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EFFECT OF ROLLER SKI TRAINING ON HEMOGLOBIN LEVEL

TEKERLEKLİ KAYAK ANTRENMANLARININ HEMOGLOBİN DÜZEYİNE ETKİSİ

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ABSTRACT

Sixteen roller skiers whose mean of age is 16,00±0,89, mean of height is 168,56±2,22 and mean of weight is 57,25±3,64 attended voluntarily to this study with the aim of researching the effect of eight-week roller-ski trainings on boys' national team skiers' hemoglobin levels. For the skiers participating in the study, a roller ski training program was applied for eight weeks, six days a week, in accordance with the pretest-posttest model. Blood samples were taken eight weeks before and after the pretest-posttest from skiers. There was no statistically significant difference in the pretest and posttest comparison of the hemoglobin values of the roller skiers participating in the study (P>0.05). Consequently, it was observed that roller ski training at an altitude of 1700 meters did not lead to a change in the level of hemoglobin.

Key words: Ski, hemoglobin, exercise.

ÖZET

Genç erkek milli takım sporcularında 8 haftalık tekerlekli kayak antrenmanlarının hemoglobin düzeyine etkisinin incelenmesi amacıyla yapılan bu çalışmaya, yaşları ortalaması 16.00±0.89 yıl, boyları ortalaması 168.56±2.22 cm, vücut ağırlıkları ortalaması 57.25±3.64 kg olan 16 tekerlekli kayak sporcusu gönüllü olarak katılmıştır. Araştırmaya katılan sporculara, öntest – sontest modeline uygun olarak 8 hafta süreyle, haftada 6 gün tekerlekli kayak antrenman programı uygulanmıştır. Sporculardan öntest – sontest olarak 8 hafta öncesinde ve sonrasında kan örnekleri alınmıştır. Araştırmaya katılan tekerlekli kayakçıların hemoglobin değerlerinin ön-test ve son-test karşılaştırılmasında istatistiksel olarak anlamlı bir farklılık bulunamamıştır (P>0,05). Sonuç olarak, 1700 m yükseklikte yapılan tekerlekli kayak antrenmanlarının hemoglobin seviyesinde bir değişime yol açmadığı görülmüştür.

Anahtar kelimeler: Kayak, hemoglobin, egzersiz

INTRODUCTION

In sports, the skiing sport has been among the most demanding branches in individual performance sports and has been accepted as a special study. It is called Alpine discipline and northern discipline as its construction, construction forms, competition shape and area. The alpine discipline and the northern discipline are also divided into different branches among themselves. As in all sports branches, there are features that distinguish between the physical and physiological aspects that must be in both the construction and the athletes (Demirci, 2014). Cross-country skiing is a sports branch with no distinction between male and female competitors. Cross-country skiing is a branch that can be made on a certain amount of snow, woodland, city centers or in different regions. Cross-country skiing is a Northern region skiing. It is considered to be the sport of the Northern regions, which are areas of heavy snow, and the ancestor of the Scandinavia region. In the very old times, they were providing transportation with slits and skis to provide transportation in areas that were heavily snowy.

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The roller ski consists of 2 silicon wheels and a durable profile body. It is a piece of equipment that has been invented for the summer work of skiing on the asphalt. The techniques used in cross-country ski and roller ski are very similar (Abramovitz, 2014). The physiological effect of exercise in various periods and severity, including hemoglobin level, thrombolytic and leukocyte counts, has been investigated. Hemoglobin has been shown to increase due to hemoconcentration after exercise, especially because of the fluid's intracellular shift and loss during respiration and sweating (Wasserman et al., 2004). The concentration of hemoglobin has shown that athletes can improve their performance (Wasserman et al., 2000). But to achieve a maximum aerobic power, the total amount of hemoglobin has a significant effect, rather than the concentration of blood hemoglobin. Therefore, decreasing hemoglobin with increased blood volume (plasma volume) can lead to an unchanged VO_2Max, but may shorten the performance time (Kanstrup & Ekblom, 1984). In elite endurance athletes, it is reported that the level of hemoglobin is very stable for many years, but can be temporarily increased to the altitude training. It has been seen that elite athletes have %35 higher hemoglobin masses than sedentary, and this condition is %14 higher than 2600 meters in height (Schmidt & Prommer, 2008). Therefore, the aim of this study is to examine the effect of eight-week cross ski training on hemoglobin levels.

