



EFFECT OF EIGHT WEEKS OF TRAINING ON SELECTED PHYSIOLOGICAL PARAMETERS OF NATIONAL LEVEL MALE TAEKWONDO PLAYERS

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ABSTRACT :

Taekwondo (TKD) is evolved into a modern-day Olympic combat sport. TKD athletes need high level of inner engineering for optimum performance which has to be developed through proper training. The physiological demands of TKD athletes to be conditioned in several aspects of fitness along with anthropometry, aerodynamic skill, correct techniques, and tactics along with psychological motivation. The purpose of the study was to determine the effect of training on physiological profile of national level TKD athletes. The training directed mainly to the improvement of physiological qualities towards winning medals. The relevance of these variables for optimum performance is a major prerequisite for athletes and coaches. The sample consists of 14 male taekwondo athletes (age: 18 ± 2 years; height: 176 ± 7 cm; body mass: 68 ± 11 kg) who compete at the national level. Physiological attributes of TKD athletes examined before (pre-intervention) and after (post-intervention) 8 weeks of training. The aerobic parameters such as sub max HR responses, anaerobic threshold HR, VO_2 max, recovery HR responses by incremental Quark CPET treadmill run test. The data analyzed by using SPSS Software of paired t-test at 0.05 level of significance. Results showed that there were significant adaptations in sub-maximal HR 2min, sub-maximal HR 4min and recovery heart rate responses but no significance in VO_2 max and anaerobic threshold heart rate (ATHR). This study suggest that 8 weeks of training has a positive effects sub-maximal HR 2min, sub-maximal HR 4min and recovery heart rate responses

KEYWORDS : Taekwondo, Training, Physiological Parameters, Aerobic, ATHR.

INTRODUCTION

Taekwondo is a Korean martial art, characterized by its emphasis on head-height kicks, jumping and spinning kicks, and fast kicking techniques. TKD athletes need high level of inner engineering for optimum performance which has to be developed through proper training in addition to game specific skills. Every movement that require the co-ordinated responses of the neuromuscular, hormonal, metabolic, and cardio-respiratory systems. The Physiological factors are critical components that have most impact on motor performance. A higher exercise stress is required to create overload and lead to specific physiological adaptations. Involvement in the systematic program of training brings about desirable adaptations in physiological abilities. Monitor right intensity and frequency and duration (volume) of training brings desired performance with balanced diet and proper rest periods (Furlan, R. et al., 2014). Great anaerobic power needed during the many brief burst of high-energy release for different kicks and punches, aerobic capacity is also needed for efficient recovery during the short rest periods (Boyle et al., 1994 & Toscovic et al., 2002). Therefore, this study deigned to find out the training effects on physiological variables.

OBJECTIVES

- To enhance Physical performance through training protocol.
- To strengthen Physiological abilities for better motor skill performance in Taekwondo payers.
- To find out training effects on selected physiological parameters of aerobic qualities.

HYPOTHESES

1. There would be significant changes in Aerobic Qualities like Submaximal adaptation, Anaerobic Threshold, VO₂max and recovery heart rate responses due to training.

WORK PLAN

Experimental Design: The study was formulated as quasi experimental group design of 8 week training of national level male taekwondo players. The physiological parameters (aerobic qualities) were measured before and after the training:

Sample: A total of fourteen taekwondo players were selected for this study. The players were selected from the Sports Authority of India, Sports training Centre, Bangalore who were represented different National level competitions and were being trained under qualified coaches.

DETAILED METHODOLOGY

In the present study the physiological variables were measured by using the following test method.

QUARK CARDIOPULMONARY EXERCISE TEST

The Quark CPET (Cardio Pulmonary Exercise Test) is the ideal solution for the assessment of the physiological response to graded exercise. Its high quality components and super-fast analyses assure unsurpassed accuracy, reliability and real breath-by-breath analysis of pulmonary gas exchange, even at low to high intensity exercises. The easy-to-use and intuitive software guides the user through calibration and test execution. Quark CPET can be integrated with an optional 7-liter physical mixing chamber gas cylinder. Preparation of the subjects

All the subjects will be instructed to avoid heavy food intake and exercise at least 2 hrs before the treadmill test in the laboratory. The detail procedure of the test will be explained to the subjects and the demonstration of the test was shown to them. They will be also asked to follow the instructions of the investigator during the experiment. Subjects will be given a trial run on treadmill with 5-km/h speeds for 2 minutes with the mouth-piece (with triple 'V' transducer) to make them familiar with treadmill running. The maximum oxygen consumption (VO₂ max) and related cardio-respiratory variables will be assessed during continuous incremental graded exercise protocol, designed on computerized treadmill (Cosmed). The exercise protocol designed by Cosmed Company (Germany) in Quark Gas analyser will be applied. This protocol consists of three phases, viz., initial phase, exercise phase, and recovery phase.

Initial Phase: In this phase, heart rate, oxygen consumption, carbon-di-oxide production, pulmonary ventilation and respiratory quotient (RQ) will be recorded while the subject will be standing on the treadmill for two minutes.

Exercise Phase: In this phase, the initial speed and the inclination of the treadmill will be 6-km/ h and 2% respectively. The speed will be increased by 2-km/ h at every 2 minutes, till complete exhaustion, while the inclination will be kept constant. Oxygen consumption at the maximum effort will be taken as maximum aerobic capacity (VO₂ max). Oxygen consumption, heart rate, respiratory quotient (RQ) will be monitored breath by breath. When the subject's heart rate will be levelled off, prior to the final exercise intensity at value at least 95% of predicted maximum heart rate (from age) and his respiratory exchange ratio will be greater than unity, the observed VO₂ will be considered as VO₂ max (Armstrong, 1991).

Recovery Phase: During recovery phase, the treadmill will be stationary and all the above physiological variables will be monitored, till the oxygen consumption returned to pre-exercise level.

The whole experiment was performed at room temperature, varying from 23 to 28 degree centigrade, with the relative humidity, varying at 50 to 60 %.

STATISTICAL ANALYSIS

In the present study for statistical analysis the student t-test statistical technique was used to find out the effect of 8 weeks training on selected physiological parameters of national level male taekwondo players. For this analysis SPSS software was used.

Results

There were significant differences observed with 8 weeks of training intervention for taekwondo athletes.

Table 1: Changes in Aerobic Qualities before and after Training Intervention

Variables	Before		After		t-value
	Mean	SD	Mean	SD	
Sub max HR 2min	148	3.9	139	5.6	7.6**
Sub max HR 4min	167	7.6	160	5.1	5**
VO ₂ max (ml/kg/min)	49.3	2.7	48.7	2.2	.78
ATHR	174	5	172	6	1.5
Recovery HR 3min	127	8	120	9	3.5**

**Significance at 0.05 level, df is 13.

DISCUSSION

Significant changes were noted in aerobic adaptations due to eight weeks of training on Sub-maximal HR 2minute, sub-maximal HR 4minute and Recovery HR 3minute. VO₂max and Anaerobic Threshold Heart Rate were not showed any significance.

CONCLUSION

This is the first study that examined Indian Taekwondo athletes of aerobic qualities. Within limitations and delimitations of this study, the following conclusions were arrived. This study concluded that the training showed more significant adaptations in aerobic parameters like Sub-maximal HR 2minute, sub-maximal HR 4minute and Recovery HR 3minute. in the same study, it was observed that there were no significant changes in VO₂max and anaerobic threshold heart rate.

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