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Original Study Article

Psychological analysis of the life situation of adolescents with orthopedic diseases

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BACKGROUND: The situational approach is a promising direction in the study of the determinants of mental development and behaviors in modern psychological research. This study considered the possibility of using a situational approach in the study of psychological problems of children and adolescents with orthopedic diseases and discussed the objective and subjective characteristics of the life situation associated with orthopedic diseases and surgical treatment.

AIM: The study aimed to examine the peculiarities of life situations in adolescents with various orthopedic diseases.

MATERIALS AND METHODS: The study involved adolescents aged 12–17 years diagnosed with idiopathic scoliosis (n = 54) and juvenile chronic arthritis (n = 44) and healthy adolescents (n = 43). Clinical–psychological and psychodiagnostic methods were used. Mathematical and statistical data processing was carried out.

RESULTS: The life situation of adolescents with idiopathic scoliosis and juvenile chronic arthritis was characterized by events that cause traumatic experiences. Objective factors of the life situation and traumatic life events presented in the mental picture of the disease of adolescents agree with the pronounced emotional problems of patients with orthopedic diseases. Compared with healthy adolescents, adolescents with orthopedic diseases had higher general index of PTS, which indicates a pronounced subjective difficulty of the life situation of adolescents with orthopedic diseases. The results are confirmed by the severity of the subjective negative emotional reactions to certain characteristics of the disease. The objective and subjective characteristics of the life situation of adolescents with idiopathic scoliosis and juvenile chronic arthritis may determine the degree of difficulty and the degree of risk in the occurrence of emotional trauma for illness, hospitalization, and treatment.

CONCLUSIONS: Understanding the life difficulties of adolescents with orthopedic diseases can improve the prediction of behavioral problems and adaptation opportunities in hospital settings and provide timely psychological assistance to adolescents with severe orthopedic diseases, taking into account situational variables.

Keywords: orthopedic disease; idiopathic scoliosis; juvenile chronic arthritis; adolescents; difficult life situation.

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Оригинальное исследование

Психологический анализ жизненной ситуации подростков с ортопедическими заболеваниями

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Обоснование. Перспективным направлением в изучении детерминант психического развития и поведения в современных психологических исследованиях выступает ситуационный подход. Рассмотрена возможность применения ситуационного подхода при изучении психологических проблем детей и подростков с ортопедическими заболеваниями. Обсуждены объективные и субъективные характеристики жизненной ситуации, связанные с ортопедическими заболеваниями и хирургическим лечением.

Цель — изучение особенностей жизненных ситуаций у подростков с различными ортопедическими заболеваниями.

Материалы и методы. В исследование вошли подростки 12–17 лет с идиопатическим сколиозом (54 человека), ювенильным хроническим артритом (44 человека) и здоровые подростки (43 человека). Проводили математико-статистическую обработку данных.

Результаты. Жизненная ситуация подростков с идиопатическим сколиозом и ювенильным хроническим артритом характеризуется наличием событий, вызывающих травматические переживания. Объективные факторы жизненной ситуации и травматические события, представленные в ментальной картине заболевания подростков, согласуются с выраженными эмоциональными проблемами пациентов с ортопедическими заболеваниями. У больных подростков в отличие от здоровых выше значения общего индекса посттравматического стресса, что свидетельствует о выраженной субъективной трудности их жизненной ситуации. Полученные результаты подтверждаются выраженностью субъективно-негативных эмоциональных реакций на отдельные характеристики заболевания. Характеристики жизненной ситуации, связанной с болезнью подростков с идиопатическим сколиозом и ювенильным хроническим артритом, могут определять степень ее трудности и степень риска возникновения эмоциональных травм у подростков в ситуации болезни, госпитализации и лечения.

Заключение. Понимание трудностей в конкретной жизненной ситуации подростков с ортопедическими заболеваниями может улучшить прогнозирование поведенческих проблем, расширить возможности адаптации в условиях стационара, обеспечить своевременную психологическую помощь с учетом ситуационных переменных.

Ключевые слова: ортопедическое заболевание; идиопатический сколиоз; ювенильный хронический артрит; подростки; трудная жизненная ситуация.

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ЭКО•ВЕКТОР

BACKGROUND

The problematic field of psychology involves the study of the determinants of mental development and behaviors in children and adolescents with chronic orthopedic diseases receiving complex rehabilitation treatment.

