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Role of psychoemotional stress in abnormal occlusion

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ABSTRACT

BACKGROUND: Psychoemotional stress is one of the most significant risk factors in many pathological conditions.

AIM: To assess the incidence and severity of psychoemotional stress in patients with abnormal occlusion.

MATERIALS AND METHODS: The severity of psychoemotional stress was assessed in 120 patients with abnormal occlusion. A dental examination using primary and secondary methods was performed in all patients. Following a clinical examination, the patients were divided into three groups based on the severity of dental attrition (according to Bushan, 1979). The Russian version (according to Vodopianova) of the Psychological Stress Measure (PSM-25; Lemyr–Tessier–Fillion) was used to assess the severity of psychoemotional stress. The questionnaire included 25 questions with an 8-point score for the interpretation of answers, with 1 point representing the absence of psychoemotional stress symptoms and 8 points representing constant daily emotional stress.

RESULTS: The analysis revealed that 42 patients had enamel attrition (Group 1), 49 patients had enamel attrition with partially affected dentin (Group 2), and 29 patients had severe attrition that exposed the dentin (Group 3). All respondents reported experiencing varying levels of psychoemotional stress in their daily lives. The severity of stress increased with more severe clinical manifestations of abnormal occlusion. Moreover, the study revealed that the incidence of psychological stress of varying degrees was 100%. The most common manifestations of psychological stress in patients with abnormal occlusion were as follows: grinding and clenching habit (mean: 3.080±0.099 in Group 1, 4.870±0.185 in Group 2, and 6.080±0.122 in Group 3); feeling unwell (mean: 4.020±0.072, 5.620±0.107, and 6.02±0.12, respectively); fatigue (mean: 4.310±0.103, 5.920±0.124, and 7.310±0.263, respectively); and sleep disorders (mean: 5.280±0.121, 5.690±0.165, and 6.280±0.151, respectively).

CONCLUSION: The severity of stress can be used as an integrated quantitative measure of an interdisciplinary approach in the management of these patients, highlighting the need for specialist consultations to improve the psychological status. The severity of stress is an objective efficacy criterion for the diagnosis and treatment, reflecting changes in the level of psychological stress.

Keywords: abnormal occlusion; psychoemotional stress; correlation.

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Роль психоэмоционального стресса в развитии нарушений окклюзионных взаимоотношений

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АННОТАЦИЯ

Обоснование. Психоэмоциональный стресс рассматривается как один из важнейших факторов риска развития многих патологий.

Цель исследования — определить частоту встречаемости и степень выраженности психоэмоционального стресса у пациентов, имеющих нарушения окклюзионных взаимоотношений.

Материалы и методы. Изучен уровень психоэмоционального стресса у 120 пациентов, имеющих нарушения окклюзионных взаимоотношений. Всем пациентам проведено стоматологическое обследование, включающее основные и дополнительные методики. После проведения клинического обследования пациентов разделили на 3 группы в зависимости от уровня стираемости твёрдых тканей зубов (согласно классификации М.Г. Бушана, 1979). Для определения уровня психоэмоционального стресса обследуемые приняли участие в анкетировании по шкале психологического стресса PSM-25 (Лемур–Тесье–Филлион) в адаптации русского варианта методики по Н.Е. Водопьяновой. Анкета включала 25 вопросов с прилагаемой 8-балльной шкалой оценки для интерпретации ответов, где 1 балл означает, что пациент никогда не испытывает симптомы психоэмоционального стресса, а 8 баллов присваивается суждениям, свидетельствующим о постоянном ежедневном эмоциональном напряжении.

