



# PERSONAL RESOURCES OF PROTECTIVE-COPING BEHAVIOR OF ADOLESCENTS WITH IDIOPATHIC SCOLIOSIS AT THE STAGE OF PREPARATION FOR SURGERY

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**Objective.** To analyze personal resources in adolescents with idiopathic scoliosis at the stage of preparation for surgery.

**Material and Methods.** The study involved 29 adolescents aged 12–17 years (7 boys and 22 girls) with grade III–IV idiopathic scoliosis. The survey was conducted within the first days of admission. The control group consisted of 30 adolescents aged 12–17 years without serious somatic diseases. The following diagnostic methods were used: analysis of medical records (case histories), semi-structured interview to assess the severity of traumatic experiences in children and adolescents, the Life Style Index questionnaire, the Coping Strategies Questionnaire, a self-assessment scale, and self-test questionnaire.

**Results.** In adolescents with idiopathic scoliosis, events associated with the disease and preparation for surgery are accompanied by extreme level experiences manifested in medium and medium-high values of post-traumatic stress. Moderate symptoms of avoidance, hyperarousal and obsessive reproduction of traumatic episodes predominate in the structure of stress. Positive self-attitude indicators contribute to the activation of effective coping strategies and can be considered as an adaptive personal resource in a difficult life situation associated with a serious illness and the upcoming surgery.

**Conclusion.** Understanding of personal resources that contribute to the formation of effective coping behavior in a difficult life situation associated with the disease and complex surgical treatment will optimize psychological preparation of adolescents with idiopathic scoliosis for surgery.

**Key Words:** idiopathic scoliosis, adolescents, personal resources, protective-coping behavior, post-traumatic stress.

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Idiopathic scoliosis is a three-dimensional spinal deformity of unclear etiology. In adolescence, spinal deformities can reach severity grade III–IV, which is an indication for surgical treatment. There are many foreign and domestic studies of the psychological problems caused by the peculiarities of the disease and the nature of the orthopedic treatment of children and adolescents with idiopathic scoliosis [1–11].

According to Leszczewska et al. [9], wearing a brace reduces the level of health-related quality of life in adolescents with idiopathic scoliosis. The characteristics of the surgical intervention itself (duration, number of approaches, volume of blood loss) and related changes in the postoperative period (intensity of the pain syndrome, somatic complications), according to a study by Peters et al. [11], are also factors that increase the level of psychological maladjustment

and functional impairment. Rullander et al. [4] in their work show that the level of anxiety, cognitive impairment, and the presence of social problems before the operation affect the severity of pain after it, which, in turn, affects the level of anxiety and increases alienation.

According to Sanders et al. [5], adolescents with idiopathic scoliosis are at risk of developing clinically expressed emotional and behavioral problems regardless of the treatment method. The study compared the observation results for adolescents receiving therapy with a brace and adolescents who underwent surgery. The authors note that the prevalence of such disorders among patients with idiopathic scoliosis significantly exceeds similar average values for general population [5]. According to Aulisa et al. [3], adolescents with idiopathic scoliosis show a high level of neuroticism, anxiety, high susceptibility to stress, and the

presence of communication problems. A high level of personal anxiety, problems with understanding and expressing one's emotions have been recorded in the studies of G.V. Pyatakova et al. [1, 2]. A meta-analysis of 58 investigations into psychological problems associated with idiopathic scoliosis conducted by Gallant et al. [7] revealed a high incidence of dissatisfaction with one's own body, which significantly reduces the quality of the patients' life.

Thus, foreign and domestic studies point to a high risk of emotional and behavioral problems in adolescents suffering from severe forms of idiopathic scoliosis. What remains virtually unexplored, however, is the compensatory potential of an individual and the protection factors that allow adolescents to successfully cope with the difficulties of the life situation characterized by the disease and the need for complex rehabili-

tation treatment. The heuristic notion for analyzing the psychological state of adolescents with severe idiopathic scoliosis is the concept of post-traumatic stress, which we understand as the continuum of human responses to high-intensity strain accompanied by experiencing fear or helplessness. Only high rates of post-traumatic stress correspond to the manifestations of post-traumatic stress disorder [1].