Russian and international psychologists consider the situational approach to be promising in this field [1–3]. However, until now, no generally accepted theory of the situation has been established in psychological science [1, 2]. Initially, ideas about the situational approach were developed within social psychology and behaviorism. Researchers have focused on the possibilities of predicting and controlling human behaviors [2, 3]. Moreover, the explanatory model of human behavior included either exclusively objective environmental factors or social and personal variables [1–3]. Modern researchers tend to adhere to the idea of behavior as a function in continuous personal–situational interaction [3].

The situational approach is being actively developed in interdisciplinary medical and psychological research. Moreover, clinical psychologists note that life situations can be analyzed from the standpoint of both an external observer and an internal reality [1, 3].

For empirical research, understanding the scale of the situation is important [4, 5]. The differentiation of situations according to the criterion of scale involves studying the general situation of a person's life (situation in a loose sense) or situational variables in connection with individual and specific (external or internal) events (situation in a strict sense). Examples of situations in a strict sense are stressful and difficult circumstances [4, 5]. Osukhova considered a difficult life situation as "a situation where, as a result of external influences or internal changes, a person's adaptation to life is disturbed, and as a result, he is unable to satisfy his basic vital needs through models developed in previous periods of life" [5]. Moreover, special cases of difficult life situations are extreme and crises characterized by intense experiences and possible development of mental trauma as a result of exposure to extraordinary events.

According to clinicians, having an illness, including orthopedic ones, and the need for complex medical intervention are difficult life situations [3, 6]. Objective parameters of a disease are considered criteria for determining difficulty, namely, clinical characteristics, such as the risk of death and disability, need for radical treatment, pain, and negative effect of the disease on significant social bonds and relationships [6]. In children and adolescents with somatic pathologies, factors such as pain syndrome, disease severity, nature of therapeutic measures, functional impairment, disease-related social circumstances, and emotional problems are often considered criteria for determining the difficulty of a disease situation [6–12]. In children and adolescents with orthopedic diseases, the difficulty of their life situation is possibly described based on objective and subjective characteristics of the disease. The external conditions of those with orthopedic diseases include musculoskeletal deformities, motor restrictions and impaired movement, cosmetic defects, physical discomfort, severity of the pain syndrome, stress-inducing factors, frequent and prolonged hospitalizations, threats of surgical treatment, and disability [13–15].

In children and adolescents with orthopedic diseases, difficult life situation, from the standpoint of internal reality, is described based on two levels of subjective factors. Level 1 includes individual emotional characteristics and cognitive presentations of objective factors in a life situation, and level 2 is considered an integrative phenomenon, which includes the most general characteristics of objective factors of the situation in the human psyche. In a disease situation, subjective factors in the primary level can be emotional reactions to the disease, anxious expectations regarding the possibilities of healing, emotional reactions to pain, traumatic experiences regarding the disease, need for complex treatment, treatment results, cognitive assessment of the threat in relation to one's future, idea of one's physique and presence of a cosmetic defect, and emotional problems manifested as signs of post-traumatic stress [12–15]. Integrative subjective factors in a disease situation include phenomena such as the "internal presentation of the disease," "health-related quality of life," self-evaluative constructs of consciousness, and personality associated with objective factors of the life situation [16–18].

An empirical study of the life situation involves the identification of objective and subjective factors that determine the level of difficulty. The analysis of objective and subjective factors of the life situation in a child or an adolescent with an illness can reveal various forms of protective coping behaviors aimed at increasing adaptive capabilities [19, 20].

Furthermore, life situation, given its complexity and multilayeredness, is difficult to assess in empirical research and is presented fragmentarily in modern works. The life situations of children and adolescents with orthopedic diseases that require complex medical interventions are virtually uninvestigated both theoretically and practically. Specifically, the life situations of adolescents with idiopathic scoliosis (IS) and juvenile chronic arthritis (JCA) have not been examined. IS is a severe spine deformity of unknown origin, which creates a visible inaesthetism and disrupts the functioning of internal organs. The prevalence of IS among the pediatric population, according to international authors, ranges from 2% to 4% [20, 21]. According to

Russian authors, the incidence of IS among pediatric patients reaches 17.3% [22]. In several children, the spinal deformity progresses in over several years, and by adolescence, it can represent a severe pathology requiring surgical intervention. Most often, severe spinal deformities (Cobb degrees III–IV of severity) occur in girls aged 11–13 years and in boys aged 12–14 years. IS combines a cosmetic defect associated with spinal deformity and curvature of the chest, pelvic bones, and internal symptoms of severe pathology manifested in the disruption of the respiratory, cardiovascular, and other body systems [23].