Результаты. После анализа пациентов исследуемых групп установлено: у 42 человек наблюдалась стираемость зубов в пределах эмали (1-я группа), 49 пациентов имели нарушения твёрдых тканей в пределах эмали и частично дентина (2-я группа), у 29 обследованных отмечена стираемость в пределах дентина (3-я группа). Выявлено, что все респонденты в различной степени подвержены воздействию психоэмоционального стресса в повседневной жизни. Степень выраженности стресса возрастает в зависимости от клинических проявлений нарушений окклюзии. Выявлено также, что частота встречаемости психологической напряжённости различной степени тяжести равна 100%. Наиболее распространёнными показателями психологического напряжения у пациентов с нарушениями окклюзионных взаимоотношений являются бруксизм, кленчинг (средний уровень в 1-й группе — 3,080±0,099, во 2-й группе — 4,870±0,185, в 3-й группе — 6,080±0,122), физическое недомогание (средний уровень по группам равен 4,020±0,072; 5,620±0,107; 6,02±0,12 соответственно), усталость (1-я группа — 4,310±0,103; 2-я группа — 5,920±0,124; 3-я группа — 7,310±0,263), расстройства сна (средняя интенсивность по группам: 5,280±0,121 в 1-й группе, 5,690±0,165 во 2-й группе, 6,280±0,151 в 3-й группе соответственно).

Заключение. Выявленный уровень стресса служит количественным интегральным показателем реализации междисциплинарного подхода в ведении данных пациентов и, как следствие, необходимости консультационной поддержки специалистами с целью психологической коррекции. Определение уровня стресса служит объективным критерием эффективности диагностики и ведения пациентов, так как свидетельствует об изменении показателя психологической напряжённости.

Ключевые слова: нарушения окклюзионных взаимоотношений; психоэмоциональный стресс; корреляционная взаимосвязь.

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BACKGROUND

According to studies, psychoemotional stress is one of the most significant risk factors in many pathological conditions [1, 2]. It contributes to the development and progression of dental diseases, with emotional lability serving as an aggravating factor [3]. The impact of psychoemotional stress on the integrity of the dentition is a significant issue.

Studies on psychoemotional stress during dentist appointments show decreased emotional lability threshold and increased stress in anticipation of dental treatment [4, 5].

Researchers currently acknowledge the concept of stress-induced pathology, which refers to conditions caused by long-term, untreated psychoemotional stress [6]. This pathology has been shown to negatively affect all body systems, including oral health [7, 8].

Malocclusion is a pathgnomonic condition with clinical signs that can imply long-term psychoemotional stress.

The prevalence of malocclusion and the severity of stomatognathic diseases are steadily increasing. Thus, data on the incidence of psychoemotional stress in patients with these conditions are important for assessing its role in the development and progression of malocclusion.

STUDY AIM: To assess the incidence and severity of psychoemotional stress in patients with malocclusion.

MATERIALS AND METHODS

Study design

An observational, single-center, prospective, controlled, non-randomized sampling study was performed in 120 patients with malocclusion aged 18–44 years (young age according to the World Health Organization classification). A dental examination using primary and secondary methods was performed in all patients. The study design is presented in Fig. 1.

Eligibility criteria

Inclusion criteria:

- Informed consent;
- Age of 18 to 44 years.

Non-inclusion criteria:

- Absence of informed consent;
- Socially disadvantaged patients;
- Acute infectious diseases and decompensated chronic somatic diseases;
- Inflammatory periodontal diseases in the acute stage;
- Mental disorders;
- Cancer.

Exclusion criterion: refusal to participate in the study.

