

**THE IMPACT OF HORMONAL CHANGES IN ADOLESCENCE ON MENTAL  
STATE**

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**Abstract:** This article comprehensively analyzes the impact of hormonal changes occurring during adolescence on the human psyche from the perspective of medicine and psychology. Changes in the endocrine system, especially a sharp increase in sex hormones, affect the limbic and prefrontal areas of the brain, which is accompanied by psychological states such as emotional instability, depressive states, impulsive behavior, problems with self-esteem and social withdrawal during adolescence. The article provides scientific reasons for these states, medical and psychological consequences, as well as practical recommendations for their elimination.

**Keywords:** Adolescence, hormonal changes, mental health, affective disorder, testosterone, estrogen, depression, psychological balance, neuro-hormonal system, prefrontal cortex.

**Introduction**

Adolescence is one of the most important and complex stages of human life. During this period, physical growth, sexual maturation, social adaptation, and psychological formation occur simultaneously. From a medical point of view, adolescence is a stage characterized by the activation of the endocrine system and a sharp increase in sex hormones. In psychology, this stage is considered a period of personal identity formation, emotional stability, and adaptation to a social role. It is at this time that the dramatic changes that occur in the adolescent's body directly affect his mental state.

**Main part**

During adolescence, children undergo very significant psychological changes, and we will consider this. The period of adolescence (from 10 to 15 years old) includes the age. Adolescence is a period of human maturation, which is sharply different from other stages of maturation in its own way. The adolescence period includes girls and boys aged 11-15 years. First of all, children of this age are shy and easily upset. They get upset even over trivial things and attach great importance to this. They are ashamed of their appearance, their movements become stiff. Because they cannot control their body as before. Similarly, a teenager cannot control their emotions. They consider themselves an adult and demand that others treat them accordingly. However, during this period, teenagers are neither adults nor children, but are in between these two periods. For this reason, their behavior changes in various ways. A new feeling that appears in the psychology of a teenager is self-awareness. Self-awareness is the main stage of adolescence. At this time, a person discovers his new "I", tries to learn his strengths and weaknesses. He begins to compare himself with other people, becomes interested in himself, looks for a suitable friend. He also begins to pay attention to his appearance and behavior. If we look at his situation at school, as a rule, the assessment of the child by the team is more

important than that of the teacher or parents. At this age, the child has good conditions for the formation of organizational, business and other personal abilities. Teenagers want to show that they can confidently take on responsible tasks and perform them. Therefore, their upbringing should not be neglected. Below, V. Sukhomlinsky describes the main personality traits as follows.

1. On the one hand, not submitting to ignorance, not accepting it emotionally, is combined with the inability to deal with difficult situations in life, on the other hand.
2. The teenager wants to be good, strives for the ideal, but does not like to be properly raised.
3. The teenager wants to be a person. He wants to do something heroic, romantic, unusual. Despite the demand for the process and the desire to gain self-confidence, the teenager still does not know how to achieve this.
4. In a teenager, the richness of desire and the limitation of strength are opposed. This is where the diversity and instability of interests come from. The teenager is afraid to find out that he is not capable. He loves himself too much and hides behind it the need for help. He can hide behind demonstrative reliability and determination.
5. The teenager combines romantic feelings and rough behavior. He enjoys beauty and has a chronic attitude towards it. But he is ashamed of his own feelings. He considers these feelings to be characteristic of young children. He is afraid that they will consider him too emotional and hides behind roughness. The influx of physical strength sets him on the path to activity. When working with adolescents, it is necessary to take into account their age and personal characteristics, the main psychological renewal of this age.

Demanding freedom arouses fear in them. Almost all adolescents complain that their parents are suppressing their freedom. It is natural for a growing child to demand his rights, but parents are not obliged to fulfill every request. Fear is a negative emotional state that arises when the subject receives information about a threat that threatens or may threaten his peaceful life. When a person gives in to the feeling of fear, he knows only in a probable way that he may fail and acts on this (often insufficiently convincing) assumption. The feeling of fear can be both sthenic and asthenic, or it can be expressed in a state of intense mental depression and anxiety, or in an affective state. Fear is an emotional reaction of a person to a real or imaginary danger that concerns himself or his loved ones. Fear is expressed by a pale face, trembling of the body, and a number of other involuntary sounds and movements. Fear can also manifest itself in the form of running away from danger or remaining motionless.

