

## UBIQUITY AND FORMATION OF CHRONIC FATIGUE IN QUALIFIED SPORTSMEN

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**Abstract.** *Purpose:* estimation of ubiquity of chronic fatigue among qualified sportsmen of Ukraine in different kinds of sports and determination of specificities of chronic fatigue syndrome's formation among them. *Material:* in the research qualified sportsmen of different kinds of sports (n=286) participated. For determination of chronic fatigue degree we used the questionnaire of Leonova. *Results:* in 104 sportsmen we registered symptoms of chronic fatigue of different degree. Among women symptoms of chronic degree were registered oftener (47.0%), than among men (29.2%). Most of chronic fatigue cases were noticed in swimming, light athletics and football. Formation of chronic fatigue was preceded by certain stages: overtiredness, over tension, over training. In 36.4% of the questioned sportsmen we registered chronic fatigue symptoms of different degree. We offered a model of chronic fatigue and syndrome of chronic fatigue formation in qualified sportsmen. *Conclusions:* progressing of sportsmen's chronic fatigue and chronic fatigue syndrome are characterized by gradual appearing of stable or relapsing significant tiredness or by quick tiredness. As a result we can observe reduction of usual activity during long period of time (more than one month).

**Key words:** sportsmen, overtiredness, over tension, over training, chronic fatigue.

### Introduction

Modern elite sports are a sphere of activity, in which sportsman's organism endures extreme physical and psychological impacts. Unlimited increase of sports loads in elite sports is irrational, because it negatively influences on sportsman's health. Unjustified high volumes of fulfilled work and wish to increase fitness result in progressing of distress. In its turn, it results in "fluctuations" of immune system, progressing of pre-morbid states and diseases. And more, than 50% of sportsmen have deviations in health [4, 6].

According to the conducted research qualified sportsmen form special group. The sportsmen of this group can have over tension of functional systems in conditions of training and competition loads. Further, favorable adaptive reactions can transform into pre-pathological and even pathological changes in organism [10, 14]. In opinion of a number of scientists syndrome of chronic fatigue can form in such conditions [4, 6, and 24].

In our previous works we stated that chronic fatigue of different degree is very often diagnosed in qualified sportsmen of different kinds of sports. It is connected with progressing worsening of their functional, psycho-physiological status and physical condition indicators. In such conditions there is a risk of different pre-pathological and pathological states' formation [1, 6]. In connection with great urgency of this problem, in the present work we continued the research of ubiquity and formation of chronic fatigue in qualified sportsmen of Ukraine.

*Hypothesis:* it is assumed that qualified sportsmen can endure impact of unfavorable factors in the process of their professional functioning. These factors are connected with non compliance of physical and psychological loads with their functional potentials, chronic diseases, irrational eating, ecology and etc. It can result in progressing of chronic fatigue and chronic fatigue syndrome in sportsmen.

*The purpose of the work* is to estimate ubiquity of chronic fatigue among qualified sportsmen of Ukraine in different kinds of sports and determination of specificities of chronic fatigue syndrome's formation among them.

### Material and methods

*Participants:* in the research 286 qualified sportsmen, members of combined teams of Ukraine participated. The age of sportsmen was from 16 to 37 years. They were from such kinds of sports as: light athletics bicycle racing, wrestling, swimming, hockey, football, freestyle, academic rowing, sport dances and rock climbing.