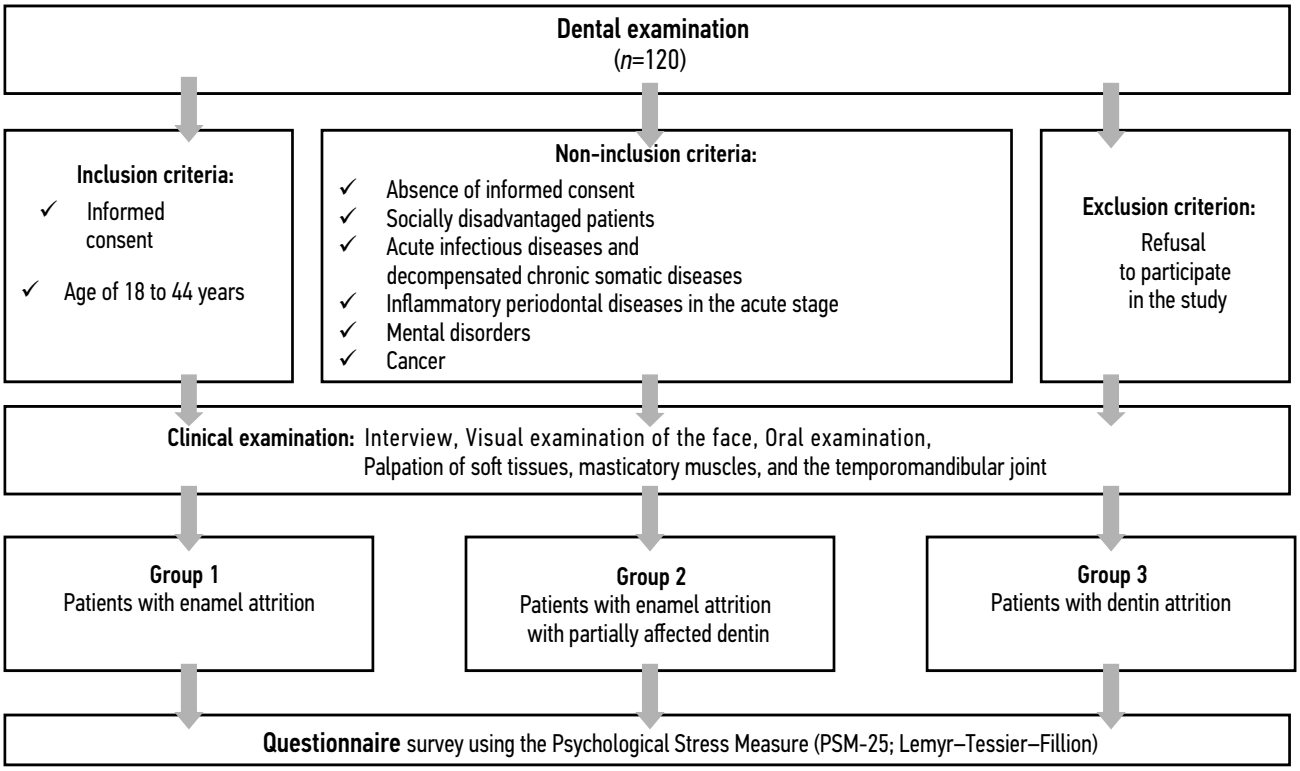

Fig. 1. Study design.

Study setting

The study was performed at the Department of Dentistry of the Institute of Continuing Medical and Pharmaceutical Education, Volgograd State Medical University. The study included patients who sought dental care.

Study duration

The study involved a single dentist appointment, during which all planned procedures were performed.

Therapeutic intervention

A dental examination using primary and secondary methods was performed in all patients. A clinical examination included an interview, visual examination of the face, oral examination, and palpation of soft tissues, masticatory muscles, and the temporomandibular joint.

The Russian version (according to Vodopianova) of the Psychological Stress Measure (PSM-25; Lemyr–Tessier–Fillion) was used to assess the severity of psychoemotional stress. This questionnaire was selected due to the necessity for a quantitative assessment of somatic, behavioral, and emotional parameters of psychoemotional stress. This will contribute to the development of an individualized expert system for predicting the risk of malocclusion in future studies.

The questionnaire includes 25 questions with an 8-point score for the interpretation of answers, with 1 point indicating the absence of psychoemotional stress symptoms and 8 points indicating constant daily emotional stress. The total of all answers is an integrated psychological stress measure (PSM). Question 14 is assessed in reverse order. The higher the PSM, the higher the level of psychological stress. PSM above 155 points indicates a high level of stress, disability, and psychological discomfort, necessitating a wide range of therapies and interventions to decrease psychoemotional stress, provide stress relief, and improve the thinking style and lifestyle. PSM of 154–100 points indicated a moderate level of stress. PSM <100 points indicated a low level of stress and effective stress management.

