

ORIGINAL RESEARCH

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THIAMINE SUPPLY TO THE FREESTYLE WRESTLERS OF YAKUTIA

The study is devoted to a comparative analysis of the results of thiamine supply to the body of freestyle wrestlers training in the conditions of the North at the age of 18 to 29 years. Vitamins play an important role in ensuring high physical performance of athletes during training and competitions. Insufficient intake of vitamins into the body against the background of intense muscle activity can lead to a relative vitamin imbalance with a subsequent decrease in performance, and excessive uncontrolled intake of vitamins can cause toxic effects.

The assessment of thiamine content in blood serum was carried out by photometric method in all seasons of the year. The analysis of the data obtained showed the dependence of the vitamin B1 level on the season of the year: adequate provision of the body with thiamine was noted in the autumn period of the year in all the athletes studied, the most suboptimal provision of the body with vitamin B1 was observed in the spring season of the year in 55% of wrestlers. When analyzing the actual nutrition, it was revealed that the reason for the optimal provision of the athletes' body with vitamin is its insufficient intake with food. An increase in the vitamin content in the body of athletes should be provided not only by foods rich in thiamine, but also by taking proven vitamin complexes, as well as biologically active additives in which the ratio of vitamins is optimal. Correction in order to prevent hypovitaminosis B1 in the spring in the body of wrestlers by taking a vitamin drink in winter increased its level to 20%.

Keywords: freestyle wrestlers, vitamin availability, hypovitaminosis, thiamine, vitamin B1.

Introduction. The need for vitamins in athletes training in the conditions of the Far North is doubly increased. With excessive physical exertion in extreme climatogeographic conditions, metabolism increases, oxygen consumption increases, which accelerates oxidative processes. In this regard, in addition to a balanced diet and special diets, a constant saturation of the body with vitamins, including thiamine, is required.

Freestyle wrestling is a sport in which there is a high physical and psycho-emotional tension. The athlete is required to tolerate large training and competitive loads, rapid recovery after them. The value of thiamine is that it has a beneficial effect on the nervous system. Vitamin B1 stimulates metabolism, promotes accelerated energy production and rapid growth of muscle tissue [14]. Therefore, maintaining the necessary concentration of this compound in blood and tissues is a prerequisite for the effectiveness of martial arts and the expansion of adaptive potential to extremely high physical and mental loads [3].

Materials and methods of research. The study participants were 38 freestyle wrestlers UOR and SHVSM of Yakutsk, yakut nationality, aged 18 to 29 years. All athletes had high sports qualifications: CMS, MS, MSMC, ZMS. The studies were conducted in all seasons of the year: summer (June), autumn (October), winter (December), spring (March).

The level of thiamine (vitamin B1) in whole blood taken from the ulnar vein in the morning on an empty stomach, in a state of relative muscle rest, was determined by photometric method on the Fluorat-02-ABLF bio-liquid analyzer of Lumex (St. Petersburg).

To assess the content of vitamin B1 in the diet of the athletes examined by us, the vitamin composition of the daily diet was determined using the questionnaire method of 24-hour nutrition reproduction [5] using the "Table of chemical composition and caloric content of Russian food" [11].

In order to eliminate hypovitaminosis, in the winter period of the year, a study was conducted in which 21 highly qualified freestyle wrestlers of the UOR and SHVSM of Yakutsk took a dietary supplement "Dry mixture with vitamins and minerals" in the form of a drink, 1 time a day after evening training, for 20 days. To prepare the drink, 10 g of a dry mixture containing 0.95 mg of vitamin B1 was diluted in 250 ml of bottled water at room temperature.

Statistical processing of the study results was performed using the SPSS 17.0 software package. The method of descriptive analysis was used to calculate arithmetic averages (M) and mean errors (m). The significance of the differences was assessed using the Student's t-test for independent samples in the case of a normal distribution and Mann-Whitney in the case of deviations from the normal distribution. To identify the relationship between the studied indicators, the method of correlation analysis of data with the calculation of the coefficient and rank correlation of Spearman and Pearson was used. The significance of multiple group differences was revealed using

single-factor analysis of variance. The threshold level of significance was taken to be $p < 0.05$.