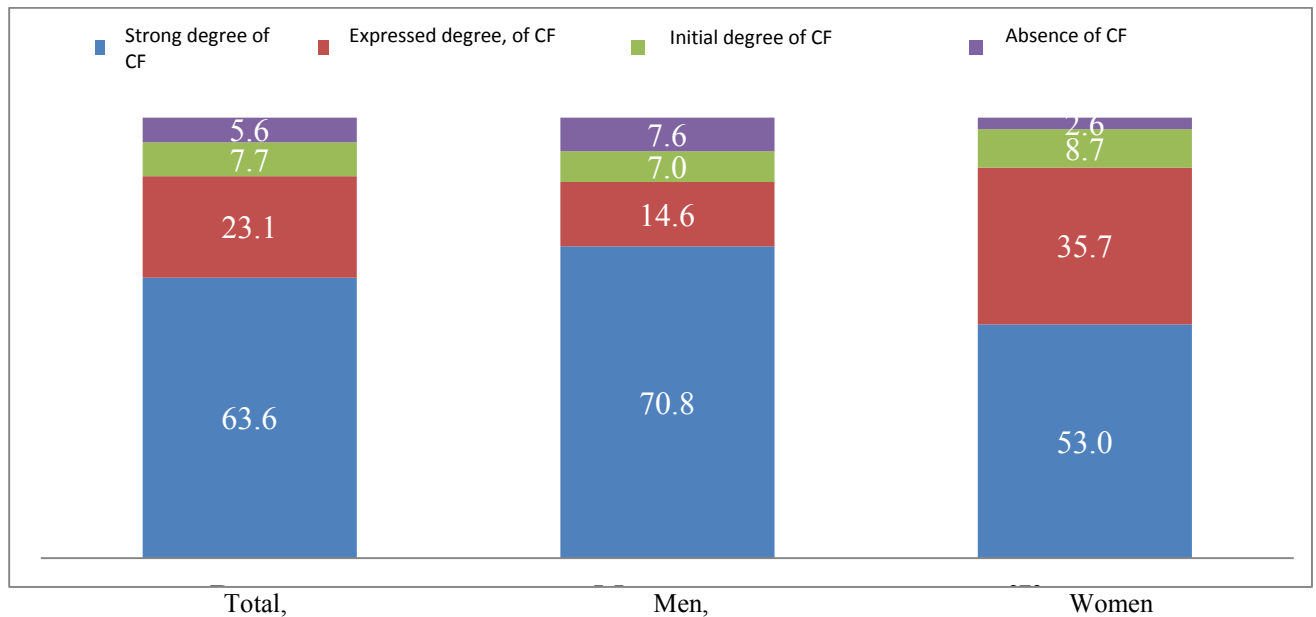
*Organization of the research:* the researches were conducted on the base of SRI\* (University of physical culture and sports of Ukraine), center of Olympic training (Concha Zaspá). For determination of chronic fatigue degree (CF) we used the questionnaire of Leonova [8].

*Statistical analysis:* we used well known methods of transformation of questioning data [13]. With the help of logically meaningful procedures we found correlations of the tested variables.

### Results of the research

Analysis showed that 182 (63.6%) of sportsmen had no symptoms of chronic fatigue. In 66 (23.1%) sportsmen we found symptoms of chronic fatigue's initial degree. In 22 (7.7%) we found expressed symptoms of chronic fatigue. In 16 sportsmen (5.6%) we registered strong degree of chronic fatigue. We also found that among women symptoms of chronic degree were registered oftener (47.0%), than among men (29.2%), (see fig.1).

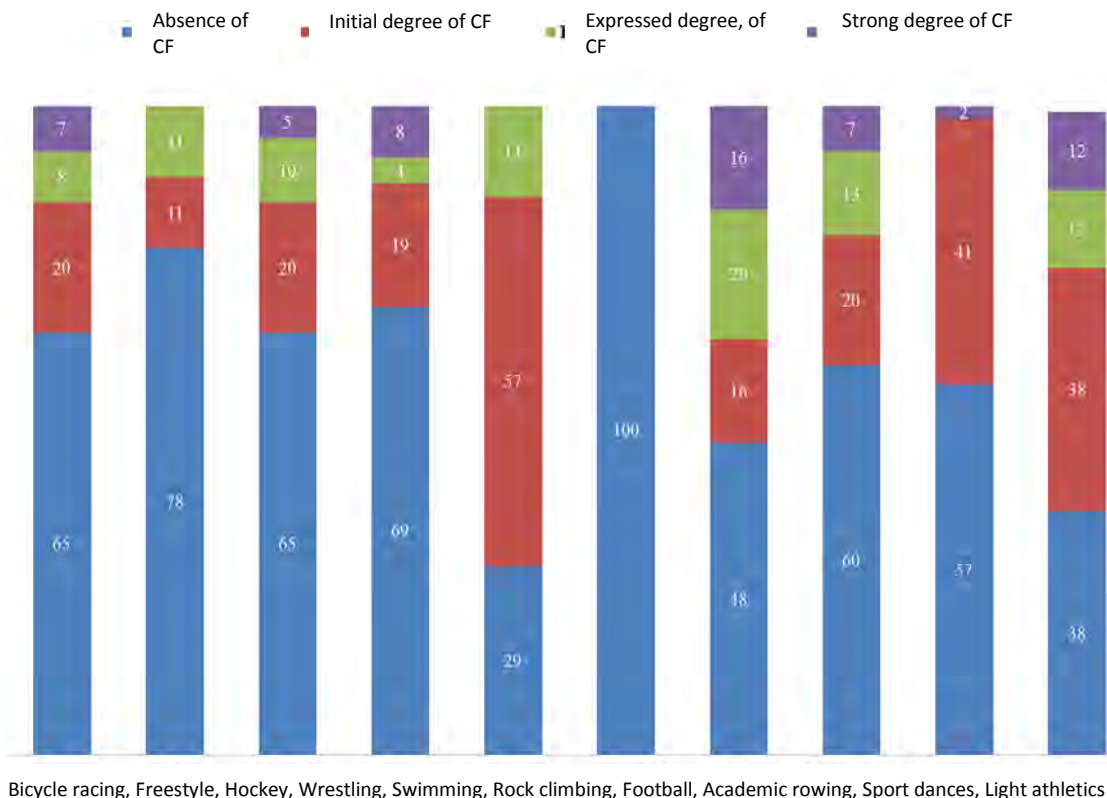
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- SRI – scientific research institute