The prevalence of JCA among pediatric population is 0.028%–0.08% [24]. JCA is a serious disease that often leads to damage to the musculoskeletal system. JCA is characterized by pain, loss of function, uncertainty of the disease progression, and changes in appearance, including those of large joints. The mechanism of the increase in disease symptoms includes the development of an autoimmune process as a result of immune deregulation. Consequently, a systemic disease arises that requires constant treatment and threat of disability. The disease can occur at any age. Clinical and laboratory manifestations of the disease, which last for 6 months, are considered chronic [24].

Thus, detailed analysis of the situations of adolescents with orthopedic diseases can contribute to understanding their psychological adaptation and prospects for personal development and will enable the development of a scientifically based approach to providing psychological assistance to patients of orthopedic clinics.

We assumed that the life situation of adolescents with orthopedic diseases is difficult in terms of the scale of its effect on personality. The degree of difficulty of such a situation can be determined by the level of severity of post-traumatic stress (PTS) (traumatic experiences), which is an obligate sign of psychological maladaptation [4, 25]. The severity of PTS manifestations is determined by significant events in the life of adolescents, including the clinical characteristics of the disease and therapeutic effects that are reflected in the mental presentation of the patients' emotional experiences.

This study aimed to investigate the characteristics of life situations in adolescents with various orthopedic diseases.

MATERIALS AND METHODS

The study involved adolescents aged 12–17 years (n = 54 patients; 12 boys and 42 girls) who were admitted for the treatment of IS and JCA at the H.I. Turner National Medical Research Center for Children's Orthopedics and Trauma Surgery. The study included adolescents with severe IS (grades III–IV) who were indicated for surgical treatment. Forty-four adolescents (21 boys and 23 girls) were diagnosed with JCA. In this study, adolescents with predominantly articular disease participated voluntarily. At the time of the examination, all adolescents with JCA could move independently without the use of orthopedic supports. The treatment of JCA implied the stay of adolescents in a hospital for the correction of medication and diagnostic and therapeutic procedures. As a control group, 43 adolescents without severe somatic diseases were examined. The inclusion criterion was a diagnosis of IS or JCA and that for the control group was the absence of severe somatic diseases, intact intellectual development, and absence of catastrophic event experience (such as violence, fires, and severe traffic accidents). The IS and JCA groups were examined individually in the psychologist's office during week 1 of hospitalization. The examination procedure lasted from 40 min to 1.5 h. According to the examination results, an individual consultation was held, at which the data obtained were discussed and clarified.

The objective characteristics of the life situation of adolescents with orthopedic diseases were described based on medical records, which were used twice, during week 1 of the adolescent's stay in the hospital and after discharge from the clinic. To clarify and verify the data obtained, a clinical psychological interview [6] was conducted, and the results were used to clarify the characteristics of the treatment situation and other significant events in the life of an adolescent. Moreover, the questionnaire items used in the semistructured interview were expanded to assess the severity of PTS symptoms in children and adolescents. It included event characteristics such as "prolonged and repeated hospitalizations," "changes in appearance," "difficulties in movement," and "brace therapy." The degree of difficulty of a life situation was determined based on PTS severity (the data were obtained using a semistructured interview to assess the traumatic experiences of children and adolescents [N.V. Tarabrina et al.]) [25]. As regards the subjective characteristics of the life situation of adolescents, the attitude of children and adolescents toward their disease was analyzed using the technique of "unfinished sentences" (modified by I.K. Shatz, V.K. Kagan) [26]. In addition, the relationship between adolescent attitudes to various aspects of the disease and the degree of difficulty in the life situation (indicators of the severity of PTS symptoms) was analyzed.

Mathematical and statistical data processing included methods of descriptive statistics. The Mann–Whitney U-test was used to compare criteria, and φ* was Fisher's angular transformation that can be used to compare the incidence of a certain trait in two samples. Correlation analysis was performed using Spearman's rank correlation test [27].

RESULTS

The objective characteristics of the life situation of adolescents with orthopedic diseases were described based on medical records and clinical and psychological interviews. Objective characteristics of the situation included clinical characteristics and traumatic events from the experience of adolescents.

