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The Effects of Quick Strength Training Method on Basketball Players' Respiratory Functions, Heart Rate, and Blood Pressure

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Abstract: The aim of this study is to examine the effects of quick strength training method on basketball players' respiratory functions, heart rate, and blood pressure.The sample of this study includes 15 male basketball players' who participate in training at least 3 days in a week, 2 hours, are 15,00 ± 1.46 year age averages, 158,20 ± 9.62 cm height average, 49,80±11.39 kg bodyweight. Before and after participating in quick strength training program, these volunteer basketball player participants' heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), respiratory rate (RR), forced expiratory volume (FEV), and peak expiratory flow rate (PEFR) have been examined. The researchers have found that the participant basketball players' respiratory rate, heart rate ($p<0.01$), have been dramatically increased after participating in circuit training method. On the other hand, the participant basketball players' forced expiratory volume, peak expiratory flow rate, systolic and diastolic blood pressure have not been changes after participating in circuit training method.
Keywords: Wrestling, Quick strength Training Method, Respiratory Functions, Heart Rate, Blood Pressure.

INTRODUCTION

Today, sports is accepted as a part of healthy and balanced of our lives and one of the the best social activity. Every human being is born, grown up and developed in its own environment.

Sports can teach and develop a method to an individual to struggle against the nature, other things or a force. The sports activities especially performed regularly during the childhood play an important role in the development of healthy physical structure and its sustainability. Regular sports performance has an important place in the healthy and balanced development of a child [2, 8].

Human body has a great tendency towards physical exercises related to its structure and function. Such a tendency proves that training science is very important to the human body to improve this special performance ability [21]. Training science generally determines the principles of strength and performance increase of an individual. The main purpose of the training is to improve the technical and tactical conditions as well as physilogical, physical, intellectual and social abilities and to make the individual ready for the matches. In another word, the purpose of the training program for the athletes is to improve their physical ability and physiological capacity [23, 9, 20].

Physical structures occured by the chain of exercises related to the sportive branches are unlike each other both posture and antropometric features [16]. Like in other sports, planning in training is crucial to improve the motoric features in basketball. Basketball training consists of planned, programmed and continuous exercises to increase the performance or keep the same performance level [13]. In sports, the exercises based on regularity and scientific principles regulate the muscle strength, resistance, quickness, flexibility and also arrange the body composition [17]. An effective training should be based on the physical methods related to the anatomic structure of the individual and also based on the physical physological needs of the sport he is performing[12]. The high level of basketball players' physological features are investigated by the scientists and trainers and this event appeals great interest. Such a case needs some scientific research. An athlete should display high performance related to the physological and motoric features to catch a success in sport. For this reason, in this study, it is aimed to compare the heart rate(HR), sistolic blood pressure(SKB), diastolic blood pressure(DKB), respiration rate (RR), forced expiratory volume (FEV) and peak explatory flow rate values of the basketball players.

MATERIALS AND METHODS

The volunteer 15 male basketball players' were accepted to the research whose sports year was 3, and these subjects were given regular training program for 4 days a week and 2 hours in each day. Each volunteer subject was informed about the details of the training program and they signed a form which proved that they participated to the program volunterely.

Training Program

Cırcular quick strenght training program was applied to the subjects. The program contained 8 different activity and occured at 8 stations. Each activity consisted of 3 sets and the subjects were given 5 minutes to rest between the sets. The activities took 20 seconds and the resting period between the activities was 30 seconds. The activities were at high pace and applied by two experienced trainer. Before the activity 20 minutes warm-up training program was given to the subjects. The whole period took 40 minutes.

The stations in the activity are; 10 meters race, sit-up, knife motion, Push-up knee stretching and double leg leap, reverse shuttle, right and left jump with double leg over the height 30 cm gym line, , pull the arm on the horizontal bar, respectively

Measurement methods

In the research, the values were taken both before and after the training programs. The age of the athletes were accepted as a year, their heights were measured by 0.1 cm precion balance and a metal bar on the balance, their weighs were measured by 0.01 kg precion digital balance and their Sistolic and diastolic blood pressures were measured by using stethoscope and sphygmomanometer. By pressing the radial arter on their wrists with fingers was used to determine their heart rates. Heart rate was counted by pressing the fingers on their arter for one minute. Mikrolab 3300 spirometre device was used to measure the respiratory parameters of the research group. Respiration rate (RR) forced expiratory volume (FEV) and maximal current peak point (PEF) measurements were taken.