**Fig. 1.** Symptoms of chronic fatigue of different degree in the questioned sportsmen in general and separately among men and women

This fact complies with literature data [11, 26]. At the same time we found that strong degree of chronic fatigue in men is met oftener (7.6%), than in women (2.6%). May be it is connected with the fact that men represent “heavier” kinds of sports: wrestling, football, hockey.

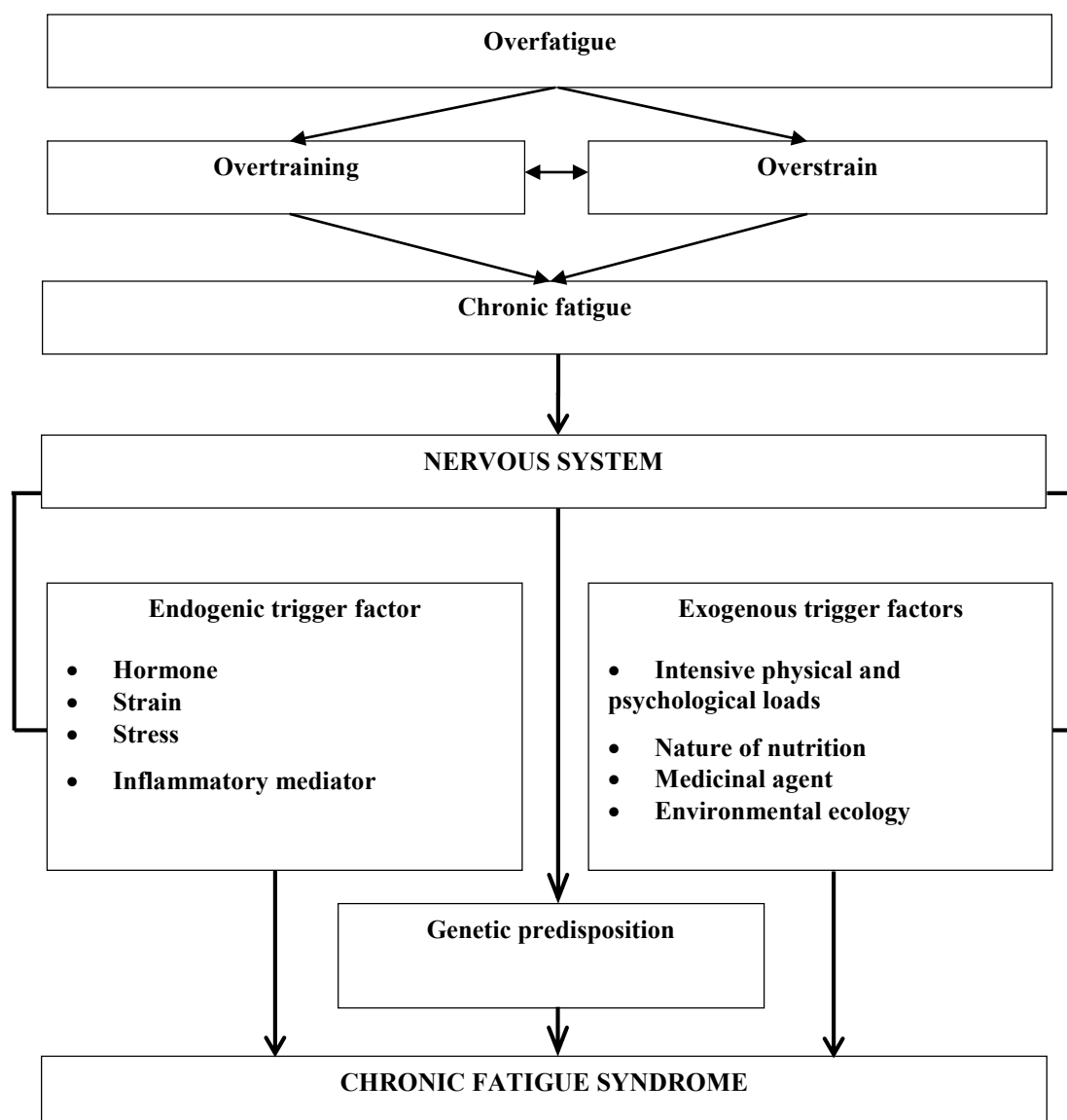
Analysis of frequency of chronic fatigue symptoms’ manifestation in different kinds of sports showed that the most often these manifestations take place in swimming (71% of all questioned swimmers), in light athletics (62%) and in football (54%). In football, light athletics, wrestling and bicycle racing there were more sportsmen with strong degree of chronic fatigue (16%, 12%, 8% and 7% accordingly). In such kinds of sports as freestyle and rock climbing syndrome of chronic fatigue was rather rare, (see fig. 2).