Based on the results of the analysis of medical records and clinical and psychological interviews, the objective characteristics of the life situation of adolescents, presented in their mental pattern, included age at disease onset, duration of hospitalization, frequency of hospitalization, nature of treatment, and nature of recommendations.

In the IS group, the mean age at diagnosis was 9.8 ± 2.7 years. In 37 (68.5%) patients, IS was diagnosed at the age of 7–11 years, whereas in the rest of the respondents, the diagnosis was established during adolescence.

In our sample, the average age at JCA onset was 7.2 ± 3.8 years, whereas the disease emerged at preschool age in 15 patients and in adolescence in 8 patients, and the diagnosis was made at primary school age in 21 patients.

Moreover, 54 adolescents with IS were admitted to the hospital for surgical treatment. The majority of adolescents (n = 51, 94.4%) had not undergone surgeries before hospital admission.

Forty-three adolescents with IS (79.6%) were hospitalized, and recovery was expected.

Hospitalization for 37 (84.1%) adolescents with JCA was a routine and constantly recurring event in life (several times a year).

Among 44 adolescents of the JCA group, 37 (84.1%) patients presented to the clinic with an already confirmed diagnosis and for the correction of drug treatment, and 7 (15.9%) patients presented to the clinic to clarify the diagnosis, which was subsequently confirmed. The JCA group received conservative treatment, including nonsteroidal anti-inflammatory drugs, a complex of vitamins and microelements, physiotherapeutic procedures, physiotherapy exercises, and modern drugs to ensure stable remission and avoid severe functional impairment and radical treatment. For the IS group, medical recommendations after hospital discharge included an orthopedic regimen, homeschooling for a year, and prohibition against certain types of physical activity (vertical loads on the spine, jumping, and weight lifting). For the JCA group, medical recommendations after hospitalization included continued medication, dietary adjustments, prevention of acute respiratory infections, and limited sunlight exposure.

Based on the analysis of data collected from medical records and clinical and psychological interviews, the objective characteristics of the life situation of the IS group and JCA group were somewhat different. Compared with the JCA group, the IS group had longer hospital stays ($p < 0.01$), planned surgery, and more significant lifestyle changes during rehabilitation. Hospitalization was a predictable and recurring event in life in the JCA group. Modern treatment methods that prevent radical medical interventions and improve significantly the functional capabilities of adolescents do not imply a harsh breaking of the life stereotype of the JCA group; however, the disease prognosis remains unclear.

To clarify the objective characteristics of the life situation of adolescents with orthopedic diseases and identify traumatic events, the statements of sick and healthy adolescents collected during the semistructured interview are summarized in Table 1.

The sick and healthy groups noted life events associated with changes in the family. Thus, compared with the healthy group, the JCA group was more likely to report emotional problems associated with their parents' divorce ($p < 0.01$). Both the healthy and sick groups had witnessed the death of close relatives. The healthy and sick groups equally mentioned these events accompanied by traumatic experiences. The control group did not report life events associated with symptoms of a serious

Table 1. Traumatic events in the life of adolescents with idiopathic scoliosis (IS) and juvenile chronic arthritis (JCA)

Event	IS group n = 54	JCA group n = 44	Healthy group n = 43
Divorce of parents	9 (16.7%)	14 (31.8%)**	5 (11.6%)
Death of a close relative	16 (29.6%)	13 (29.6%)	11 (25.6%)
Prolonged and repeated hospitalizations	30 (55.6%)**	21 (47.7%)**	0
Change in appearance	49 (90.7%)**	6 (13.6%)*	0
Movement difficulties	0	23 (52.3%)**	0
Corset therapy	29 (53.7%)*. **	0	0

* Differences are significant between groups of sick adolescents.
** Differences are significant between the group of sick and healthy adolescents.

