it identifies whether a problem is entirely internal or has interpersonal or social components. Also, because impacts do not usually occur independently, a single impact score is offered to assess the total oral impact. The DIDL evaluates dimension scores and then adds them into a single score; this characteristic is not offered by tools such as the Oral Health Impact Profile (OHIP).\textsuperscript{1}

Previous studies have evaluated the DIDL questionnaire among various populations and have established its accuracy, sensitivity, validity, reliability, and reproducibility.\textsuperscript{1,4,21} In addition, it is simple, relatively short, more sensitive to the effects of variations in psychological profiles, efficient to use, and easy to understand and score.\textsuperscript{1,4} For all these reasons, the DIDL effectively evaluates the impact of teeth on daily living and satisfaction with the oral condition.

The NEO-FFI test was used in this study because it is simple, valid, reliable, sensitive, and uncomplicated to use statistically; it can also be completed quickly and offers comprehensive measurement of the 5 dimensions of personality.\textsuperscript{2-5,26,29} Previous studies have used different tools to evaluate psychological status in their attempts to investigate the relationship between personality profiles and satisfaction with dental prostheses. Unfortunately, those tools have problems of reliability, validity, comprehensiveness, and suitability of use.\textsuperscript{2-5}

Each participant completed both questionnaires before their prostheses were made. Then participants received 8-unit maxillary metal ceramic partial fixed dental prostheses to replace or restore dentition in their maxillary anterior esthetic zone; this involved teeth from the maxillary right first premolar to the maxillary left first
Premolar. The prostheses were made of nickel chromium alloy (Remanium G-Soft; Dentaurum; J.P Winkelstroeter KG) and porcelain (Vita VMK Master; Vita Zahnfabrik H. Rauter GmbH and Co KG). All clinical procedures were performed by 1 consultant prosthodontist (B.K.Z.), and all laboratory procedures were done by 1 certified dental technician. Prostheses were placed from 4 to 8 weeks after the completion of the baseline questionnaires.

Three months after being fitted with the prosthesis, each participant was examined to ensure the clinical success of the prosthesis before completing the questionnaires a second time. Specific clinical criteria used by previous studies to assess the clinical success of prosthetic rehabilitations were expanded and modified before being used for this study. Therefore, the assessed criteria included assessment of appearance, fitting, margins, speech, occlusion, and health of the supporting tissues.

Patients with any prosthesis associated with poor extensions, poor speech, poor esthetics (tooth size, shape, color, arrangement, and position), infections beneath the prosthesis, presence of trauma or lesions related to prosthesis, or problems in vertical dimension or occlusion were excluded. Patients with inadequately functioning or fractured or cracked prostheses were also excluded.

Patient personality profiles and levels of satisfaction were assessed before insertion and 3 months after insertion of the prosthesis. The DIDL and NEO-FFI questionnaires were administered discretely and confidentially to the participants. The investigator was available to provide participants with a full explanation of the dimensions and scoring methods of each questionnaire without interfering with responses.

One investigator (M.K.A-O.) performed all clinical examinations and assessed each patient. Intraexaminer reliability was established with 5 duplicate examinations using kappa statistics. Kappa value was 0.94, indicating significant agreement as the examination criteria were clear and simple. Interexaminer reliability was also assessed by having another consultant prosthodontist (M.G.S.) examine the same 5 participants; the kappa value was found to be 0.93, indicating high interexaminer reliability.

Data were analyzed using software (Statistical Package for the Social Sciences v19.0; SPSS Inc). The Pearson correlation test was used to test for correlation among personality factors, satisfaction with prosthetic rehabilitations, and age. The paired sample t test was used to compare satisfaction and personality scores before and after treatment. For all statistical analysis, significance levels were set at an α level of .05. The statistical analysis methods used in this study are supported by the conclusions and recommendations suggested by Hannigan and Lynch.

RESULTS

Fifty-nine patients (25 men and 34 women) participated in this study. The age of participants ranged between 20 and 49 years old (mean age = 32.4 ± 6.9 years). Before treatment, 27 participants (45.8%) were dissatisfied with their oral condition; however, only 5 participants (8.5%) were dissatisfied with their oral condition after treatment. Before treatment, total satisfaction scores ranged between −1.00 and 0.95 with a mean score of 0.088 ± 0.46. After treatment, total satisfaction scores ranged between −0.34 and 1.00 with a mean score of 0.469 ± 0.33. Mean scores of total satisfaction with their oral condition and each dimension of the DIDL were higher after receiving the prosthetic treatment (Table 1).