**Fig 2.** Symptoms of chronic fatigue of different degree in the questioned sportsmen of different kinds of sports

The received data can witness that in football, light athletics, swimming, wrestling and hockey training and competition loads are too high for some sportsmen and restoration processes in their organisms are inhibited. It is necessary to pay attention of coaches, methodic specialists and medical personnel to the demand in correction of trainings' building and character for such sportsmen. Besides, it is necessary to pay attention to full and consequent application of sports workability restoration methods and means (day regime, control over functional systems' state and so on) in kinds of sports, in which manifestations of chronic fatigue is the most frequent. Besides, it is important to use means, oriented on increase of organism's non specific resistance at all stages of training and competition processes [15]. Recreational means shall be included in general plan of sportsman's training in close connection with general organization of training regime [2, 5].

Basing on our own and literature data [9, 10, 14, 17, 23] we offer the following model of chronic fatigue and chronic fatigue syndrome's formation in qualified sportsmen, (see fig. 3).



**Fig. 3.** Model of chronic fatigue and chronic fatigue syndrome's formation in qualified sportsmen

Appearing of chronic fatigue syndrome in qualified sportsmen can be preceded by certain stage, specific for elite sports: tension, tiredness, overtiredness, over tension, over training, chronic fatigue from initial to strong degree [12, 14]. Tension and tiredness are normal functional states, which accompany physical loads. Overtiredness appears as a result of irrational regime of work and rest, resulted from overlapping of following loads on not recreated previous. In some cases overtiredness can be additional stimuli for mobilization of hidden reserves and development of training effect [14]. Over tension results from obvious non compliance of physical loads with sportsman's functional potentials and can progress in pathological changes in different organs and systems. Over training is regarded as a state, caused by over tension of nervous humoral regulation mechanisms. Such over tension results in violation of adaptation processes and favorable changes' in organism transformation in pre-pathological and pathological states [10]. For over tension also gradual progressing is characteristic – from initial to stable degree. This state is closely connected with progressing of sportsmen's chronic fatigue and chronic fatigue syndrome. Over training state is similar to definite nosological form of disease, pathological-physiological basis of which are functional disorders of nervous system [14]. Symptoms of over training are rather similar to symptoms of chronic fatigue. The border between them is rather thin.

Thus, progressing of chronic fatigue and chronic fatigue syndrome in sportsmen are characterized by gradual appearing stable or relapsing significant tiredness or quick tiredness, which do not disappear during usual recreation period after training loads or, even, after full rest. It results in reduction of usual activity during long period of time

(more than one month). In sportsmen with increasing chronic fatigue indicators of their functional and psycho-physiological statuses worsen as well as physical condition. However, syndrome of chronic fatigue can not form in sportsman, if he has no genetic aptitude to it and has no trigger endogenous and exogenous factors. Such factors are realized through nervous system and result in appearing of clinical symptoms [9, 17, and 23].