Primary study outcome

The primary outcome criteria included a questionnaire survey in patients with malocclusion, as well as an assessment of the relationship between psychoemotional stress level and severity of clinical signs of malocclusion.

Secondary study outcomes

The study did not assess secondary outcomes.

Subgroup analysis

Following a clinical examination, the patients were divided into three groups based on the severity of dental attrition (according to Bushan, 1979) to assess the relationship between psychoemotional stress level and severity of malocclusion. This assessment method was selected because of its simplicity and the necessity for qualitative analysis of dental attrition, one of the key symptoms of malocclusion.

Reporting outcomes

Malocclusion was confirmed based on clinical examination findings. The psychoemotional stress level was assessed using the Russian version (according to Vodopianova) of the Psychological Stress Measure (PSM-25; Lemyr–Tessier–Fillion). To assess the relationship between stress symptoms and malocclusion, the strength of correlation was determined using ANOVA.

Ethical review

The study complies with the Declaration of Helsinki (2013). The patients were examined after providing informed consent to participate in the clinical study (extract from the protocol No. 087 of April 15, 2024, Local Ethics Committee of the Volgograd State Medical University).

Statistical analysis

Sample size calculation: The sample size was not calculated in advance.

Statistical analysis methods: The statistical analysis was performed using Microsoft Excel 2016 for MS Windows 10 (Microsoft Corp., USA), following generally accepted medical statistics procedures, as well as Statistica 13.0 (Stat Soft Inc., USA). Multidimensional (correlation) analysis was used for data processing.

RESULTS

Study subjects

The study included 120 patients with malocclusion aged 18–44 years (young age according to the World Health Organization classification). The patients were divided into three groups: 42 patients had enamel attrition (Group 1), 49 patients had enamel attrition with partially affected dentin (Group 2), and 29 patients had severe attrition that exposed the dentin (Group 3).

Primary findings

All respondents reported experiencing varying levels of psychoemotional stress in their daily lives (Fig. 2).

The incidence of psychological stress of varying severity was 100%. Due to high variability in the

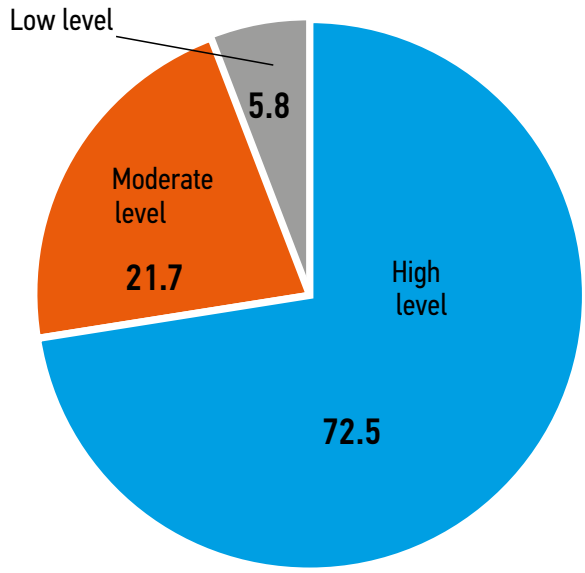

Fig. 2. Psychological stress levels in patients with malocclusion, %.

interpretation of the results, individual questionnaire criteria, most relevant for dental health, were analyzed in each group (Table 1).

The analyzed parameters indicate somatic signs of psychoemotional stress, which worsens the course of the dental disease. Moreover, the severity of assessed disorders increases depending on clinical signs of dental attrition (Fig. 3).

Emotional indicators of stress, such as feeling tense or stressed, forgetfulness, difficulty concentrating, and mood swings, were identified. Moreover, all respondents reported easy fatigability (Fig. 4). To assess the relationship between stress symptoms and malocclusion, the strength of correlation was determined (Table 2).

A positive correlation was observed in all cases, which increased between groups and indicated the impact of psychoemotional stress on the severity of malocclusion. The most valid parameters for analyzing and diagnosing stress-induced malocclusion were symptoms of bruxism and/or clenched jaw, psychological stress, and fatigue.

