Manifestations of personal characteristics in individual oral care

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Abstracts

Background: Preventing diseases of oral cavity, specifically periodontal diseases, is currently a high-priority issue. Despite the wide selection of individual oral care products and the abundance of information on individual oral care, the prevalence of tooth decay and inflammatory periodontal diseases remains high. Apart from knowledge of individual oral care, of great importance for patients is their capacity to develop strong motivation for full-scale hygienic procedures.

Results: Patients' motivation is immediately interconnected with their personality specifics.

Conclusions: This article provides the analysis on the relationship between the patient's oral cavity status and his or her personality profile.

Keywords: Prevention of dental diseases, Oral care, Dental status, Psychological status, Motivation for individual oral care

Overview

The “doctor-patient” relationship is one of the most important components of the medical dental care activity system [1]. Given the severe competition between dental clinics, apart from manual skills, dentists need the knowledge of psychological characteristics of their patients, because the relationships in the dyad doctor-patient are crucial for the success of the treatment and the implementation of doctor’s recommendations for the patient [2].

As a rule, the time for the dental visit is strictly limited, so the doctor does not always pay sufficient attention to psychological characteristics of patients. Therefore, doctors often do not use the opportunity of emotional regulation of their patients in account of their individuality as a whole, and this is what the success of dental treatment depends on [3].

The dentist should not expect the success of their work without applying individual psychological approach to each particular patient [4]. Individual motivation plays an important role in implementing recommendations on individual oral hygiene given by the attending physician [5, 6]. Numerous studies have been devoted to the effectiveness of the physician-patient interaction methods; however, none of them have identified the best model of this interaction [7].

Methods

The study was housed by the Therapeutic Dentistry Department of the First Saint Petersburg State Medical University (SMU). A total of 153 people, 18 to 24 years of age, participated in the study, with the majority represented by students of SMU Faculty of Dentistry, who went through identification of dental status—through determining oral hygiene indexes (Greene and Vermillion, Silness and Loe, Fyodorov and Volodkina). The study also included determining the gingival bleeding index (Saxer and Muhlemann) and the papillary marginal alveolar (PMA) index.

Afterwards, the patients were provided with professional hygiene, individual oral care training, and recommendations on the use of individual oral care products. In a month, the patients were invited for a repeated examination, which included determination of dental indexes.
We developed a questionnaire to obtain information about the patient’s age, sex, social status, attitudes to his/her general health status, and dental health. To identify personality traits of the respondents, we performed a survey, which included the following psychological methods: the Leary test, big five (Big5) test, integrative anxiety test (IAT), and level of subjective control (LSC) test.

The technique of T. Leary [8] “diagnostics of interpersonal relations” (DIR, adapted from L. Sobchik) [9] is intended to define the style of interpersonal relationships, which a patient performs in relation to other people, in particular, in a situation of treatment. The following two factors are most often identified in the studies on interpersonal relationships: domination-submission and friendliness-aggressiveness. This technique will allow exploring the influence of behavioral characteristics of the patient and the style of relationships set with the physician on the implementation of medical recommendations and treatment. The questionnaire contains 128 value judgments.

The LSC questionnaire technique is a modified version of the questionnaire of the American psychologist J. Rotter [10, 11] that allows estimating the level of subjective control over a variety of situations, that is, determining the extent of human responsibility for their actions and their lives. It was established that the locus of control (responsibility) type the person belongs to affects various characteristics of his behavior. The level of subjective control is one of the important characteristics of self-awareness, which generates a sense of responsibility and willingness to be active. The LSC questionnaire consists of 44 items.

The ITA [12, 13] allows estimating the patient’s emotional status and, in particular, the level of anxiety, both as a condition and a personal characteristic.

The Big5 technique (BIG 5, Big Five Inventory) [14], adapted from A.G. Shmelev [15], is intended for express diagnostics of the patient’s main personality characteristics, the so-called big five factors of his/her temperament and character. The human personality includes five general and relatively independent features (reports): extraversion, friendliness, conscientiousness, neuroticism, and willingness to cooperate. The technique allows building a personality profile of the patient and, to some extent, predicting his/her behavior in the process of treatment.

Our research was approved by the Ethical Committee of the First Pavlov State Medical University of Saint-Petersburg.

We have obtained informed consent from each participant.

Statistics
The main approach to the analysis of obtained data was correlation analysis using nonparametric Spearman’s rank correlation coefficient $r_S$. Correlations were claimed as statistically significant at the commonly used significance level $\alpha = 0.05$. As usual values, $0.0 < r_S < 0.4$ were interpreted as practically (clinically) negligible, $0.4 < r_S < 0.6$ as weak, $0.6 < r_S < 0.8$ as moderate, and $0.8 < r_S < 1.0$ as a strong correlation.