During adolescence, the levels of hormones such as testosterone, estrogen, progesterone, cortisol, dopamine, and serotonin in the body change dramatically. These changes, along with the physical development of the body, the formation of sexual organs, and the appearance of secondary sexual characteristics, also directly affect brain activity. In particular, the limbic system (center of emotions) and the prefrontal cortex (center of thinking, decision-making, and impulse control), which are responsible for the mental state, undergo rapid changes during adolescence.

Psychologically, adolescents during this period are characterized by emotional instability, low self-esteem, dissatisfaction with their appearance, constant comparisons, loneliness, depression, anxiety, and a tendency to risky behavior. The reason for this is, firstly, that the balance between

the brain and the hormonal system has not yet been fully formed; secondly, that the effect of hormones on the mental system is very strong.

Increased testosterone levels in boys lead to strong physical changes, muscle development, and a change in voice, but at the same time, as a result of the effect of this hormone on brain centers, aggressiveness, impulsivity, and a desire to compete increase. In girls, an increase in the amount of estrogen and progesterone hormones is accompanied by the onset of the menstrual cycle, changes in body shape, and increased emotional sensitivity. It is these hormones that activate the limbic system and cause tearfulness, emotional instability, rapidly changing moods, and difficulties with social self-awareness in adolescent girls.

An imbalance in serotonin and dopamine levels can lead to depressive states, decreased motivation, social withdrawal, social phobias, and sometimes even suicidal thoughts. According to medical sources, the prevalence of depression among adolescents has increased significantly in the last decade. According to reports from the World Health Organization (WHO), 20 percent of adolescents aged 15–19 suffer from mild or moderate depressive symptoms, with girls being twice as likely as boys to experience this. Another important psychological condition is a crisis of self-awareness and identity. According to the theory of psychologist Erik Erikson, adolescence is a key stage in the formation of personality, and if during this period a teenager does not accept himself positively and cannot find his own path in life, this can lead to mental health problems in later stages. Low self-esteem, frequent mirroring, comparing oneself with others, striving for social isolation - all this is observed as a psychological effect of hormonal changes. The medical-psychological approach to adolescence should be comprehensive. First of all, hormonal tests should be performed by an endocrinologist, and medical treatment should be prescribed, especially in case of delayed menstruation, hyperandrogenism, hypothyroidism or other endocrine problems. At the same time, regular emotional monitoring, psychological counseling, and psychotherapy sessions should be conducted by a school psychologist or clinical psychologist, if necessary. One of the most effective areas of psychological assistance is cognitive-behavioral therapy. This approach serves to increase the adolescent's self-esteem, identify negative thoughts and replace them with positive ones, and restore emotional balance. Psychoeducation provided to parents also plays an important role. Trying to understand, not criticize, a teenager, emotional support and creating a safe family environment are some of the main factors of psychological health. Taking into account the above circumstances, it can be said that hormonal changes during adolescence have a strong impact on all systems of the body, especially the central nervous system and mental state. Psychological problems that occur during this period are often closely related to physiological processes, and it would be wrong to consider them only as educational or social problems.

### Conclusion

Hormonal changes that occur during adolescence are one of the most important and influential biological processes in human life. These changes have a profound impact not only on physical development, but also on the psycho-psychological state. In particular, the imbalance of hormones such as testosterone, estrogen, cortisol, serotonin and dopamine leads to the emergence of problems such as emotional instability, impulsive behavior, depressive states, social withdrawal and personality crisis in adolescents. The integration of medical and psychological approaches is of great importance during this period. Therefore, in order to prevent negative psychological states and ensure stable mental development during adolescence, the cooperation of several specialists is necessary - an endocrinologist, a psychologist, a teacher and parents. Proper understanding of this period, managing emotions, creating a healthy social

environment and providing psychological support for the process of self-realization ensure the healthy formation of adolescence. This serves to strengthen the foundations of mental health in society.

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