The results of the study. Anthropometric indicators of the athletes studied by us showed that 61% of freestyle wrestlers were short athletes (< 1.67 m), 26% had a height from 1.67 m to 1.79 m and the proportion of tall (> 1.80 m) was 13%. The athletes' body weight ranged from 58.0 to 72.0 kg and averaged 62.5 kg. The average body mass index was 23.7 kg/m² and ranged from 22.7 to 26.0 kg/m². The analysis of the obtained data showed that among the wrestlers 13 (34.2%) were overweight.

Analyzing the data we obtained on the vitamin availability of the body of the athletes we examined, it can be noted that the level of vitamin B1 in the blood of freestyle wrestlers depends on the season of the year (Fig. 1).

So, in the summer, the level of thiamine in the blood of most athletes was within the normal range. On average, its blood level was 6.83 ± 0.30 ng/dl with a norm of 5-20 ng/dl [12]. Not optimal security was found only in 5% of the surveyed athletes.

In autumn, all athletes have an adequate supply of thiamine. The content of vitamin B1 in the blood plasma of freestyle wrestlers ranged from 5.00 to 9.04 ng/dl and averaged 7.24 ± 0.39 ng/dl.

In the winter season of the year, there is a decrease in the level of vitamin B1 in the body of athletes compared to the data obtained in the summer and autumn periods. At the same time, this indicator varied from 4.03 to 8.11 ng/dl, the average value was 5.75 ± 0.26 ng/dl. Suboptimal provision of this vitamin was detected in 28% of wrestlers.

In spring, the lowest amount of vitamin

B1 is observed in the blood of athletes. Thus, the average level of thiamine in the blood plasma of athletes ranged from 3.50 to 10.02 ng/dl and amounted to 4.99 ± 0.22 ng/dl. Normal levels of vitamin B1 in the body were observed in 45% of athletes. Hypovitaminosis was detected in 55% of wrestlers, which was 2 times higher compared to the winter period.

Thus, a comparative analysis showed that the content of vitamin B1 in the blood of athletes was optimal only in the autumn period of the year; in summer, winter and spring, hypovitaminosis states were detected in some of the surveyed wrestlers.

The analysis of the daily diet of the studied freestyle wrestlers showed that adequate intake of vitamin B1 with food was noted only in the summer, in other seasons of the year its content in the diet was below normal [7]. The greatest deficit was noted in the winter period of the year, which is 1.9 times less than in the summer season ($p < 0.01$) and in the autumn season – 1.7 times less than in the summer season ($p < 0.05$) (Fig. 2).

The assessment of the vitamin level in food was carried out by us during the training process, when the athletes were on an organized meal in the SHVSM canteen. However, the competitive training activity of a martial artist has its own specifics. So, during the competitive season, athletes participate in 8-9 competitions and change up to 5 bases per year, where training camps take place with the need for a certain adaptation to the conditions of these bases, in particular to radically different nutrition. For example, the bases may have a restaurant type of food, a buffet, meals in public canteens or self-catering. At the same time, in most cases, the nutrition of highly qualified athletes is controlled not by a nutritionist (there was no full-time position at the time of collecting the material), but only by a coach and a team doctor.

The method of assessing actual nutrition is questionnaire-based, the respondents describe the consumed products for the previous day, which does not guarantee that the respondents fully described all the consumed products. In addition, there were few products containing thiamine in the diet according to the survey over the past 24 hours. In this regard, the data obtained may have an error.

The data obtained by us show that the level of thiamine in the blood of athletes in summer and autumn was within the normal range, since firstly vitamins tend to accumulate in the body, and secondly athletes begin taking multivitamins in autumn with the beginning of the training

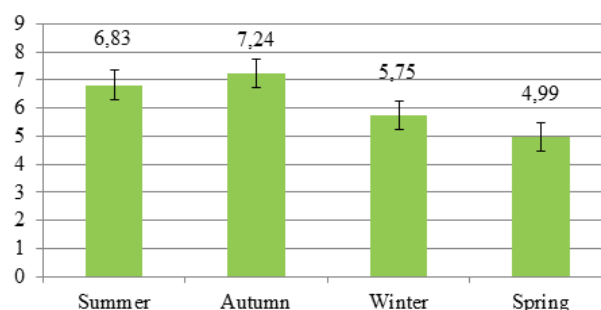


Fig. 1. Vitamin B1 availability of the body of freestyle wrestlers in different seasons of the year (ng/dl)

