Ontogenetic Characteristics of Anxiety of Gymnasts of High Sports Qualification

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ABSTRACT
Aim: We have identified age-related changes in the level of anxiety in athletes involved in rhythmic gymnastics. In this article the need for a differentiated approach of psychological preparation is proved, when planning a training process in different periods of ontogenesis of gymnasts. In the rhythmic gymnastics it is a necessity to make a decision on the preparation of a training course.

Material and Methods. The present study involved girls engaged in rhythmic gymnastics with high sports qualification at the age of 10-15 years of age: the 1st category included 48 gymnasts, CMS-36, MS-20 (n=104). The control group is represented by girls who do not play sports (n=100). The "anxiety Scale" was used as a method of diagnosing the level of anxiety [6]. The experimental results were subjected to variations and statistical processing.

Results. Clear age differences in indicators of Interpersonal anxiety gymnasts were revealed. The maximum values in both the experimental and control groups were recorded at the age of 12-13 years. Throughout puberty the sportswomen of measure of Interpersonal anxiety was higher than in the controls. The level of school anxiety in gymnasts of 10 and 12-15 years is significantly higher in girls of the control group (P<0.01<0.05). The maximum values are recorded in athletes aged 12-13 years old, outside the norm. An increase in the level of self-esteem anxiety in girls engaged in gymnastics was detected at the age of 12-15 years (P<0.05<0.001); the maximum values of interpersonal anxiety fall on the age of 10 and 12 years (P<0.01 - <0.001).

Conclusions. The age at which there is a maximum level of anxiety in gymnasts, high sports skills on all scales, falls on 12-13 years. In all age groups, female athletes have significantly higher anxiety than those in the control group. School and self-esteem anxiety have a
Introduction

Modern sport of the elevated achievements makes extremely high demands not only on technical and tactical training, but also on the psycho-emotional stability of athletes [1]. Competitive activity, including rhythmic gymnastics, causes a strong emotional arousal, which is expressed in a variety of feelings, including conditions associated with increased anxiety [3]. A certain role in the practice of preparing sports reserve is played by the neurophysiological properties of gymnasts' personality [4]. Different states of anxiety can both “help” to overcome difficulties in achieving the intended goal and also prevent solving those difficulties [7, 15]. This is explained by the fact that the level of anxiety reflects vegetative reactions to various life situations, neurosis-like and psychosomatic disorders [5], reflecting both the momentary state of the athlete and prolonged exposure to stress.

The connection of the level of anxiety of athletes and the results of their performances in competitions has long been interested in sports psychologists, coaches and sports functionaries. However, in modern psychological science there is a growing interest in the other side of the issue, as exercise anxiety affects athletes [7, 8, 9, 11, 12, 13]. Currently, the attention of athletes and coaches is focused on improving athletic performance by monitoring and controlling the level of anxiety before and during competitions. Moreover, the level of anxiety depends not only from changes in the surrounding personality conditions, but also from the period of ontogenesis of the athlete.

K. Spilberger [10] identifies two forms of anxiety as a condition, i.e. situational anxiety and a personality trait, i.e. personal anxiety. The personality reflects a fairly stable individual property, determined by tendency of the subject to perceive the threat of its own personality and its readiness to respond to this elevation of situational anxiety under conditions of even a small danger or strain. For an athlete, the level of situational anxiety is determined by both the degree of significance of success and his personal characteristics [2, 14].

When calculating the training loads and psychological support of the training process, it is especially important to take into account that in rhythmic gymnastics high physical and psycho-emotional stresses associated, including with competitive activities, fall on puberty due to the fact that in this sport gymnasts are already 12 years can have a high sports qualification, and by the age of 18–20 most sportswomen finish their sports career.

Therefore, in our opinion, one of the most important problems of the psychological training of gymnasts is to maintain an optimal state of anxiety level, taking into account their age characteristics for the most effective performance at competitions.

In connection with the above, the purpose of our work was to study the ontogenetic features of the manifestation of anxiety in gymnasts of high sports qualification.

Organization and Methods of Research

The study of the manifestation of anxiety in gymnasts was carried out in vivo remotely using interactive technologies. We surveyed girls involved in rhythmic gymnastics in sports schools living in central Russia at the age of 10 to 15 years (experimental group) with sports qualifications: 1st class - 48 gymnasts, CMS - 36, MS - 20 (n = 104). The control group consisted of schoolgirls; general education schools not involved in sports (n = 100). To diagnose the level of anxiety, the method of A. Kondash [6] was used, which included three scales of anxiety: school, self-esteem and interpersonal. The results of the study were subjected to variation-statistical processing.
To create a simultaneous statistical report containing information about the central tendency and variability of input data, Microsoft Excel was used.