Table 1. Psychoemotional stress symptoms in patients with malocclusion

Symptom	Mean level (points, M±m)		
	Group 1 (*n*=42)	Group 2 (*n*=49)	Group 3 (*n*=29)
Feeling tense or stressed	4.310±0.198 (*n*=40)	5.830±0.111 (*n*=49)	6.68±0.12 (*n*=29)
Physical complaints	4.020±0.072 (*n*=34)	5.620±0.107 (*n*=45)	6.02±0.12 (*n*=29)
Dry mouth	3.630±0.123 (*n*=31)	4.310±0.159 (*n*=43)	5.630±0.191 (*n*=28)
Forgetfulness	3.610±0.119 (*n*=30)	4.850±0.170 (*n*=40)	5.77±0.19 (*n*=26)
Fatigue	4.310±0.103 (*n*=42)	5.920±0.124 (*n*=49)	7.310±0.263 (*n*=29)
Bruxism and/or clenched jaw	3.080±0.099 (*n*=19)	4.870±0.185 (*n*=44)	6.080±0.122 (*n*=28)
Sleep disorders	5.280±0.121 (*n*=33)	5.690±0.165 (*n*=38)	6.280±0.151 (*n*=24)
Difficulty concentrating	4.740±0.147 (*n*=39)	6.040±0.097 (*n*=48)	6.910±0.276 (*n*=28)
Mood swings	3.130±0.063 (*n*=28)	4.260±0.085 (*n*=34)	5.170±0.186 (*n*=20)

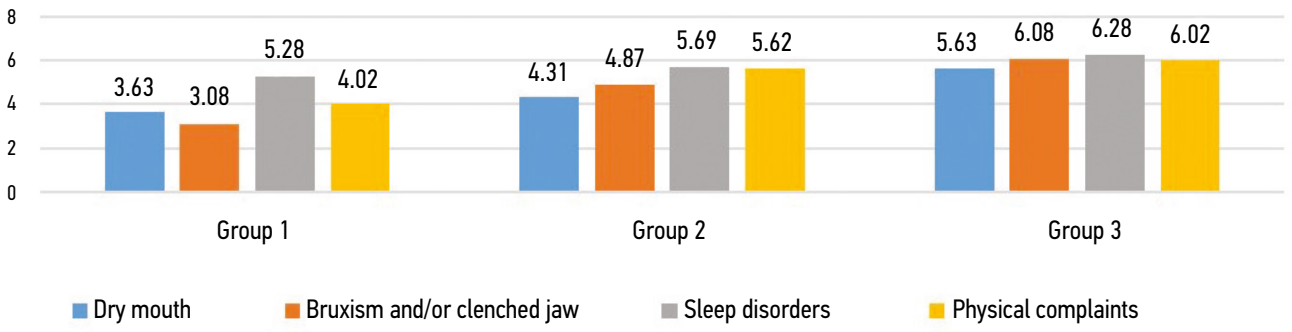

Fig. 3. Incidence of somatic psychoemotional stress symptoms, mean (points).

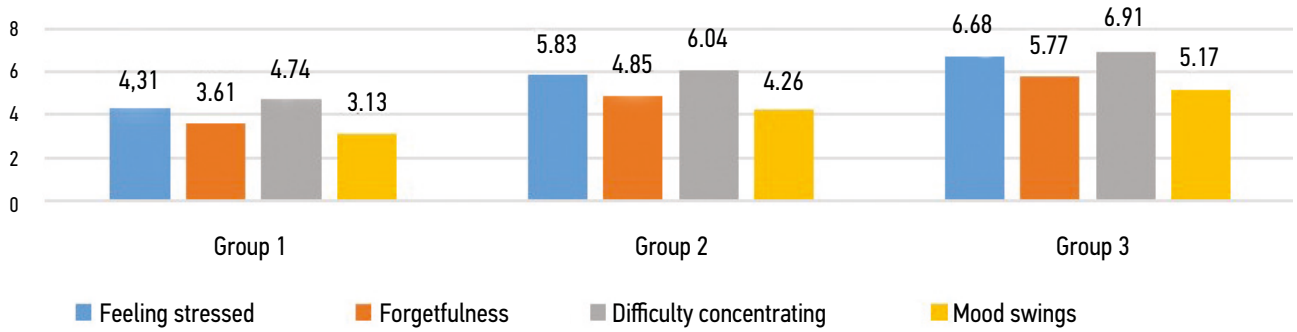

Fig. 4. Incidence of psychoemotional stress symptoms, mean (points).