STATISTICAL ANALYSIS

To determine the change differences of the measurement results taken before and after the exercise, arithmetic means (X) and standart deviations (SD) are calculated. Paired-Samples T-test is used to see whether the difference in arithmetic means at 0,01 and 0.05 levels is meaningful or not. SPSS 20.0 for Windows packet program was used for the statistical operations.

Table-1: The demographic features of the subjects (N=15)

Variables	X S.D.
Age (Year)	15,00 ±1,46
Tallness (Cm)	158,20 ±9,62
Body Weight (Kg)	49,80 ± 11,39
BMI (kg/m2)	19.64 ± 2.74

Table-2: The respiration rate of the athletes before and after training, FEV, PEF, heart rate and blood pressure values (N=15)

Variables	Before training Mean ± SD	After training Mean ± SD	T	P
RR	18.40 ± 2.52	30,93 ± 4,13	-9,320	0,000 *
FEV	1,38 ± 0,53	1,62 ± 0,47	-1,616	0,130
PEF	333.70 ± 156.33	382,32 ± 139,33	-1,472	0,163
HR	66.13 ± 8.66	80,80 ± 12,30	-6,898	0,000 *
SBP (mm Hg)	106,00 ± 15,94	109,33 ± 13,34	-0,960	0,353
DBP (mm Hg)	67.33 ± 9.33	70,66 ± 8,83	-1,348	0,294

∗ P< 0,01 ** P < 0,05

DISCUSSION

In this study, it is tried to find out the differences among the respiratory rate, forced expiration volume FEV, peak exspituar flow rate PEF, heart rate and blood pressure with circuit quick strenght training method. In the research, the average age of the basketball players are 15,00 ±1,46 year, height averages are 158,20 ± 9,62 cm, body weigh averages are 49.80±11.39 kg and BMI averages are 19,64±2.74. At the end of the reseach, it is seen that the respiratory rate averages of the subjects are 18.40 ±2.52 before the training, after training they are 30,93±4,13, FEV (forced expiration volume) averages are 1,38±0,53 before training, after training they are 1,62±0,47, PEF (peak ekspiratuar flow rate) averages are 333.70±156.33 before training, after training they are 382,32±139,33. At the end of the quick strength training method of the basketball players, a meaningful increase is recorded in the values of respiratory rate. The studies related to the exercises applied on the respiration parameters of the young basketball players bring different ideas. Some of the researchers claim that heavy physical training increases the respiratory parameters[1,7,11,3,4,15] whereas the others say that xercises do not affect the

respiratory parameters [10,5,7,19]. Apart from these two groups, some reserachers indicate that the development of the respiratory parameters are based on the age dynamic and parallel to the normal growth of the individual [12, 11]. The meaningful increase in the respiratory frequency, forced expiration volume and peak expiratory flow rate after the exercise program can be caused by the increase of O2 amount used by the muscles during the exercise and produced CO2 amount increases in the maximum minute vantilation [22]. When the heart rate, sistolic and dialostic blood pressures are compared before the exercise, it is found out that heart rate averages before the exercise are 66.13±8.66 beats/min, after the exercise they are 80,80±12,30 beats/min, sistolic blood pressure averages are before exercise are 106,00±15,94 mm Hg, after exercise they are 109,33±13,34 mm Hg, Diastolic blood pressure averages are before exercise 67.33±9.33 mm Hg, after exercise they are 70,66±8,83 mm Hg, and meaningful increase is recorded between the heart rate values but the changes occured in the sistolıc and diastolic blood pressure was not found meaningful statistically. Similar results were reported by the other researchers [6, 24, 18]. The effect of the activity on the heart rate and blood pressure was caused by the increase in the heart rate and heart flow rate. During the exercise, dialostic blood pressure was decreased because of the decrease in the periferic vascular resistance. The type of the exercisi is important in such a case, for example in the weight lifting, the periferic vascular increase is in the first place. Because of the increasing flow rate, the resistance in the vessel decreased and the blood pressure increased related to the condition of the athlete and the type and the difficulty of the exercise. The inrease occured in Sistolic and dialostic blood pressure is significant in the sistolic blood pressure and ther is a slight change is seen in the diastolic pressure[14].

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