ORIGINAL ARTICLE

CONTENTS

Connection and assessment of the psychological status of orthodontic patients with various types of malocclusion

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ABSTRACT

Aim: Assessment of relationship between the psychological status of orthodontic patients and the type of malocclusion using the Eysenck Personality Questionnaire.

Materials and Methods: Interviews were conducted using the Eysenck test. After the survey, the results of the questionnaire were analyzed according to the openness scale and 206 people aged 12 to 38 years were included in the further study. All patients were divided into groups according to the classification of malocclusion according to Angle – I, II and III class.

Results: During the verification of the first hypothesis regarding the relationship between patients with malocclusion and the level of neuroticism, a relationship was established in patients with II class ($\chi 2=8.87$, $p=0.064$). When establishing a relationship between patients with different classes of malocclusion and personality traits, no correlations were found ($\chi 2=1.72$, $p=0.787$). According to the results of the Pearson's Chi-square analysis, a relationship was established between patients with different classes of malocclusion and types of temperament ($\chi 2=32.0$ $p=0.004$).

Conclusions: According to the results of our research, patients with pathology of III class according to Angle most often have the temperament type of sanguine and melancholic with introverted personality traits, with II class – melancholic and choleric, with I class according to Angle – sanguine and choleric, who are characterized by extraversion traits.

According to the psychosocial status, patients with pathology of I and II class correspond to a high level of neuroticism, with III class – to an average level of neuroticism.

KEY WORDS: psychological impact, facial aesthetics, malocclusion, orthodontic treatment, temperament type

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INTRODUCTION

Health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. If a person loses at least one link from this chain, which are interconnected and complement each other, he cannot be considered completely healthy [1].

A malocclusion negatively affects the psychological state of adults and adolescents, their social interaction, quality of life and self-esteem, which is directly proportionally reflected in the social adaptation of the patient, his behavior and self-perception [2]. Some patients may complain of discomfort and even pain, especially in the area of the temporomandibular joint [3]. But not only the function of the maxillofacial system suffers, but the aesthetics of the face, which has a direct impact on the patient's mental health and social stereotypes can have a serious impact on the psychosocial status [4].

Nowadays, the demand for orthodontic treatment is constantly growing, especially among adults, who make up more than half of all orthodontic patients, for whom improving their appearance and social recognition is an important motive for undergoing orthodontic treatment [5, 6]. Early studies have shown that many adult patients with malocclusion have problems with social psychological adjustment, which interferes with the normal relationship between the doctor and the patient, despite the successful results of orthodontic treatment. An orthodontist, who cured a patient with malocclusion as a physical disability, can significantly improve his psychological condition [7].

The use of psychological tests in dentistry and orthodontics helps to identify emotional aspects, phobias, anxiety or discomfort that the patient may feel during orthodontic procedures. In cases of hearing-impaired patients, psychological tests are the only objective method of psychodiagnosis, which may allow developing an individual approach to each patient, providing more comfortable and effective orthodontic care [8].

The connection between personal traits and the psychological state of patients and the results of dental treatment has been recognized, which is important to know before the start of long-term orthodontic treatment, in which the patient himself takes an active part [9].

Patients with malocclusion have higher rates of neuroticism, psychological symptoms such as paranoid ideas, anxiety, self-deprecation, introversion, and shyness [10].

AIM

The aim of this study was to assess the relationship between the psychological status of orthodontic patients and the type of malocclusion using the Eysenck Personality Questionnaire.

MATERIALS AND METHODS

This study was conducted at the Department of Postgraduate Education of Orthodontists at the Poltava State Medical University in the period from March to May 2023 and was approved by the Bioethics Problem Commission № 221 dated 12.21.2023. Written informed consent was obtained from all participating patients before the start of the study.

