
Determine and Evaluate the Aerobic and Anaerobic Threshold Heart Rate of Maximum Heart Rate Threshold in Sedentary Female

Negar Asghari Moghaddam

Marefat Siahkoughian

Nasrin Azizian

Faculty of Physical Education and Sport Sciences, Mohaghegh Ardabili university, Ardabil

Professor of Sport Physiology, Mohaghegh Ardabili university, Ardabil

Department of Physical Education and Sport Sciences, Mohaghegh Ardabili university, Ardabil

Abstract

The aim of this study was to answer this question Vastanh aerobic, anaerobic threshold heart rate in the percentage of maximum heart rate in girls is disabled? For this purpose, 16 disabled students with an average age of $19/46 \pm 1/12$ years, weight $57/73 \pm 7/87$ kg, height $161/9 \pm 6/08$ cm And body mass index $22/93 \pm 3/02$ kg per square meter, with no history of heart disease, pulmonary, on a voluntary basis, were selected. When you increase the work load of low intensity to high blood lactate levels almost 2 mmol / l increases as well as the VE / VO₂ increases disproportionately as the aerobic threshold is defined. As well as during incremental exercise a certain intensity, blood lactate concentration increases for non-linear, or intensity of activity which blood lactate concentration 4 mmol / l is defined as anaerobic threshold. The aerobic threshold and anaerobic threshold in this study, the first and second point has to do with heart rate curve breaks. Changes in participants' heart rate during exercise protocol implementations, using telemetry minute was recorded. To avoid any error when the minute heart rate telemetry was used, two-hour special on the subject, one of which was closed and the other was given to researchers. When the subject is the point of exhaustion, the heart rate was at maximum value that was recorded as maximum heart rate. Results showed that the mean maximal heart rate subjects 189/46 aerobic threshold heart rate of 135/66 was, So the aerobic threshold heart rate at 71/60% maximum heart rate is disabled students And given that the average maximum heart rate for subjects 189/46 anaerobic threshold heart rate of 189/46, so anaerobic threshold heart rate at 100% maximum heart rate is disabled students. The share of aerobic system for energy increases, the person's heart rate less to operate. When we increase the exercise intensity, heart rate increases and the share is reduced aerobic machines and other energy supplier to assume

the duty of energy supply, especially glycolytic devices that use the anaerobic glycolysis to produce of the energy.

Keywords: *Aerobic threshold heart rate, Anaerobic threshold heart rate, Maximum heart rate*

1. Introduction

Exercise any purpose that requires attention to three principles: intensity, duration and frequency of exercise. Sports activities such as those found in some texts referred. In case of application of the severity and duration of work, biological adaptations in the form of increased maximal oxygen consumption (VO₂max), anaerobic threshold is manifested. Generally, for exercise activities are closely related and hence the combination of the two to achieve the desired biological adaptations, is one of the following methods: 1. Moderate-intensity activity (60 -30 minutes) and high intensity (anaerobic threshold slightly below, approximately 85-75% of maximum heart rate) 2. Activities of moderate intensity (10 -4 min) and high intensity (anaerobic threshold slightly above, approximately 95% to 75% of maximum heart rate) 3. Short-term activities (30 seconds to 3 minutes) and severe (in the VO₂max, almost 100% of maximum heart rate) In an increasingly physical activity, blood lactate increased workload Azshdt the bottom up, when amounts of 2 mmol / l increases, the amount of carbon dioxide as well as the pulmonary ventilation (VE / VO₂) increased disproportionately, as anaerobic threshold or lactate first break point (LTP1) defined [2]. In continuation of intensive training with the blood lactate almost 4 mmol / l increase, as well as VE / VO₂ rise further decreases known as anaerobic threshold or LTP2 called [8]. The phenomenon of lactate break point (LTP2), beginning accumulation of blood lactate (OBLA) and anaerobic threshold as synonymous terms can be used interchangeably. Anaerobic threshold during the run, also defined as MLSS [4], can be used as a tool used to predict the performance in endurance athletes [5]. Based on the intensity of the activity areas can be established in a maximal exercise blood lactate accumulation [9]. In this regard, the lactate threshold intensity less than the first phase, the first and second lactate threshold intensity, phase two and higher than the second threshold, lactate, classified phase III [11]. In the first phase, blood lactate remains close to the surface rest, But then with increased activity, increased lactate production and harvest is balanced in phase two and phase three more in production will lead to withdrawal. Between phase one and two, the lactate threshold is the equivalent of 40 to 60% of maximum oxygen consumption. And between phases two and three, the second lactate threshold is the equivalent of 60 to 90% of maximum oxygen consumption, is located. The anaerobic threshold between 60 to 80% of maximum heart rate and anaerobic threshold between maximum heart rate is 80 to 90% [1]. Anaerobic threshold as the intensity of the work or the amount of oxygen consumption (VO₂) is set to start metabolic acidosis and respiratory gas exchange is associated with changes in [10]. Anaerobic threshold for detailed planning exercise intensity, always one of the important topics of