Post-traumatic stress disorder is a form of mental maladjustment that combines both physiological and psychological symptoms that are persistent and scarcely ever disappear spontaneously without psychological assistance. In view of the above, it is necessary to understand what defensive factors are inherent in adolescents with idiopathic scoliosis and what are individual features (psychological characteristics) that can help one to overcome a difficult life situation associated with the disease.

The defensive factors may be personal resources, by which we mean stable personal qualities that contribute to the activation of effective defensive coping behavior in a difficult life situation. Thus, personal resources do not directly affect the success of adaptation but determine how to cope with psychological problems. There are two recognized groups of methods for such coping, i.e. defense mechanisms and coping strategies. The first is traditionally associated with an unconscious change in the view of the situation in order to reduce emotional discomfort and the significance of disturbing events [12]. The use of defense mechanisms is not controlled by consciousness and can be identified by indirect signs. Coping strategies, on the contrary, are considered as active and conscious ways of relieving internal discomfort [13]. Defense mechanisms are considered innate and are explicitly triggered in early childhood, coping strategies are formed as a result of socialization and gaining experience in responding to problem situations. According to recent studies, we can talk about conditionally-adaptive and conditionally non-adaptive defenses and copings, which are more or less often associated with positive results

of coping. At the same time, the effectiveness of the mechanism of psychological defense or conscious coping strategy is determined by the characteristics of the specific situation and the tasks of coping [12, 13].

The purpose of the study is to analyze the personal resources of adolescents with idiopathic scoliosis at the stage of preparation for surgery.

The study is designed based on the theoretical model of identifying personal resources and includes 1) evaluating the characteristics of difficult life situations; 2) evaluating defensive coping behavior and identifying effective defensive mechanisms and coping strategies; and 3) search for personal characteristics associated with the activation of effective ways of coping.

### Material and Methods

The study involved 29 adolescents aged 12–17 years (7 boys and 22 girls) with grade III–IV idiopathic scoliosis. Patients with severe comorbidity, systemic diseases, and intellectual disabilities were excluded from the study (all respondents were examined using Slosson's intelligence test). The survey was carried out at the stage of preparation for the surgical intervention. The control group consisted of 30 adolescents aged 12–17 years without serious somatic diseases.

The following diagnostic methods were used: analysis of medical records, semi-structured interview aimed at assessing the severity of traumatic experiences in children and adolescents [14, 15], the life-style index questionnaire [12], the coping strategies questionnaire [13], a self-assessment scale [15], and self-test questionnaire [16].

A semi-structured interview is a psychodiagnostic technique consisting of two parts. The first part is a screening survey for identifying the presence and nature of traumatic events in the life of an adolescent. The second part is focused on identifying the level indicators of post-traumatic stress disorder in accordance with the international diagnostic and statistical manual of mental disorders (DSM-4).

The following criteria of post-traumatic stress disorder were taken into account: criterion A – primary trauma (emotional reaction at the time of the traumatic event); criterion B – intrusive recall of traumatic experiences (in thoughts, conversations, behavioral reactions, creative products, dreams), criterion C – avoidance criterion (manifested in the unwillingness to mentally return to traumatic events, to visit places connected with them, to meet people), criterion D – hyperarousal (exaggerated response to external stimuli due to the general nervous tension); and criterion F – functional impairment (problems with attention and memory, which undermine the ability to cope with daily activities). The total severity index of post-traumatic stress was calculated [14].

The life-style index questionnaire is designed to determine the intensity level of the personality defense mechanisms. It makes it possible to assess the degree of intensity of the eight defensive mechanisms in adolescence in difficult life situations. These psychological defenses include the following: unintentional forgetting of traumatic events (repression); reverting to behavior characteristic of earlier age periods (regression); transfer of reaction from one situation to another, usually less frightening and significant (displacement); non-recognition of a problem or minimizing its significance (denial); the rejection of one's own experiences and the simultaneous attributing them to surrounding people (projection); propensity to hide the problem and strive for the goal (compensation); demonstration of feelings opposite to those experienced (reaction formation); search for explanations and solution of a problem simultaneously banning one's emotions (rationalization) [12].