SELECTION OF THE RESEARCH METHOD

Interviews were conducted according to the Eysenck test [11]. The method makes it possible to evaluate the symptom complex of extraversion, introversion and neuroticism. The questionnaire contains 57 questions to which the participants answered «yes» or «no» depending on the real situation, 24 of which assess extroversion-introversion, the other 24 questions characterize stability-instability, and the last 9 are included in the scale of openness and probability of results.

This test helps to identify personal characteristics and possible psychological difficulties that can affect the behavior, interaction and perception of the patient before treatment and to find an approach to the patient with bite pathology depending on its form.

Processing of the questionnaire was carried out with the help of a key, starting with the openness scale. If the examinee has 5 or more points, the results of his surveys are not taken into account, and the reasons for the dishonest answers are searched. Then we define extroversion and introversion by the number of points (more than 12 and less than 12, respectively). The lower the score, the more introverted person, the higher the score, the more sociable person. The same scores are applied to the scale of neuroticism: if 12 points or more – neuroticism, less – emotional stability.

INCLUSION CRITERIA

Patients with malocclusion and permanent bite.

EXCLUSION CRITERIA

Congenital facial defects previously treated orthodontically or individuals in whom aesthetic defects were eliminated by prosthetic or restorative methods,.

Before the further study 206 patients who applied to the Department of Postgraduate Education of Orthodontists with malocclusion, aged from 12 to 38 years.

After the survey, the results of the questionnaire were analyzed according to the openness scale, which objectively assesses the reliability of passing the test. Patients who provided inaccurate information were also excluded.

Regarding orthodontic pathology, all patients were divided into groups according to the classification of malocclusion according to E. Angle- I, II and III class. This classification is internationally accepted and characterizes malocclusion in the sagittal plane. The first class is characterized by a neutral relationship on the first molars and an anomaly of the teeth in the frontal area. The second class corresponds to the distal ratio on the first molars of the upper and lower jaw, the third class corresponds to their mesial ratio.

STATISTICAL ANALYSIS

Statistical data processing was carried out in open statistical software for the desktop Jamovi free license v. 2.3.28.0 [12, 13].

In order to establish the relationship between the classes of malocclusion and the type of temperament, the level of neuroticism and personality traits (extraversion and introversion), an analysis of the mutual distribution of frequencies by Pearson's $\chi 2$ was conducted.

The null hypothesis was that there is no relationship between the psychological status of patients and the type of malocclusion. The alternative hypothesis is that there is a relationship.

RESULTS

During the verification of the first hypothesis regarding the relationship between patients with malocclusion and the level of neuroticism, a relationship was

Table 1. Analysis of the mutual distribution of frequencies between patients with malocclusion and level of neuroticism

Class according to Angle	Number of patients	Level of neuroticism (N, %)		
		High	Medium	Low
I	90	36 (42.8%)	38 (42.2%)	16 (17.8%)
II	80	38 (47.5 %)	24 (30.0%)	18 (22.5%)
III	36	9 (25.0 %)	21 (58.3%)	6 (16.7%)
		χ2= 8.8 p=0.064		

Table 2. Analysis of the established relationship between the level of neuroticism of patients with malocclusion by gender and age

Allocation criteria	Characteristics by gender and age	The value of χ^2	p
Sex	Female	6.48	0.166
	Male	35.36	<0.001*
Age(years)	12-18	9.63	0.047*
	19-25	7.79	0.100
	More than 26	14.33	0.006*
χ2=35.36, p<0.001; χ2=9.63, p=0.047; χ2=14.33, p=0.006			

Table 3. Analysis of the mutual distribution of frequencies between patients with malocclusion and personality traits

Class according to Angle	Number of patients	Personality trait		
		Extrovert	Medium	Introvert
I	90	46 (51%)	7 (7.8%)	37(41.1%)
II	80	43 (53.8 %)	7 (8.8%)	30(37.5%)
III	36	15 (41.7 %)	3 (8.3%)	18 (50%)
		χ2=1.72, p=0.787		

established in patients with II class (χ2=8.87, p=0.064) Table 1.