interest to researchers and scientists have been sports. Various methods are used to estimate the anaerobic threshold generally is non-invasive and invasive procedures, but the consensus on this matter which of these methods is better there. The most accurate method to determine the anaerobic threshold, invasive procedures that require multiple blood samples during the incremental test standards and determine the amount of lactate in the blood. On the other hand, non-invasive methods for estimating anaerobic threshold that these methods are based on the relationship between heart rate heartbeat-time work and determining break point (HRDP) is [4,10]. When a certain work activity or workload gradually increases, the increase in heart rate associated with the work load during the recorded activity and heart rate curve - time work, is drawn. The curve associated with an increased work load, heart rate also increases linearly must, in the exercise intensity, with increasing work load, heart rate did not increase with the previous harsh and deviate from a straight line is known as the point of failure, heart rate (HRDP) is called [6]. Anaerobic threshold intensity exercise that takes place is different from the athlete to athlete. For example, non-prepared athletes and non-athletes anaerobic threshold, maximal oxygen consumption between 55 to 65 percent or 70 to 77 percent of maximum heart rate, While endurance athletes and athletic, anaerobic threshold may be more than 80% of maximal oxygen uptake or to reach more than 88 percent of maximum heart rate. A study was conducted to investigate how to control physiological observation that with increasing distance endurance athletes practice with a smaller percentage of maximum heart rate work, To the final haul to end its practice [7]. So given that little information about the percentage of maximum heart rate for aerobic and anaerobic threshold heart rate, especially in young people there, this study was conducted to answer this question.

2. Method

The research method, quasi-experimental designs within the team it has been a repeated test. For this purpose, 16 disabled students with no history of heart disease, pulmonary, on a voluntary basis, were selected. The aerobic threshold and anaerobic threshold in this study, the first and second point has to do with heart rate curve breaks. Changes in participants' heart rate during exercise protocol implementations, using telemetry polar minute was recorded. To avoid any error when the minute heart rate telemetry was used, two-hour special on the subject, one of which was closed and the other was given to researchers. When the patient reaches the stage of exhaustion, the heart rate was at maximum value that was recorded as maximum heart rate.

In this study, subjects during the last six months at least not any regular exercise. All subjects in terms of public health and health status, health records and diseases, drug materials and energy, the diet and level of physical sleep and motility were evaluated and homogeneity. As the age and sex also plays a role in the identification of aerobic and anaerobic threshold and time to exhaustion, so for age

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and sex were homogeneously. In addition, according to the study objectives and the impact of physical inactivity and food on the variable, all subjects were asked to 48 hours before performing any heavy physical exercise or 1-2 hours before eating fatty food and heavy refrain. Aerobic threshold determined by the subjects Narita ($74/8 + (0/76 \times \text{resting heart rate})_{0/27} \times \text{age} + 7/3 \times 1$) was determined. Then for each subject were scheduled day and hour deadline for the implementation of the first subjects in the study protocol, participated in the laboratory. In the second phase the participants after the warm-up, Aerobic threshold for the calculation of heart rate intensity running protocol, performed. Then, for each subject, date and time of the next steps in the research laboratory to perform at least 72 hours from the scheduled time. In the third stage the subjects after the warm-up, depending on individual protocols carried out to determine the anaerobic threshold. To determine the anaerobic threshold increasingly dependent on individual subjects, the protocol was used. After closing the Polar subjects, for 5 to 10 minutes to warm up to 70 percent of maximum heart rate activity until they reached their MHR. uivalent to 70 percent of MHR test speed for 1 minute. Then with the passing of each minute, two kilometers an hour on the treadmill speed increased. This practice continued to exhaustion. Heart rate Deflection point (HRDP) in the protocol depends on the individual anaerobic threshold were considered as an indicator estimate. HRDP using the short maximum distance (SDmax) was determined. The protocol depends on the rate of subjects from the beginning to 70 percent of maximum heart rate by the end of protocol collected using a computer program, curve polynomial function (Polynomial) set of points (heartbeat-time) drawing and then baseline and end of the curve using a straight line connected to each other. Most are the heartbeat of straight lines to curves. Heart rate as a point of failure (anaerobic threshold) was determined using the slope of the parallel line[3]. Then at the last minute maximum heart rate program also records the time spent in the laboratory protocol for the next step was to research the subject. Finally, the participants after jogging warm-up protocol for the calculation of the anaerobic threshold intensity were performed at the time exhaustion. Heart rate and time to the minute treadmill speed was recorded at all stages. All measurements were performed in laboratory conditions in terms of temperature and humidity. During the execution of this study was to motivate more participants, was hosted them and in the end the gifts were donated to them. In this study, descriptive statistics in categories of data mean, standard deviation, minimum and maximum amount Variables charts to determine the anaerobic threshold SDMAX software was used. Statistical analysis was performed using SPSS version 16.