Coping strategies questionnaire [13] allows one to determine the frequency of using the three basic ones: problem-focused, seeking social support, and avoidance. The first is associated with proneness to self-planning and performing necessary actions, the second – with seeking advice and/or help from the

people around them, the third – with switching to another activity, refusing active participation in the situation.

The self-assessment scale [15] is a 10-centimeter scale, on which the respondent is asked to make two marks: 1 – to show the estimate of this parameter in himself (real self-esteem), and 2 – the desired degree of this quality in himself (ideal self-esteem). The study used eight scales: «health», «looks», «intelligence», «firm character», «authority among peers», «self-will», «happiness», «self-confidence».

The self-test questionnaire [16] is designed to explore self-image and self-perception. It includes the following scales: self-respect, autosympathy, expected self-other relations, self-interest, self-understanding, self-direction, self-accusation, and global self-attitude. Self-respect is an aspect of self-attitude that emotionally and meaningfully unites self-belief, capabilities, and ability to control one's own life. Autosympathy is a scale, the positive pole of which represents a positive general self-assessment, the approval of certain personal qualities, and the negative pole indicates low self-esteem and readiness for self-accusation. Self-interest represents a focus on one's own thoughts and experiences, confidence in one's value and attractiveness to others. The expected self-other relations is an indicator of positive or negative self-attitude. Self-understanding reflects the assessment of one's aptitude, the ability to understand oneself. Self-confidence is an aspect of self-attitude that unites self-belief, confidence in one's own energy, independence, ability to control various aspects of one's life and to be self-consistent. Global self-attitude represents an undifferentiated feeling, reflecting general self-acceptance or self-dissatisfaction.

For the statistical analysis of the data we used the methods of descriptive statistics, correlation analysis with calculation of Spearman's rank correlation coefficient, and in order to determine the significance of differences we applied Mann-Whitney U-test, Student's t-test, and  $\phi$ -criterion (Fisher angular transformation). Significant statistical relations

were those with an error level not exceeding 5 %.

## Results and Discussion

Analysis of the components of the traumatic experience - events in a life situation of adolescents with idiopathic scoliosis showed that in their lives there were specific events associated with orthopedic illness and typical events that occur in both sick and healthy adolescents. Adolescents with idiopathic scoliosis noted that in their life they encountered the following specific events: hospitalization – 16 (58.6 %) people, wearing brace – 16 (58.6 %), and surgery – 7 (27.6 %). As typical traumatic events, adolescents with idiopathic scoliosis, named parents' divorce – 9 (31.0 %) cases and death of a close relative – 9 (31.0 %). Thus, both specific (related to the treatment situation) and typical events can be a source of traumatic experiences and contribute to the development of post-traumatic stress disorder.

The severity of post-traumatic stress in adolescents with idiopathic scoliosis was assessed based on standard indicators, which identify low, medium, high, and extremely high levels corresponding to the manifestations of post-traumatic stress disorder [14]. Indicators of the general level of trauma among the sick adolescents were as follows: a low level in three (10.3 %) people, moderate level was observed in 16 (55.2 %) adolescents, and medium-high trauma level was diagnosed in 10 (34.5 %) sick teenagers. Thus, on the one hand, the situation of preparation for surgery is difficult and traumatic for adolescents, on the other hand, the traumatic experiences of sick adolescents do not reach the level of clinically significant impairments.

The severity of post-traumatic stress symptoms in adolescents with severe spinal deformities and their peers without somatic diseases is presented in Table 1. The parameters of post-traumatic stress disorder were significantly increased in adolescents with idiopathic scoliosis while a relatively low level of primary trauma (by criterion A) was detected in

comparison with standard indicators. Probably, the obtained result reflects the peculiarity of this traumatic situation: time elongation, gradual increase of intensity (due to deteriorating health), uncertainty associated with adolescents' cognition of the experienced traumatic episode.

The more frequent manifestations of post-traumatic stress disorder in adolescents with idiopathic scoliosis were found to be moderate symptoms of avoidance (criterion C), hyperarousal (criterion D), and intrusive recall (criterion B). The obtained results suggest that adolescents with severe spinal deformities are in a state of constant emotional stress, they are wary and may be very sensitive to information related to the disease and treatment, unwilling to talk about their problem, and prefer to hide it. However, they often recall this problem, and the disease is a persisting background of their thoughts and plans.