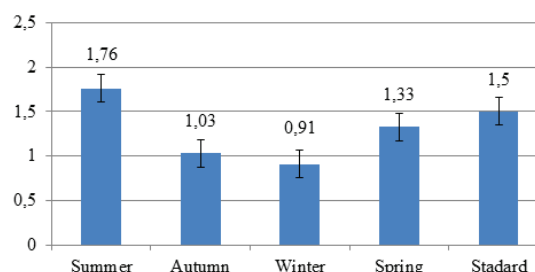


Fig. 2. Vitamin B1 content in the daily diet of freestyle wrestlers (mg)

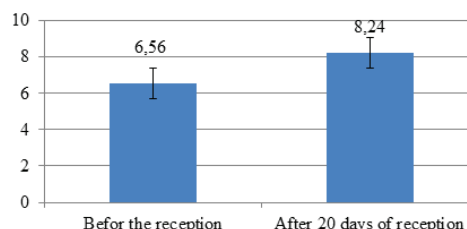


Fig. 3. Vitamin B1 content in the body of freestyle wrestlers before and after taking a vitamin drink (ng/ml)

period. The low content of thiamine in the daily diet of freestyle wrestlers affects the content in the body in winter.

Probably, the reason for thiamine deficiency in freestyle wrestlers training in Yakutia is its accelerated excretion from the body during intense physical exertion and high psychoemotional loads at low temperatures, as well as insufficient intake of this vitamin from food and prevention of the occurrence of hypovitaminosis.

The population of the Far North has an inadequate intake of vitamins. The conditions of hypovitaminosis are especially pronounced in the winter season of the year, which are caused by a lack of vitamin intake from food and an increase in metabolism in a harsh climate [1, 2, 6, 8, 9, 13].

There is information in the literature sources that insufficient provision of vitamin B1 was detected in athletes-rowers in the autumn and winter seasons of the year [10]. Insufficient intake of this vitamin was found in Turkish gymnasts [16] and in young athletes of both sexes [15, 18, 21]. Sufficient intake of vitamin B1 was observed in gymnasts of France and

the USA [17, 19] and women engaged in judo [20].

Based on the data obtained, in order to prevent the development of hypovitaminosis B1 in the spring, we carried out a correction in winter [4]. The average level of vitamin B1 in the blood of athletes before taking the vitamin drink was within the normal range (5-20 ng/ml) and amounted to 6.56 ng/ml, and by the end of the 20-day course, the concentration of vitamin B1 in the blood of athletes increased by 20% compared with the value before taking the drink and amounted to 8.24 ng/ml ($p < 0.05$) (Fig. 3).

Thus, a 20-day intake of a vitamin drink significantly ($p < 0.05$) increases the level of thiamine in the blood of athletes, cases of hypovitaminosis B1 were not noted.

Conclusion. Thus, the assessment of the thiamine supply of the body of freestyle wrestlers of Yakutia showed that the vitamin level depends not only on the season of the year, but also on the vitamin content in the daily diet. Seasonal suboptimal provision of vitamin B1 in the body of freestyle wrestlers was noted:

the most suboptimal provision of vitamin B1 in the body of wrestlers was observed in the spring season of the year in 55%. A positive correlation was revealed between the concentration of vitamin B1 ($r=0.457$, $p<0.000$) in the blood of athletes with the intake of vitamin B1 with nutrition ($r=0.310$, $p<0.018$). When analyzing the actual nutrition, it was revealed that inadequate intake of vitamins from food was the cause of hypovitaminosis in the body of the freestyle wrestlers examined by us. Vitamin deficiency in the body of wrestlers is also caused by accelerated excretion during intense physical exertion and high psychoemotional loads and high psychoemotional loads in the conditions of the North and the lack of measures to prevent the occurrence of hypovitaminosis B1. To prevent vitamin B1 hypovitaminosis in athletes in the spring, it is necessary to begin correction in winter, since the decrease in its level begins in winter.

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