3. Results and Discussion

The results of the students inactive with a mean age of $19/46 \pm 1/12$ years, weight $57/73 \pm 7/87$ kg, height $161/9 \pm 6/08$ cm and body mass index $22/39 \pm 3/02$ kg per square meter, showed that the average maximum heart rate for subjects 189/46 Aerobic threshold heart rate of 135/66 was, So

Aerobic threshold heart rate at 71/60% maximum heart rate is disabled students and Considering that the average maximum heart rate for subjects 189/46 anaerobic threshold heart rate of 175, so the anaerobic threshold heart rate at 92/36% maximum heart rate is disabled students. The share of aerobic system for energy increases, the person's heart rate less to operate. When we increase the exercise intensity, heart rate increases and the share is reduced aerobic machines and other energy supplier to assume the duty of energy supply, Glycolytic system that uses anaerobic glycolysis for energy production deals. or anaerobic energy production from glycogen produced in the body that causes the fatigue in the body and prevents the person from activities ,The most important of which is to lactate, which causes fatigue and exhaustion Of course, this is not your lactate person, but acidosis due to the accumulation of lactate in the blood and skeletal muscles that cause it to be. These acids cause the blood to create disturbances in muscle contraction and is, thus, a substance that is secreted at the end of neural synapses (Asytl choline), affects. And as the material plays an important role in his contracting operation has been disrupted, contraction is quite good. Other factors glycogen depletion and exhaustion include muscle, reducing energy phosphate (ATP), the increase in hydrogen ions, ADP and Pi increase in the skeletal muscles and other factors reducing training volume by increasing the amount of exercise.

References

1. Binder ,R., Wonisch, M.,Corra, U.,Cohen-Solal, A. 2008. Methodological approach to the first and second lactate threshold in incremental cardiopulmonary exercise testing. *European Journal of Cardiovascular Prevention and Rehabilitation*, 15: 726-734.
2. Bodner, M., Rhodes, E., Langill, R. 1999. Heart rate threshold: Relationship to steady state cycling at ventilatory threshold in trained cyclists. *Journal of Medicine & Science in Sports*, 31: p313.
3. Bodner M, Rhodes E, Langill R, et al. 2000. Heart rate threshold: relationship to steady state cycling at ventilatory threshold in trained cyclists [abstract]. *Med. Sci. Sports. Exerc.* 3,1: 1561.
4. Chmura, J., Nazar, K. 2010. Parallel changes in the onset of blood lactate accumulation (OBLA) and threshold of psychomotor performance deterioration during incremental exercise after training in athletes. *International Journal of Psychology & Physiology*, 75: 287-290.
5. Coen, B., Urhausen, A., Kindermann, W. 2001. Individual anaerobic threshold: Methodological aspects of its assessment in running. *International Journal of Sports Medicine*, 20: 8-
6. Conconi F, Ferrarti G, et al. 1982. Determination of the anaerobic threshold by a noninvasive field test in runner. *J. Appl. Physiol.* 52, 4: 869-873.
7. Esteve-Lanao, J., Lucia A., deKoning, J., Foster, C. 2008. How do humans control physiological strain during strenuous endurance exercise. *Journal of Medicine and Science in Sports*, 20: 29- 43.

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8. Ghosh, AK. 2004. Anaerobic threshold: Its concept and role in endurance sport. *Malays Journal of Medicine Science*, 11: 24-36.
 9. Kindermann, W., Simon, G., Keul, J. 1979. The significance of the aerobic-anaerobic transition for the determination of work load intensities during endurance training. *European Journal of Exercise Sport*, 51: 234-248.
 10. Rogers D, Turley K, et al. 1995. Allometric scaling factors for oxygen uptake during exercise in children. *Ped. Ex. Sci.* 7: 12-25.
 11. Seiler, S., Tonnessen, E. 2009. Intervals thresholds and long slow distance: The role of intensity and duration in endurance training. *International Journal of Sports Physiological Performance*, 15: 27-34.