The comparative analysis of intensity indicators of defense mechanisms in adolescents with idiopathic scoliosis and their healthy peers show that the defense mechanism of reaction-formation type is significantly more common in adolescents with idiopathic scoliosis than in healthy teenagers ( $p < 0.001$  by Fisher criterion). It can be assumed that the structure of defensive behavior is determined by age characteristics and the intensifying activity of the mechanism of psychological protection of the reaction - formation type is a response to the difficult life situation associated with the preparation for the surgery. The functioning of reaction formation may be manifested in the child's exaggerated optimism, interest, and enthusiasm for the surgery. Such reactions can suggest the presence of suppressed fear, high emotional stress, which requires psychological support. In addition to reaction formation, adolescents with idiopathic scoliosis often use psychological defense mechanisms such as projection, denial, and rationalization, the functioning of which distorts the perception of the situation, makes it difficult to assume responsibility, and can also be an obstacle to support from psychologists, medi-

cal personnel, and even parents because the significance of the problem is denied and negative feelings and reactions are attributed to others or ignored.

In the group of adolescents with severe idiopathic scoliosis, most frequently used are conscious problem-focused and support-seeking strategies of coping (at  $p < 0.01$  by Fisher's criterion) while the avoidance coping strategy is applied significantly less often ( $p < 0.01$ ). It appears that at the stage of preparation for surgery adolescents with idiopathic scoliosis prefer active coping strategies aimed at transforming the situation on their own or with the help of other people. No differences have been observed between the frequency of using coping strategies by adolescents with idiopathic scoliosis and their healthy peers.

Comparative analysis of correlative relationships between indicators reflecting defense mechanisms and coping strategies (Table 2) showed that 67 % of possible interconnections between the intensity level of psychological defenses and occurrence frequency of coping strategies are significant. It appears that the system of defensive coping behavior in adolescents with idiopathic scoliosis is poorly differentiated. At the same time, the support-seeking indicator of the strategy formed the least number of links (3) with the parameters of psychological defenses. Adolescents with idiopathic scoliosis receive psychological support, most likely from parents, medical staff, psychologists as well as through social networks. The problem-focused indicator of the coping strategy (inde-

pendent construction and execution of actions) proved to be most associated with parameters reflecting the intensity of defensive mechanisms (8 correlation dependences). The obtained result seems to reflect the objective limitations of the adolescent's ability to actively influence on the disease and treatment strategy.

To identify effective ways of coping, we analyzed the correlations between the parameters reflecting the level of trauma (severity of post-traumatic stress symptoms) and the occurrence frequency of various psychological defenses with coping strategies in difficult life situations at the stage of preparation for surgery. The following statistically significant correlations were found: the occurrence frequency of the projection defense mechanism was positively related to the values of post-traumatic stress according to criteria D ( $p < 0.01$ ) and F and the overall level of trauma ( $p < 0.05$ ); indicator of the severity of post-traumatic symptoms by criterion B is negatively associated with the intensity parameters of the problem-focused and support-seeking coping strategies ( $p < 0.05$ ). The obtained results suggest that when the projection mechanism of psychological defense is included in the process of coping with the psychological discomfort, this aggravates the severity of post-traumatic stress symptoms, contributes to the development of the process of mental trauma in difficult life situations associated with the disease and surgical treatment.

Altogether, it should be emphasized that the use of any coping strategy reduc-

es the severity of the intrusive recall of the traumatic experience, which presumably reflects the attempts of sick adolescents to independently and consciously cope with an emotional problem. At the same time, taking an active attitude towards the problem (even if it does not manifest itself in actions) is effective from the viewpoint of adaptation to a difficult life situation.

In adolescents with idiopathic scoliosis, personal resources can be interpreted as characteristics that contribute to the inclusion of those methods of defensive coping behavior in difficult life situations that prevent the development of psychological trauma at the stage of preparation for surgical intervention. As possible personal resources, we considered characteristics reflecting age-related psychological features providing new opportunities for self-cognition and self-regulation in adolescence - level indicators of self-assessment of personal qualities and characteristics of self-attitude. We conducted a correlation analysis between self-assessment characteristics and parameters of defensive coping behavior that influence the development of psychological trauma in a difficult life situation associated with the disease and surgical treatment. These characteristics were assumed to include the indicators of the psychological defense, which induce the symptoms of post-traumatic stress (the "projection" psychological defense mechanism), and coping strategies mitigating manifestations of stress (avoidance, seeking social support, and problem-focused strategies).