Results. The analysis of the results of the study revealed clear age differences in the overall anxiety indicators of gymnasts (Fig. 1). The maximum values in both the experimental and control groups were recorded at the age of 12–13 years. The decrease in the level of interpersonal anxiety in the experimental group among athletes was found at 10 and 14 years, and in the control group at 10 and 15 years. Throughout puberty in girls of the experimental group, the overall anxiety index was higher than in the control group.

![Graph showing age-related changes in Interpersonal anxiety](image)

**Figure 1.** Age-related changes in the level of Interpersonal anxiety (in points) in gymnasts of high sports qualification, * - P<0.01 - significance of differences between the indicators of the control and experimental groups.

The level of school anxiety (Table 1) in girls of all ages of the control group is within the normal range, and in the experimental group there is a significant increase in this indicator, in girls 10 and 12-15 years old (P <0.01 <0, 05). Especially high rates were observed in schoolgirls aged 12–13 years who were out of the norm, which may indicate a decrease in the functional capabilities of the central nervous system (CNS) of gymnasts in high-intensity physical exertion, which, in turn, may further increase emotional distress in the critical period of ontogenesis.

Comparison of indicators of the level of self-esteem anxiety (Table 1) between the experimental and control groups revealed a significantly pronounced increase in athletes aged 12–15 years (P <0.05- <0.001). The maximum value of this indicator reaches 12-13 years, as well as in the control group, however, it is much higher than the normal value.

The level of interpersonal anxiety in girls of all ages of the control group is within the normal range (Table 1), its highest values were found at the age of 11 years. And in the experimental group there is a significant increase in the level of interpersonal anxiety (P <0.01- <0.001), the maximum values occur at the age of 10 and 12 years.

**Table 1**

**Age Features of Anxiety in Gymnasts of High Sports Qualification, in Points**
### Table

| Age  | Control  |  |  | Experimental  |  |  |
|------|----------|  |  |  |  |  |
|      | SA       | SEA | IA | SA       | SEA | IA |
| 10 years | 10.95±1.14* | 15.96±0.79 | 14.56±0.92* | 18.21±2.72 | 17.40±2.36 | 26.00±3.93 |
| 11 years | 13.13±0.52 | 14.33±1.52 | 15.20±1.68* | 17.21±2.34 | 16.08±2.57 | 21.75±1.44 |
| 12 years | 15.24±1.45* | 15.2±0.85* | 14.75±1.72 | 26.47±3.29 | 25.20±3.05 | 23.60±3.92 |
| 13 years | 14.67±0.81* | 14.17±0.97* | 14.44±0.84 | 25.32±0.81 | 25.53±1.99 | 20.00±1.62 |
| 14 years | 10.34±1.07* | 10.17±0.65** | 12.39±0.91* | 13.71±0.40 | 13.00±0.39 | 16.00±0.48 |
| 15 years | 10.41±0.67 | 10.58±0.96** | 10.46±0.87** | 12.54±0.33 | 17.00±0.51 | 17.00±0.68 |

Note: SA – school anxiety, SEA – self-esteem anxiety, IA – interpersonal anxiety.

Significance of differences between the indicators of the control and experimental groups: * - P<0.01; ** - P<0.001

### Conclusion

Such high levels of anxiety can talk about the real disadvantage of athletes in the most significant areas of activity and communication. Such anxiety is often experienced by quite successful adolescents, both in training and in sports, but this apparent well-being is given to them at an unreasonably high price. In such children, marked vegetative reactions, neurosis-like and psychosomatic disorders can be observed [6].

As a result of the research, we determined the age at which there is a maximum level of anxiety on all scales; it is 12-13 years of age, when the body is overloaded both physically and emotionally in connection with the process of puberty. Moreover, in all age groups of athlete’s anxieties is much higher than that of girls in the control group. In our opinion, this should be taken into account by coaches when planning the training process to maintain an optimal state of anxiety and the most successful performance at competitions.

### Findings

1. Anxiety level of girls involved in rhythmic gymnastics is significantly higher than that of girls in the control group.
2. As a result of the study, higher levels of anxiety were found in girls between 12–13 years old, both in the experimental and control groups, which may be related to the stages of puberty, but in athletes this indicator exceeded the normal limits.
3. The level of interpersonal, school and self-esteem anxiety have a clear age dynamic, which differs significantly from that in the control group throughout the studied age limits.

### References