Table 2 presents the distribution of the mean scores of the personality profiles among the study population before and after treatment. Table 3 shows the distribution of each NEO-FFI personality domain score among the study population before and after treatment. Age and sex were correlated with the DIDL and NEO-FFI scores before and after treatment. Age had no significant relationship with the NEO-FFI or DIDL scores before treatment (P>.05). Women were less satisfied with general performance (r=.260, P=.047) and scored higher on the Neuroticism (r=.269, P=.039) personality domain before treatment. However, women were more satisfied with appearance (r=.370, P=.004) after treatment. Older participants reported higher levels of oral satisfaction.
This difference may be due to a difference in religious and cultural background, variations in study design, provision of different prosthetic rehabilitations, and the use of valid and reliable comprehensive tests.

Women exhibited higher neuroticism scores than men before treatment. This could be due to cultural or social factors that cause women to be more self-conscious and lead more stressful lives than men or to their quality of life, and contact with people may have been limited because of their compromised dentition. This finding is in agreement with the results of previous investigations that reported women exhibit higher neuroticism scores than men.6,8

In this study, older individuals reported higher levels of oral comfort after treatment with partial fixed dental prostheses in the maxillary esthetic zone. This result corresponds with the findings of previous investigations that established relationships between age and satisfaction with prosthetic rehabilitations.6,34 However, it disagrees with investigations that reported no relationship between age and satisfaction with prosthetic rehabilitations.27,32,33 Again, this difference could be explained by the difference in religious and cultural backgrounds, variations in study design, provision of different prosthetic rehabilitations, and the use of valid and reliable comprehensive tests.

In this study, participants’ satisfaction with their oral condition increased after the provision of prosthetic rehabilitations. The prosthesis may have enhanced the oral condition and consequently boosted participants’ satisfaction with their oral condition and treatment. However, and despite having technically and functionally successful prosthetic rehabilitations, 8.5% of participants were generally dissatisfied after their fixed partial denture treatment, and some participants were dissatisfied with their appearance, pain level, oral comfort, general performance, and/or eating. These numbers may be explained by the psychological features of the participants.

The findings of this study confirmed that before treatment higher neuroticism, openness, and conscientiousness scores were associated with less satisfaction with general performance, less oral comfort, and less satisfaction with appearance. After treatment, higher

Table 3. Distribution of study population (n=59) according to their NEO-FFI (personality domain) scores before and after treatment

<table>
<thead>
<tr>
<th>Personality Domain</th>
<th>Low Score (%)</th>
<th>Average Score (%)</th>
<th>High Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>Before</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>Treatment</td>
<td>Treatment</td>
</tr>
<tr>
<td>Neuroticism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 (11.9)</td>
<td>4 (6.8)</td>
<td>16 (27.1)</td>
</tr>
<tr>
<td>Extraversion</td>
<td>3 (5.1)</td>
<td>4 (6.8)</td>
<td>40 (67.8)</td>
</tr>
<tr>
<td>Openness</td>
<td>40 (67.8)</td>
<td>40 (67.8)</td>
<td>18 (30.5)</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>46 (78)</td>
<td>46 (78)</td>
<td>9 (15.3)</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>21 (35.6)</td>
<td>15 (25.4)</td>
<td>28 (47.5)</td>
</tr>
</tbody>
</table>

NEO-FFI, Neuroticism-Extraversion-Openness Five-Factor Inventory.

DISCUSSION

This study revealed that fixed prostheses in the maxillary anterior esthetic zone impacted participants’ daily living and satisfaction. Additionally, personality profiles had significant relationships with the impact of prostheses on participants’ daily living and satisfaction. Consequently, the null hypothesis of this study was rejected.

Women were less satisfied with their contact with others before treatment and more satisfied with their appearance after treatment. This may be because women are more aware of dental status, consider oral health a high priority, and seek treatment to deal with any defects. This agrees with the results of previous studies.3-5,8,31 Nevertheless, it contrasts with other investigations that reported no relationship between sex and satisfaction with prosthetic rehabilitations.6,27,32,33
neuroticism scores were associated with less total satisfaction and oral comfort. Also, higher extraversion and lower openness scores were associated with less satisfaction with eating.