Table 1

Symptoms of post-traumatic stress disorder in adolescents with idiopathic scoliosis versus healthy adolescents, scores ( $M \pm S$ )

Criterion	Adolescents with idiopathic scoliosis (n = 29)	Healthy adolescents (n = 30)	Student's t-test	p
Primary trauma	3.80 ± 3.34	1.70 ± 1.53	3.04	0.01
Intrusive recall	6.90 ± 4.28	1.17 ± 1.74	6.69	0.001
Avoidance	8.50 ± 5.03	1.07 ± 1.48	7.64	0.001
Hyperarousal	8.30 ± 4.55	0.90 ± 1.60	8.28	0.001
Functional impairment	2.60 ± 2.62	0.70 ± 1.51	3.39	0.01
General level of trauma	26.70 ± 12.67	5.50 ± 5.62	8.26	0.001



The results of the correlation analysis showed that the avoidance parameter of the coping strategy formed inverse correlative interdependencies with the level indicators of real and ideal self-esteem. Thus, in the group of adolescents with idiopathic scoliosis, the indicators of real self-esteem with regard to "happiness" formed a negative relationship with the occurrence of the coping strategy "avoidance." The obtained results indicate that adolescents who feel safe and happy, in a difficult life situation less often resort to avoiding behavior.

The level values of ideal self-assessments of one's own intellectual abilities, self-will, happiness, and self-confidence inversely correlated with the parameters of a conscious avoidance coping strategy ( $r = -0.54$  with  $p < 0.01$ ;  $r = -0.42$  with  $p < 0.01$ ;  $r = -0.42$  with  $p < 0.05$ ;  $r = -0.51$  with  $p < 0.01$ ;  $r = -0.64$  with  $p < 0.01$ ). The level values of ideal self-assessments of self-will, happiness, and self-confidence positively correlated with the indicator of psychological defense mechanism "projection" ( $r = 0.41$  with  $p < 0.05$ ;  $r = 0.46$  with  $p < 0.05$ ;  $r = 0.43$  at  $p < 0.05$ ). At the same time, no relationship has been found between the self-assessment parameters and the occurrence of the support-seeking coping strategy with the frequency of using the problem-focused coping strategy.

The obtained results indicate that adolescents with idiopathic scoliosis, which are characterized by exaggerated optimism about their own future, often

use the psychological defense mechanism of projection and less often adopt conscious strategies of coping with emotional discomfort at the stage of preparation for surgical treatment. The triggered functioning of the projection defense mechanism suggests emotional problems, maintains the process of mental trauma in a difficult life situation due to surgical treatment, it can distort its perception, form inadequate exaggerated expectations associated with the idea of the individual's well-being in the near future and exaggerated enthusiasm regarding the results of the surgical restorative treatment.

The correlation analysis of the parameters of the defensive coping behavior and characteristics of the self-attitude was carried out. It was found that the avoidance coping strategy indicator was positively related to the "self-accusation" parameter ( $r = 0.49$  with  $p < 0.01$ ) and negatively related to the characteristics of self-understanding ( $r = -0.48$  with  $p < 0.01$ ) and global self-attitude ( $r = -0.42$  with  $p < 0.05$ ). The indicator of using the problem-focused coping strategy proved to be positively associated with such indicators as global self-attitude ( $r = 0.52$  with  $p < 0.01$ ), self-respect ( $r = 0.64$  with  $p < 0.01$ ), self-understanding ( $r = 0.43$  with  $p < 0.05$ ), and expected self-other relations ( $r = 0.51$  with  $p < 0.01$ ). Adolescents more often using the mechanism of psychological protection are characterized by reduced auto-sympathy ( $r = -0.39$  with  $p < 0.05$ ) and

are prone to self-accusation ( $r = 0.39$  with  $p < 0.05$ ). The obtained results indicate that adolescents who are prone to self-accusation, who underestimate their intellectual and volitional qualities, often use a coping strategy related to avoiding a problem situation, avoiding difficulties and unpleasant conditions.