Formation of chronic fatigue and chronic fatigue syndrome can result from the following:

- Irrational application of physical loads (trainings), which can result in functional over load of muscular skeletal apparatus's tissues;
- Excessive physical loads at trainings in midlands and in hot and wet climate, which result in worsening of chronic diseases or over tension of cardio respiratory system,;
- Sharp increase of energetic losses in conditions of muscular work, in connection with which oxidation in muscular tissues goes more intensively and oxygen transportation to skeletal muscles increases.

If oxygen for oxidation of substances is not enough, then oxidation goes partially. In such case, in organism great quantity of not completely oxidized product accumulates: lactic and pyruvic acids, carbamide and so on. It results in deviation of a number of important constants of organism's internal medium that do not permit for organism to continue muscular functioning (work). With it, it appears:

- Overtiredness and over training (symptoms of neurosis, characterized by presence of somatic and vegetative disorders);
- Neurotic reactions, usually appearing with monotonous long term trainings (2-3 times a day). Such reactions result in constant emotional tension, worsening of nervous-psychic and physical state, weakening of sport and general workability.

In most cases overtiredness and over training are overlapped, resulting in complex of symptoms of organism's disorders. Overtiredness violates coordination between cortex, lower sectors of nervous system and internal organs.

#### **Discussion**

The received by us results about frequency of chronic fatigue manifestation in qualified sportsmen of Ukraine prove and supplement the data of other authors about ubiquity of chronic fatigue and chronic fatigue syndrome among sportsmen from different countries [4, 18, and 24]. Increased tiredness, constant feeling of tiredness, sleep disorders, irritability, worsening of memory, attention, difficulties in perceiving information are the most spread complaints of sportsmen at doctors' examinations [16, 24]. The quantity of sportsmen with such complaints in different kinds of sports (by data of different authors) varies within 10-20% from general population. Chronic fatigue influences on physical and intellectual abilities and reduces quality of life.

Results of our work also well correlate with the data, received, when studying sportsmen's over training [3, 14]. With over training the same symptoms that with chronic fatigue are observed: apathy, tension, uncertainty, irritability, ungrounded flashes of anger, sleep disorder, absence of wish to train [18, 22]. Over training precedes chronic tiredness and is one of main reasons of chronic fatigue's progress. It is proved by results of our research: ubiquity of chronic fatigue among the tested sportsmen is 36.4% or nearly coincides with ubiquity of over training (35%) [14], or is close to it (21-28%) [21, 22].

Many authors showed that chronic fatigue and chronic fatigue syndrome develop gradually and are the basis for consultation with doctor. It happens already after clear manifestation of main and a number of additional syndromes, which worsen life quality [7, 19, 20, and 25]. Etiology of these states is multi factor. Among main reasons medical workers mark out the following:

- Violation of work-rest regime during long period of time;
- Chronic deficit of sleep;
- Frequent and long lasted stresses;
- Demand in taking difficult decisions and find way out from difficult situations;
- Physical over tiredness;
- Excessive intellectual loads.

Under impact of listed above factors a chain of consequent pathological processes is started: disorders in metabolism happen. As a result there happens self intoxication with organism's reaction to it in the form of allergy. The accumulated in tissues, under such changes, lactic acid provokes progress of myalgia (pain in muscles). The changed up to pathological state nervous system negatively influences on functioning of endocrine and immune system. Besides, we could not but underline the role of inflammatory diseases (especially chronic outbreaks of infections) in development of chronic fatigue syndrome.

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#### **Conclusions**

Appearing of chronic fatigue in qualified sportsmen is preceded by certain stages: tension, tiredness, over tiredness, over tension, over training. Progressing of chronic fatigue syndrome in sportsmen is characterized by gradual appearing of stable or relapsing significant tiredness or by quick tiredness. Such states do not disappear after recreational period after trainings or even after full rest; the tiredness becomes frequent or constant “satellite”. At the same time chronic fatigue syndrome can not form, if there is no genetic aptitude to it, endogenous or trigger exogenous factors. Such conditions can realize through nervous system and result in clinical symptoms.

It is assumed that further research of appearing and the course of chronic fatigue in elite sportsmen shall be conducted for the following purpose: determination of its ubiquity in different kinds of sports; improvement of control system of chronic fatigue estimation; prophylaxis of chronic fatigue syndrome on the base of assessment of sportsmen’s physical fitness, physiological and psycho-physiological statuses.

#### **Conflict of interests**

The authors declare that there is no conflict of interests.

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