In general, for patients with I class (group 1) the inherent average degree of neuroticism of the personality type is 38 (42.2%), while for the II class malocclusion (group 2) the high level of neuroticism is 38 (47.5%). The average level of neuroticism of 21 (58.3%) is most often characteristic to III class. When dividing patients by gender, a relationship was established between the level of neuroticism and persons of the male category, χ2=35.36, p<0.001) Table 2.

When dividing patients by age, a relationship was established by the level of neuroticism in the age groups of 12-18 years (χ2=9.63, p=0.047) and older than 26 years (χ2=14.33, p=0.006). table 2.

The second hypothesis was characterized by the existence of a relationship between patients with different classes of malocclusion and personality traits (extraversion and introversion). During its inspection, it was found that there is no connection (χ2=1.72, p=0.787) table 3. Therefore, the analysis of the relationship between personality traits and age and gender was not conducted.

In general, when dividing patients with I and II class according to Angle, the most extroverts were found – 46 (51.1 %) and 43 (53.7 %), respectively. At the III class according to Angle, the most introverts were found – 18 (50%).

The third hypothesis was to determine the relationship between patients with different classes of malocclusion and temperament types. In the group of patients with I class pathology according to Angle, there are most sanguine 22 (24.4%) and choleric 23 (25.5%), slightly less phlegmatic and melancholic. There are 20 cholerics (25%) and 16 sanguine (20%) in group 2. And there are 15 (41.6%) sanguine and 9 (25.0%) melancholics in group 3.

Regarding the combination of temperament types, they correspond to the following gradation: the same number of melanocholeric and cholerosanguinic, and a slightly smaller group of melanophlegmatic and phlegmatosanguinic.

Based on the results of the Pearson Chi-square analysis, a relationship was established between patients with different classes of malocclusion and types of temperament (χ2=32.0 p=0.004) Table 4.

When dividing patients by gender, a connection was established between the type of temperament and the female persons (χ2=24.2, p= 0.044) Table 5.

When dividing the patients by age, a connection was established by the type of temperament in the age group of 12-18 years (χ2=40.9, p<0.001) Table 5.

Table 4. Analysis of the mutual distribution of frequencies between patients with malocclusion and type of temperament

Type of temperament	Class according to Angle (N, %)			
	I class	II class	III class	Total
sanguine	22 (24.4%)	16 (20.0%)	15 (41.7%)	53 (25.7%)
melancholic	17 (18.9%)	9 (11.3%)	9 (25.0%)	35 (17.0%)
melanophlegmatic	3 (3.3%)	0 (0.0%)	0 (0.0%)	3 (1.5%)
melanocholeric	4 (4.4%)	19 (23.8%)	3 (8.3%)	26 (12.6%)
choleric	23 (25.6%)	20 (25.0%)	3 (8.3%)	46 (22.3%)
phlegmatic person	16 (17.8%)	12 (15.0%)	6(16.7%)	34(16.5%)
cholerasanguinic	2 (2.2%)	3 (3.8%)	0 (0.0%)	5 (2.4%)
phlegmatosanguinic	3 (3.3%)	1 (1.3%)	0 (0.0%)	4 (1.9%)
Total	90 (100.0%)	80 (100.0%)	36 (100.0%)	206 (100.0%)
$\chi 2=32.0$ p=0.004				

Table 5. Analysis of the established relationship between patients with malocclusion and type of temperament and gender and age

		The value of x^2	p
Sex	Female	24.2	0.044*
	Male	NaN	NaN
Age(years)	12-18	40.9	<0.001*
	19-25	NaN	NaN
	More than 26	NaN	NaN
$\chi 2=24.2$,p=0.044; $\chi 2=40.9$, p<0.001			

DISCUSSION

An important part of diagnosing orthodontic patients and planning orthodontic treatment is their psychological assessment. The main motivating factors for patients starting orthodontic treatment are the desire to straighten their teeth and improve their smile. Orthodontists are looking for any clues that will help them treat patients successfully, which is why research on specific personality traits that can be used as predictors of patient satisfaction is an important factor. In this study, we aimed to gain some understanding of the personality traits of orthodontic patients that would be relevant in the treatment planning of adult patients with malocclusion, because understanding the motivation and psychological profile of adult orthodontic patients can help orthodontists improve their communication.