MATERIAL and METHOD

Study Universe and Sample

The research was conducted in the national team camp of the youth in Erzincan province. Athletes participating in the study had a cross ski training program for eight weeks, six days a week, in accordance with the pretest-posttest model. Blood samples were taken eight weeks before and after the pretest-posttest from athletes. Athletes participating in the study have been training at the elite level for at least four years and are participating in national and international competitions.

Height measurements of athletes were made in accordance with the measurement technique with a stadiometer with a sensitivity rating of 0.01. The body weight measurements of athletes were made with the Omron BF-508 body analysis scale.

Analysis of blood samples:

Heparinized blood samples taken from the antecubic vein were taken in the case of morning rest and after eight weeks. Heparin tubes were used in the intake of blood samples. The measurement of the parameters determined by the serum samples were used in the centrifugation at 3500 rpm for 5 minutes. The analyses of blood samples taken were conducted in Erzincan Education Research Hospital, Public Health laboratory.

Statistical Analysis

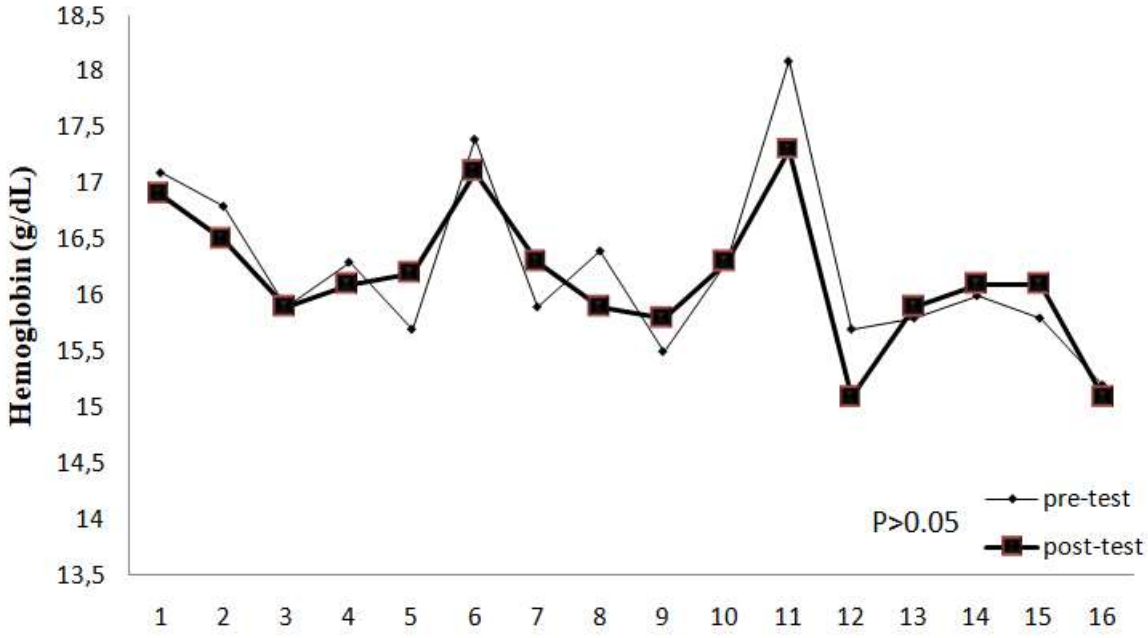
The SPSS statistical program (version 13.0) was used for data analysis. Standard statistical methods were used for the calculation of means and SD. The Kolmogorov-Smirnov test was used to determine if dependent variables were normally distributed. The Levene test was used to determine if there was homogeneity of variance. Paired t-tests were used to determine significant differences over time for each dependent variable. For all analyses, the criterion for significance was set at an alpha level of $p = 0.05$.