Results and Discussion
The correlation analysis revealed correlations (in account of the significance level not exceeding $p < 0.05$) between psychological parameters and indexes determining the status of the oral cavity and dental behavior. The results are shown in Table 1.

Thus, the type of relationships with others (technique of T. Leary) was closely associated with clinical indicators of dental hygiene:

“Suspicious” type of relationships positively correlated ($r_S = 0.44$) with hygienic index of Greene-Vermilion (OHI-S 1) that was measured at initial examination of the patient. I.e., people with intensive manifestation of such character traits as suspiciousness and aloofness are worse in watching after their teeth and are not paying sufficient attention to the hygiene of oral cavity, which is reflected in the high rates of tartar and plaque.

“Friendly” type of relationships had negative correlation ($r_S = -0.44$) with Silness 2 index (determination of soft dental plaque in the gingival margin area), which was measured at the repeated examination of the patient. In other words, the repeated examination revealed positive dynamics in relation to this index in those patients who had expressed such character traits as orientation for social approval, cooperation, and flexibility in relations with others. They began to improve their teeth cleaning practices after talking with the doctor and attending a session of preventive teeth cleaning. As a result, the repeated visits revealed less plaque. Conversely, the dynamics related to the status of oral cavity and teeth were worse in patients with low levels of friendliness and openness.

“Authoritarian” type of relationships was in negative correlation with correctness of teeth cleaning practices used by patients ($r_S = -0.41$). In other words, people showing such character traits as dominance, leadership, and self-confidence, often have misconceptions about toothbrushing.

“Selfish” type of relationships with others was positively associated with the frequency toothbrush replacement ($r_S = 0.47$) and negatively associated with the correctness of toothbrushing ($r_S = -0.47$). In other words, people with such traits as egotistical, narcissistic, and independent, and those who neglect interests of others, take care of timely replacement of the toothbrush but have poor understanding of how to clean their teeth properly.
The study revealed positive correlation ($r_S = 0.41$) between the “dependent” type of relationships and the scale in the questionnaire for patients “use of toothbrush and mouthwash for oral hygiene.” Patients with dependent type in relationships (uncertainty, obedience, fearfulness, reliance on the views of others) pay more attention to their oral health and toothbrushing. They use a toothbrush and rinse more often than others.

“Altruistic” type of relationships with others was positively linked ($r_S = 0.63$) with the scale “the frequency of changing toothbrushes,” i.e., patients with high social responsibility, care, tenderness, and compassion in dealing with others show sufficient consideration for their hygiene and toothbrushes: they change brush regularly once every 2 months.

Therefore, the style (type) of interpersonal relations is manifested in care for the dental health and personal hygiene. “Altruistic,” “dependent” types paid more attention to toothbrushing and oral hygiene. “Friendly” type was more inclined to cooperate with the doctor: after

| Table 1 Correlations between scales of psychological techniques reflecting the personality and dental indexes |
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professional tooth cleaning they started to improve their
tooth cleaning practices and monitor oral hygiene, which
led to a decrease in plaque. “Selfish” type also began to
replace a toothbrush more frequently but had no idea of
how to clean their teeth properly. “Suspicious” and “au-
thoritarian” types showed the worst oral hygiene prac-
tices; they had not realized the need to clean their teeth
properly.
Locus of control of the individual (the LSC technique)
also turned out to be interconnected with clinical indicators
of oral hygiene and dental behaviors.

The scale of “internality in the area of failures” (In)
had negative correlation ($r_S = -0.41$) with frequency of
dental visits. In other words, people with high internality
(internal locus of control) attend a dentist less
frequently.

The scale of “internality in family relations” (Is) had a
positive correlation ($r_S = 0.47$) with the Saxer 1 index
measured at the primary examination of the patient, i.e.,
the higher internality in family relations, which in our
study was most often observed in men, the worse condi-
tion of oral cavity, and more intensive bleeding and in-
flammation of the gums.

The scale of “internality in production relationships” (Ip)
was negatively related to index Saxer 1, measured at the
first inspection ($r_S = -0.41$) and index Saxer 2 measured at
repeated inspection ($r_S = -0.46$). I.e., personal internality
(internal locus of control) in the area of work and indus-
trial relations was accompanied by greater care of oral
hygiene; it resulted in the decrease in gum inflammation.

The scale of “internality in the field of interpersonal
relationships” (Im) had a positive correlation ($r_S = 0.46$)
with the scale “the frequency of toothbrushing” and a negative relationship ($r_S = -0.40$) with the scale of
the frequency shifts of the toothbrush. People with
high internal responsibility in dealing with others are
increasingly aware of the need for oral hygiene, but,
on the other hand, people with externality (external
locus) often replace the toothbrush.

Thus, high internality of personality (internal locus of
control) has contributed to greater care of oral health,
awareness of the need to clean teeth regularly, which
resulted in the decrease of gum inflammation, but “internal”
patients rarely went to the dentist. People with low intern-
ality (external locus of control) often change the brush.