Thus, adolescents with idiopathic scoliosis prone to self-accusation and low self-acceptance tend to cope with emotional discomfort by activating the psychological defense mechanism of projection and consciously triggering avoidance of disturbing situations to overcome emotional difficulties. Apparently, the strategy of avoiding real problems is coupled with the simultaneous activation of a less mature and effective way of defense against emotional difficulties, which supports traumatic experiences at the stage of preparation for surgery and may contribute to the development of psychological trauma later, at the stages of medical rehabilitation.

Adolescents with idiopathic scoliosis positively assessing themselves and their personality traits and adequately estimating their abilities and potential and confident that they are of interest to other people in difficult life situation largely tend to adopt conscious coping strategies aimed at assuming an active position in addressing the problem (even if it is not explicitly expressed by actions), which is effective in terms of adaptation to difficulties and contributes to leveling the manifestations of post-traumatic

Table 2

The values of the Spearman correlation coefficients between the indicators of the intensity of defense mechanisms and the frequency of using coping strategies in adolescents with idiopathic scoliosis

Defense mechanism	Coping strategy							
	Repression	Regression	Displacement	Denial	Projection	Compensation	Reaction formation	Rationalization
Problem solution	0.59*	0.53*	0.39*	0.39*	0.47*	0.56*	0.53*	0.51*
Seeking social support	0.29	0.36	0.14	0.64*	0.29	0.61	0.58*	0.39*
Avoidance	0.46*	0.49*	0.35	0.29	0.58*	0.50*	0.35	0.61*

\* Significant correlation coefficients at  $p < 0.05$ .

stress at the stage of preparing for surgery. Thus, the positive parameters of self-attitude can be considered the personal characteristics that trigger effective coping strategies in a difficult life situation and a personal resource in a situation of preparing for surgery in adolescents with idiopathic scoliosis.

## Conclusions

The life of adolescents with idiopathic scoliosis involves specific traumatic events: recurring hospitalization, surgery, wearing a brace in addition to typical traumatic events (parental divorce, death of close relatives). Events associated with the disease and preparation for the operation are accompanied by traumatic experiences, which is reflected in medium and medium-high values of post-traumatic stress at the stage of preparation for surgical treatment. The dominant components in the structure of post-traumatic stress are moderate symptoms of avoidance, hyper-arousal, and intrusive recall of traumatic episodes associated with the disease.

The system of defensive coping behavior in adolescents with idiopathic scoliosis is poorly differentiated and is characterized by the presence of such

psychological defense mechanisms as reaction formation, projection, denial, and rationalization, which is manifested in the distorted perception of the situation, exaggerated optimism of the adolescent regarding the operation and may be a signal of suppressed fear, high emotional stress experienced by the teenager and requiring provision of psychological support. At the stage of preparation for surgery, adolescents with idiopathic scoliosis prefer active problem-focused and support-seeking coping strategies aimed at transforming the situation on their own or with the help of other people.

When the projection psychological defense mechanism is included in the process of coping with psychological discomfort, this maintains the intensity of posttraumatic stress symptoms and promotes the process of psychological trauma in difficult life situations associated with the disease and surgical treatment. At the same time, using conscious coping strategies reduces the severity of intrusively recalling the traumatic experience. Characteristic methods of coping with emotional discomfort for adolescents with idiopathic scoliosis prone to self-accusation involve activation of the projection psychological defense mechanism and conscious overcoming emo-

tional difficulties by avoiding disturbing situations. In a difficult life situation, adolescents with idiopathic scoliosis positively assessing themselves and their personality traits more often use conscious coping strategies aimed at assuming proactive position to addressing the problem, which contributes to leveling the manifestations of post-traumatic stress in a difficult life situation at the stage of preparation for surgery.

Positive self-attitude parameters in adolescents with idiopathic scoliosis can be considered as personal characteristics that trigger effective coping strategies in difficult life situations and as personal resources at the stage of preparation for surgery. Identification of personal resources that contribute to the formation of conscious coping behavior in a difficult life situation will make psychological preparation for surgical treatment in adolescents with idiopathic scoliosis more effective.

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