An individual's personality is formed by a unique combination of the main four types of temperaments: choleric, sanguine, melancholic, and phlegmatic [14].

Each temperament can be described by the following characteristics. A choleric person is determined, explosive, intense, passionate, has low sensitivity, high reactivity and activity, impatient, has great perseverance, but may have difficulties in switching attention. Sanguines are communicative, enthusiastic, dynamic, with increased reactivity, lively, excitedly respond to everything that attracts their attention, have lively facial expressions and expressive movements, have a high threshold of sensitivity, able to quickly concentrate, disciplined, easily get along with new people, quickly get used to new requirements and circumstances, effortlessly not only switches from one job to another, but also retrains, mastering new skills. Melancholics are organized, perfectionists, are timid, restrained, overly vulnerable, painfully sensual, insecure, the slightest difficulties make them give up, lack energy, are not persistent, get tired easily and have little capacity for work, they are characterized by distraction and a slowed pace of all mental processes. Phlegmatics, on the other hand, are quiet, mystical, winged, restrained, slow, energetic and capable of working, patient, resilient, self-possessed, have difficulty getting along with new people, and respond weakly to external stimuli [15]. Extraversion, introversion mainly determines what a person's reactions and activities depend on – from external impressions that arise at the moment (extrovert), or from images, representations and thoughts related to the past and future (introvert).

At the same time, there is an opinion that both character and facial features are the result of a person's temperament [16].

According to the results of our study on the personal and phychological aspects of the characteristics of orthodontic patients, an almost equal level of distribution of patients with an extroverted personality type was established in patients with I and II classes and a high level of neuroticism,

which is generally consistent with the results of other studies [17]. This suggests that adult orthodontic patients have high levels of anxiety, tension and depression.

At the same time, patients with III class are dominated by introverts. Such patients are withdrawn, may have difficulty adapting to their environment, and have higher levels of anxiety and depression.

According to the data of McKiernan et al. it is known that the perception of malocclusion in patients with neurotic features is significantly different from the perception of a «normal» group of adult patients, due to which such patients can create problems for clinicians regarding expectations both during and at the end of orthodontic treatment [10]. It is possible that these traits are related to differences in the perception of attractiveness and expectations of society.

Research by Phillips et al. shows that adults with malocclusion have a significantly stronger correlation with their neurotic personality [18]. Such individuals can easily become nervous, anxious, irritable and depressed; this can cause them to respond to their environment with poor emotional control and experience negative feelings during certain stressful situations.

In conclusion, we would like to note that more and more orthodontic research is moving away from the traditional biomedical model to a biopsychosocial perspective and assessment of the quality of life related to oral health. The importance of taking into account the inherent psychosocial parameters of orthodontic patients is increasingly being recognized [19].

CONCLUSIONS

The success in the treatment of any pathology is influenced by the psycho-emotional status of the patient and the degree of concern about his pathology.

According to the results of our research, patients with pathology of III class according to Angle most often have the temperament type of sanguine and melancholic with introverted personality traits, with II class – melancholic and choleric, with I class according to Angle – sanguine and choleric, who are characterized by extraversion traits.

According to the psychosocial status, patients with pathology of I and II class correspond to a high level of neuroticism, with III class – to an average level of neuroticism.

An orthodontist must be competent in psychology, because thanks to a correctly established psychological status and type of temperament, he can establish feedback with patient, which increases the probability of quality treatment and obtaining the desired result not only in the understanding of the «norm» from the point of view of medicine, but also in understanding and self-perception of the patient himself.

Psychological tests can detect both quantitative and qualitative changes, adding another dimension through which better treatment planning and implementation can be achieved through a more complete understanding of patients' problems and expectations.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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