The study also found correlations between such
psychological characteristics of personality as anxiety
(IAT methodology) and clinical indicators of dental
health and oral hygiene.

The scale of “situational emotional discomfort” (alarm
component) had a positive correlation ($r_S = 0.46$) with a
frequency of the toothbrush replacement, i.e., patients with
irritability and emotional dissatisfaction (in psychological
status) often replace the brush.

Phobic component of situational anxiety negatively corre-
lated ($r_S = -0.47$) with an index of OHI-S 1, which was
measured at the primary examination of the patient. In
other words, the more anxious the patients were, the better
they cleaned their teeth; they had less plaque and tartar.

The scale of “social protection” (as a component of
situational anxiety) also had negative correlation with
the index of OHI-S 1 measured at the initial examin-
ation of the patient ($r_S = -0.59$) and at repeated examina-
tion ($r_S = -0.55$). Patients’ anxiety contributed to
improvement of their tooth-cleaning practices, and they
had less plaque.

Phobic component of personal anxiety had negative cor-
relation with the index of OHI-S 1 ($r_S = -0.45$). Also phobic
component correlated negatively with the frequency of
toothbrushing ($r_S = -0.40$). The scale of “social protection”
of personal anxiety had a negative correlation ($r_S = -0.41$)
with an index of OHI-S 1, measured at the primary examina-
tion of the patient. This again confirms the above facts:
personal anxiety contributed to the fact that patients
cleaned their teeth better and better monitored the oral
cavity (plaque and tartar became less). However, these pa-
tients brushed their teeth not so often.

Thus, anxiety in the structure of nature (situational
and personal) has a significant impact on dental behav-
ior of patients and health of the oral cavity. Anxious pa-
tients better complied with the doctor’s advice.

Negative correlation was found ($r_S = -0.42$) between
the scale of “emotional stability” and the frequency of
toothbrush replacement, i.e., the more expressed was
emotional stability and balance in the structure of per-
sonality (i.e., low neuroticism), the less frequently people
changed their toothbrush.

Unfortunately, all correlations revealed as statistically
significant appeared to be clinically negligible or very weak
with values $r_S$ from 0.41 to 0.63 (Table 1).

Nonetheless, the results could be crucial for further
search of favorable psychological factors that increase the
patient’s motivation for treatment, as well as for the pro-
gnosis of the expected response to further treatment. This
would differentiate (evidence-based) medical efforts and
impact targets for different types of patients, depending on
their personal capacity, level of compliance, and attitude to-
wards their health and treatment. It can also help in pre-
dicting and preventing dental and periodontal diseases, so
that we can save economic resources.

Conclusions

1. People with “altruistic” and “dependent” type of
interpersonal relations pay much attention to the
status of their oral cavity; they address issues of
hygiene and cleaning teeth with special care. To the
same extent careful about the health of their teeth
are people of “selfish” type, but they do not always know how to properly clean their teeth; such patients should contact a dentist for a consultation on proper oral care. People with internal locus of control also pay much attention to the status of their oral cavity.

2. The poorest oral care practices are revealed in patients of “suspicious” and “authoritarian” types of interpersonal relationships. People with external locus of control pay less attention to oral hygiene but more often replace their toothbrush.

3. Patients of “friendly” type are more than others inclined to cooperate with the doctor and comply with his recommendations; “anxious” patients also often follow the doctor’s prescriptions.

**Expert recommendations**

The study showed that there are specific relations between psychological characteristics of patients and their attitude to their dental health and hygiene of oral cavity. These characteristics with a fairly high probability influenced the behavior of dental patient after the prophylactic examination and conversation with the doctor. Therefore, it is necessary to develop more specific programs of medical interaction and psychological support of different types of patients, in account of their individual psychological profile, to enhance the effectiveness of treatment and prevention activities. The results are crucial for further search of favorable psychological factors that increase the patient’s motivation for treatment, as well as for the prognosis of the expected response to further treatment. This would differentiate (evidence-based) medical efforts and impact targets for different types of patients, depending on their personal capacity, level of compliance, and attitude towards their health and treatment.

**Abbreviations**

BigS: big five; IAT: integrative anxiety test; LSC: level of subjective control; OH-S: index of Greene-Vermilion; PMA: papillary marginal alveolar; SMU: First Saint Petersburg State Medical University.

**Competing interests**

The authors declare that they have no competing interests.

**Authors’ contributions**

VT substantially contributed to the conception and design, acquisition of the data, and analysis and interpretation of the data; has been involved in drafting the manuscript or revising it critically for important intellectual content; provided study materials or patients; recruited participants into the study; performed the statistical analysis, and helped to draft the manuscript. EL helped in the acquisition of the data, participated in the design of the study, performed the statistical analysis, and helped to draft the manuscript. All authors read and approved the final manuscript.

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