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Table 2. Comparison of the general index of post-traumatic stress in the groups of adolescents examined

Indicator	IS group $n = 37$ (1)	JCA group $n = 44$ (2)	Healthy group $n = 30$ (3)	Level of significance of differences according to the U criterion
General index of post-traumatic stress	26.1 ± 8.6	19.3 ± 11.0	6.44 ± 6.9	$p_{1, 3} \leqslant 0.001$ $p_{2, 3} \leqslant 0.001$ $p_{1, 2} \leqslant 0.01$

Note. IS, idiopathic scoliosis; JCA, juvenile chronic arthritis.

illness and medical treatment. The IS group mentioned changes in appearance more often than the JCA group ($p < 0.01$). The IS and JCA groups reported specific events related to their clinical presentation. Thus, the JCA group, which also had hip, knee, or ankle joint inflammation, complained of difficulty in moving. The IS group mentioned that the need to wear a brace is an event that is accompanied by negative experiences with a predominance of helplessness.

Thus, the life situations of adolescents with orthopedic diseases were not the same as those of adolescents without severe somatic pathologies. These events are associated with the clinical characteristics of the disease and therapeutic measures, which are accompanied by severe emotional experiences that can provoke the onset of PTS symptoms.

The results of the comparison of the overall PTS index are presented in Table 2.

When comparing the severity of PTS symptoms, adolescents with orthopedic diseases had significantly increased values of the general index of severity of PTS symptoms compared with their healthy peers (Table 2). The general PTS index was significantly high in the IS group compared with that in the JCA group. Thus, adolescents with orthopedic diseases experience greater emotional difficulties than healthy ones. Traumatic experiences are more pronounced in the IS group. It can be assumed that the IS group has more difficulties with psychological adaptation in a disease situation, which may be due to the clinical characteristics of the disease and complexity of rehabilitation treatment.

The emotional attitude of adolescents to the disease can be considered subjective characteristics of the situation. The severity of emotional reactions to various disease-related aspects and treatment in adolescents with orthopedic diseases and that of their healthy peers was compared (according to the results of the "Unfinished sentences" method). The IS and JCA groups correlated tasks with problems related to their underlying disease. The healthy group recalled a situation when they were ill with easily treatable diseases typical of childhood. The severity of emotional reactions in adolescents with orthopedic disorders and healthy adolescents was also compared in terms of "attitude toward the disease," "attitude toward treatment," "attitude toward the future," "attitude of the family toward treatment," and "attitude toward hospitalization." The values of the indicators of attitudes toward the disease correspond to the negative emotions that adolescents experience during illness and treatment.

The results of comparing the indicators of attitudes toward the disease revealed that adolescents with orthopedic diseases more often experience negative emotions about

Table 3. Comparison of indicators of attitude toward the disease in adolescents with idiopathic scoliosis (IS). juvenile chronic arthritis (JCA). and healthy participants

Indicator	JCA ($n = 44$) (1)	IS ($n = 37$) (2)	Healthy ($n = 30$) (3)	Significance level of differences
Attitude toward the disease	2.0 ± 1.1	2.6 ± 1.2	0.5 ± 0.8	$p_{1, 2} \leqslant 0.05$ $p_{1–3} \leqslant 0.001$ $p_{2, 3} \leqslant 0.001$
Attitude toward treatment	0.6 ± 0.7	1.1 ± 0.9	0.2 ± 0.5	$p_{1, 2} \leqslant 0.01$ $p_{1–3} \leqslant 0.05$ $p_{2, 3} \leqslant 0.001$
Attitude toward the future	0.5 ± 0.8	1.1 ± 0.9	0.5 ± 1.0	$p_{1, 2} \leqslant 0.001$ $p_{2, 3} \leqslant 0.01$
Family attitude toward the disease	0.9 ± 0.7	1.5 ± 0.9	0.3 ± 0.7	$p_{1, 2} \leqslant 0.01$ $p_{1–3} \leqslant 0.001$ $p_{2, 3} \leqslant 0.001$
Attitude toward hospitalization	1.4 ± 0.9	1.3 ± 0.9	0.1 ± 0.3	$p_{1–5} \leqslant 0.001$ $p_{2–5} \leqslant 0.001$

Note. JCA, juvenile chronic arthritis; IS, idiopathic scoliosis.

their disease and treatment than their peers without severe chronic diseases (Table 3).