Table 2. Correlation analysis of assessed psychoemotional stress symptoms by groups

Symptom	Strength of correlation		
	Group 1	Group 2	Group 3
Feeling tense or stressed	0.47	0.51	0.63
Physical complaints	0.12	0.11	0.14
Dry mouth	0.19	0.19	0.21
Forgetfulness	0.12	0.15	0.13
Fatigue	0.54	0.52	0.51
Bruxism and/or clenched jaw	0.69	0.77	0.75
Sleep disorders	0.30	0.36	0.41
Difficulty concentrating	0.24	0.18	0.22
Mood swings	0.1	0.11	0.08

Secondary findings

There were no secondary findings in the study.

Adverse events

No adverse events were reported in the study.

DISCUSSION

Summary of primary study findings

The study findings confirm a significant impact of psychoemotional stress on the development of malocclusion.

Discussion of the primary study outcome

The incidence of malocclusion is steadily increasing. High levels of psychoemotional stress are a risk factor for this condition. Thus, detecting the most relevant psychological stress symptoms affecting the stomatognathic system is critical in dental practice.

Moreover, the incidence of malocclusion symptoms is steadily increasing, necessitating a more proactive approach to therapy.

Psychogenic disorders are a possible cause of malocclusion, with psychological stress levels playing a critical role. Given that stress-induced symptoms can be both emotional (feeling stressed, mood swings) and somatic (sleep disorders, physical complaints), a complex, criterion-based approach to therapy is required.

The study identified the most relevant psychological stress parameters observed in patients with malocclusion: feeling tense or stressed, physical complaints, dry mouth, forgetfulness, fatigue, bruxism and/or clenched jaw, sleep disorders, difficulty concentrating, and mood swings.

A correlation between psychoemotional stress symptoms and the severity of malocclusion was determined. This correlation was positive in all cases, confirming the impact of psychological stress on malocclusion.

The severity of stress can be used as an integrated quantitative measure of an interdisciplinary approach in the management of these patients, highlighting the need for specialist consultations to improve the psychological status. The severity of stress is an objective efficacy criterion for the diagnosis and treatment, reflecting changes in the level of psychological stress.

Study limitations

A small study sample makes it difficult to extend the study findings to the general population.

CONCLUSION

Psychoemotional stress is a significant risk factor for malocclusion. The study identified the most relevant psychological stress parameters, including bruxism, clenched jaw, physical complaints, fatigue, and sleep disorders. The findings of correlation analysis indicate a direct relationship between psychoemotional stress level and the severity of malocclusion. Determining the role of psychoemotional stress enabled identifying the most relevant symptoms for patients with dental diseases, which is important for dental practice. However, the differential diagnosis requires a comprehensive assessment of multiple risk factors for malocclusion, including the detection of subtle correlations.

ADDITIONAL INFORMATION

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Competing interests. The authors declare that there are no obvious or potential conflicts of interest related to the publication of this article.

Authors’ contribution. V.V. Shkarin — final approval for publication of the manuscript; E.N. Iarygina — concept development and text editing; Yu.A. Makedonova — general management; D.Yu. Dyachenko — collection, analysis and processing of material, writing the text, checking critical intellectual content; L.M. Gavrikova — collection, analysis and processing of material, writing the text, checking critical intellectual content. The authors confirm that their authorship meets the international ICMJE criteria (all authors made significant contributions to the development of the concept, conduct of the research and preparation of the article, read and approved the final version before publication).

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