The reported relationships between personality profiles and impact of partial fixed dental prostheses on daily living and satisfaction with the prosthesis might be explained by the fact that more neurotic participants...
will be more concerned about their oral status; therefore, they report more negative impacts of oral status on their total satisfaction, oral comfort, and general performance. Also, more open participants may be more willing to express their feelings and experience, and thus would more readily report issues related to their comfort and capacity to eat. Furthermore, conscientious patients are careful and dedicated in their approach and more likely to report any impacts of their oral status on their satisfaction with their appearance. In addition, extraverted people are more outgoing and readily report the effects of treatment on their satisfaction with eating. These results concur with previous investigations that used DIDL and NEO-FFI measures to assess participants with other dental conditions and treatments, and reported some role of personality profiles in determining the impact of dental treatment on daily living and patients’ satisfaction with oral status and treatment.1-6,8

This study demonstrated that the personality traits Neuroticism, Extraversion, Openness, and Conscientiousness were helpful in predicting partial fixed dental prostheses impacts on daily living as well as satisfaction with this treatment in maxillary anterior esthetic zone. This concurs with the findings of previous studies that revealed some role for personality traits in the prediction of dental impacts on daily living and patient satisfaction with their dentition and different types of dental treatment and conditions.1-3,6,8,27

Assessment of personality factors may be helpful in predicting patient behavior and might impact on the provision of treatment. Therefore, before carrying out prosthodontic treatment it might be reasonable to suggest assessment of patients’ personality traits and if some profiles are recognized then clinicians can be more aware of patients’ expectations and response to offered treatments. This might avoid extra costs and save dentists’ and patients’ time and effort.

Study limitations are that social conditions, economy, religion, and cultural values may have possible effects on satisfaction with fixed prosthetic treatment in the esthetic zone, and might modify the relationship between personality and the impacts of fixed denture treatment on daily living and treatment satisfaction. Additional investigations are required to determine potential consequences of cultural or religious factors in this regard. Furthermore, the size of the study sample is small; however, the number of participants in this study is comparable to that of previous studies3-6,8 in this field. Further research is required on larger samples, in particular to assess the effects of issues such as treatment costs in a private versus university setting, as well as to compare the outcomes of treatment by general practitioners versus experienced specialists.

CONCLUSIONS

Psychological profiles (Neuroticism, Extraversion, Openness, and Conscientiousness) may have some involvement in, and explain, the impacts of fixed partial prosthetic rehabilitations in maxillary anterior esthetic zone on daily living and patients’ satisfaction with their oral condition and treatment; thus, they may be used to predict satisfactory outcomes of prosthetic rehabilitations.

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Effect of repeated firings on flexural strength of veneered zirconia

Vichi A, Sedda M, Bonadeo G, Bosco M, Barbiera A, Tsintsadze N, Carrabba M, Ferrari M

Dent Mater 2015;31:e151-6

Objective. Chipping and/or delamination represent a clinical failure of porcelain fused to zirconia (PFZ) prostheses. Causes and solutions have not been completely clarified. The present study was aimed at evaluating the effects of number of firings on the flexural strength of PFZ specimen.

Methods. Forty-five zirconia specimens in shape of bars were cut, sintered and divided in 3 groups (n=15). Group 1: veneering ceramic was layered "in bulk" and fired. Group 2: veneering ceramic was layered in three layers, individually fired. Group 3: veneering ceramic was layered in five layers, individually fired. Each layer thickness was controlled by the use of calibrated molds. The total veneering ceramic thickness for all the specimens was 1.2mm, and the total thickness of the specimen of 2.0mm. Three-point bending test was performed. Fracture load was recorded in Newton and MPa value was calculated taking into account the bi-layered nature of the specimen. Data were statistically analyzed.

Results. Specimens obtained with on single firing cycle obtained a statistically significant (p<0.001) lower flexural strength (54.61±8.98MPa) than specimens veneered with 3 or 5 firing cycles. The last two obtained very similar results (77.63±13.17MPa and 73.62±12.38MPa respectively) and the differences was not statistically significant.

Significance. In bi-layered PFZ specimen, three to five layers and firings determine higher flexural resistance when compared to a single firing. Thus, a 3-layers veneering procedure is recommended to increase flexural resistance. If a 5-layer procedure is necessary to improve esthetics, it does not decrease flexural resistance.

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