The IS and JCA groups more often experience negative emotions related to hospitalization. This is probably caused by objective life events, such as separation from their family and familiar environment, and anxiety associated with the upcoming treatment, breaking the stereotype of life due to a change in the habitual household environment. The IS group more often experiences negative problems related to the disease and need complex rehabilitation treatment than the JCA group. According to subjective criteria, their life situation is probably more difficult than that of the JCA group. Thus, the attitude toward the future of the JCA group, unlike the IS group, does not differ from that of the control group, which is probably due to the peculiarities of therapeutic effects, efficiency of modern drug treatment, and sparing nature of medical recommendations for the near future. A correlation analysis of the parameters of attitudes toward the disease and the severity of PTS symptoms was performed in the two groups of adolescents with orthopedic diseases. Interdependencies between the two indicators were found in both the IS and JCA groups. In the IS group, the general PTS index depended directly on the general attitude toward the disease ($r = 0.513$; $p < 0.05$) and attitude toward the future ($r = 0.370$; $p < 0.05$).

In the JCA group, the general PTS index was directly dependent on the "attitude toward the disease" ($r = 0.334$; $p < 0.05$), "attitude toward treatment" ($r = 0.493$; $p < 0.05$), "attitude toward the future" ($r = 0.350$; $p < 0.05$), and "attitude toward hospitalization" ($r = 0.348$; $p < 0.05$). The relationships revealed indicate that negative experiences in connection with illness and treatment in a hospital can promote post-traumatic symptoms in adolescents with orthopedic diseases. The opposite is also true, as in adolescents with severe PTS symptoms, negative emotional reactions are possible during hospitalization, which can cause difficulties in restorative medical rehabilitation.

DISCUSSION

The results of this study showed that the life situation of the IS and JCA groups is characterized by events that do not occur in the life of adolescents without severe somatic diseases. Some aspects of treatment and clinical manifestations of the disease can affect the mental status of adolescents and cause traumatic experiences. In the IS group, such characteristics include long-term wearing of a rigid corrective brace and visible differences in appearance, and in the JCA group, these include difficulties in movement because of the inflammatory process and dysfunction of lower extremity joints. For the IS and JCA groups, the objective characteristics of their life situations that cause emotionally negative reactions include events associated with prolonged and repeated hospitalizations.

Adolescents with orthopedic diseases and healthy adolescents experience life events caused by impaired family and interpersonal relationships. The results of studying life situations showed that the event of "divorce of parents" occurred significantly more often in adolescents with JCA than in those without severe orthopedic diseases. The results may indicate that the JCA group has pronounced emotional problems. Probably, this circumstance is a psychological risk factor for psychosomatic disorders. As regards the mental state of adolescents, the objective factors of their life situation and traumatic life events are consistent with the emotional problems of patients with orthopedic diseases, which can be characterized as the subjective difficulty of the life situation.

We studied the severity of PTS symptoms in the IS and JCA groups and healthy group. According to the results of the study on the general PTS index, adolescents with orthopedic diseases had higher general PTS index than their healthy peers, and this index was also higher in the IS group than in the JCA group. The results of the study indicate a pronounced subjective difficulty in the life situation of adolescents with orthopedic diseases, and in the IS group, the subjective difficulty of the disease and treatment situation reaches maximum values. The results confirm the emotional component of the attitude toward disease in the IS and JCA groups. The analysis of emotional reactions to the disease, medical influences and hospitalization, relations with the immediate social environment demonstrated their negative connotation in sick adolescents. The severity of such subjective and negative manifestations on individual characteristics of the disease was interconnected with the severity of the general PTS index, which may indicate a situational conditionality of the psychological difficulties in the IS and JCA groups. The objective and subjective characteristics of the life situation associated with IS and JCA can determine not only the degree of difficulty and risk in the occurrence of emotional trauma during illness, hospitalization, and treatment but also the possibility of adaptation despite a deprived background.

CONCLUSION

Professional psychological support for adolescents with severe orthopedic diseases receiving treatment, taking into account the peculiarities of their deprived background, may help them successfully overcome the difficulties of an orthopedic disease-related event and eliminate the possibility of mental trauma while receiving complex rehabilitation treatment.

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ADDITIONAL INFORMATION

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Ethical considerations. Minutes No. 22-4 dated July 18, 2022, of the meeting of the local ethics committee of the H.I. Turner National Medical Research Center for Children's Orthopedics and Trauma Surgery of the Ministry of Health of Russia. The patients and their representatives provided consent to the processing and publication of personal data.

Author contributions. *G.V. Pyatakova* developed the study design and wrote the text of the article; *O.V. Okoneshnikova* performed the literature search. *S.V. Vissarionov* edited the text of the article.

All authors made a significant contribution to the research and preparation of the article, as well as read and approved the final version before its publication.

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