RESULTS

Table 1. Physical characteristics of the roller skiers

Variables	**Roller Skiers (N=16)**
	Mean ± S.D
Age (years)	16,00±0,89
Height (cm)	168,56±2,22
weight (kg)	57,25±3,64

The mean age was 16.00 ± 0.89 years, mean height was 168.56 ± 2.22 cm, body weight was 57.25 ± 3.64 kg for roller skiers



Graph 1. Comparison of hemoglobin levels in roller skiers

As shown Graphic 1. There no was a significant difference in roller skiers between pre-test and pos-test for hemoglobin level (p>0.05).

DISCUSSION

In this study conducted to investigate the impact of 8-week cross ski workouts on hemoglobin level in young male national team athletes, there was no significant difference between pre- and post-training hemoglobin levels (P>0,05). Naef et al. (2012) has been active in a study of 18 healthy males, twice in 6 hours, after an hourly hyperoxy workout with a low exercise intensity, twice in 6 hours, 2 times in 2 hours after one hour of hyperoxy training. They measured the hemoglobin mass by applying three different protocols. The mean difference between the measurements of hemoglobin mass measured twice a day is 4.28 g (while the first measurement is higher, the hemoglobin difference between measurements made twice in 6 hours after one-hour hyperoxy training is 0.29 g (the second measurement was higher) and the difference between the hemoglobin mass measured 2 times in 2 hours after one-hour hyperoxy training was found to be 5.47 g (the second measurement was higher). In Naef et al. (2012) studies, in cases where the individual measurement of hemoglobin mass is important, one hour of hyperoxic training suggests that the measurements should be performed twice by

6 hours. In a study conducted by Schmidt & Prommer (2008), they examined the effects of different training models in 2001 – 3000 m, 3001 – 5500 m and 501 – 2000m on blood pressure. Sea level hemoglobin values of male athletes with $MaxVO_2$ values 41.9±3.9 ml/kg/min, 53.49±2.7 ml/kg/min, 61.9±2.3 ml/kg/min and 72.2±5.9 ml/kg/min are respectively 15.0±0.9 gdL, 14.8±1.0 gdL, 14.9±0.9 gdL and 15.0±1.0 gdL while the hemoglobin values of 2600 m high are respectively found as 16.6±0.9 gdL, 16.4±1.1 gdL, 16.3±0.9 gdL ve 15.9±0.7 gdL (P<0,001). In our study, the hemoglobin value of the roller skiers 16.24±0.77 gdL whereas the hemoglobin value of the cross athletes was found as 15.26±0.81 gdL. The previous studies showed that our findings have parallelism. A study examining the concentration of serum erythropoietin and hemoglobin concentration of 31 female skiers attended by 41 males with high training levels, there was no significant difference between male skiers (13.6±5.0 mU.ml-1), female skiers (14.9±5.6 mU.ml-1) and control group (12.6±3.9 mU.ml-1). Blood samples taken from 18 skiers after 2 months and 3 weeks were compared with previous blood samples, both serum erythropoietin concentration and blood samples taken in different time periods in terms of hemoglobin concentration seen (Berglund et al., 1988). Therefore, the training at the sea level showed that there was no change in serum erythropoietin concentration and hemoglobin concentration. In a study conducted by Kuipers et al., (2007), hemoglobin levels were examined in the process until 2000 to 2005 in long-distance speed skiers, and hemoglobin levels were not changed in both female athletes and male athletes. Consequently, it was observed that roller ski training with a height of 1700 meters did not lead to a change in the level of hemoglobin. This is thought to be due to the fact that athletes are constantly training at the same height.

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