



Comparing the effects of physiological stress and work RPE exercise protocols (withdrawal, periodic and continuous) in the province of Elite male soccer players

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ABSTRACT

In this study, physiological stress and exercise RPE three protocols were compared among footballers. For this purpose, 20 male elite soccer league third member of the province were selected in 2012 and some their physical characteristics such as height and weight, and aerobic capacity, anaerobic power and resting heart rate before the start of the field operations were measured. The amount of blood lactate was measured before and immediately after applying any of the protocols, the mean lactate obtained from the subjects after three protocols with each other as well as with the European average blood lactate after football teams were compared. The information obtained using the Software SPSS22 for Windows are reviewed and analyzed. The descriptive statistics command and Statistics All Cases summaries was used in inferential data about each batch of one or more appropriate test including one sample, T-test, ANOVA one_way, post hoc test Kruskal-walli, Tuckey post hoc tests fried man for the presence of significant levels of blood lactate and RPE differences between were analyzed the charts of computer software is used excel 2013. The findings with regard to the level of significance ($p \leq 0.05$) differences between the blood lactate after exercise three protocols batch, continuous periodic significant. Blood lactate levels after the implementation of protocols periodic training and continuing with European teams, according to the mean blood lactate level of significance ($p \leq 0.05$), was significantly different. Between the blood lactate after exercise protocol is interrupted with an average blood lactate European teams and no significant difference between the perceived exertion after the withdrawal of three training protocols, frequency and continuity with regard to the level of significance [$p \leq 0.05$] differences there was significant.

Keywords: Physiological Load, Intermittent Exercise, Interval Training, Continuous Training, Understanding the Working Pressure, Footballers

INTRODUCTION

Design training programs for athletes, determine the physiological needs of the various sport disciplines and methodologies appropriate training and effective in improving exercise performance seems essential [13 and 7, 6]. Compatibles and physiologic characteristics of athletes training depends on the type of structure [1]. The purpose of the preparation of athletes in many sports, features improve aerobic and anaerobic [20].and more precisely to deliver players the desired level of physical fitness is more important. High-intensity exercise football period. So aerobic and anaerobic capacity and speed of explosion is very important [5]. This is very important for football coaches and sports players the ability to execute them to the desired level, as well as the ability is in progress. According to aerobic endurance in football players is essential and very important. Aerobic endurance, body capacity to withstand the effects of a long race without feeling overwhelmed [6]. Blood lactate response to exercise also seems to be increasingly strong links with a variety of functions, endurance and lactate curve and start accumulating in the

blood, researchers compared the heart rate and respiration, heart rate and lactate as lactate curve to practice breathing patterns to evaluate the effectiveness of their physiological effects and analyzed the results to be used and the coaches and athletes [20]. Athletes need a strong base of aerobic exercise to keep moving temporary and long-term recovery burst when appropriate activities. Energy systematic proportional and specific exercises for athletes to withstand the impacts tandem with the ball during the competition helps maintain the coaches also should be important to achieve this high-intensity exercises to increase their ability [13]. There are different exercises, including temporary and intermittent exercises to strengthen and expand the fitness of footballers and increase athletic performance, but comparing lactate concentration and understanding the working pressure after exercise training between the various ways different effects show? What is the link between the accumulation of blood lactate understand the pressures of work between the different training methods are there? Which training method to a particular sport [in this study] physiological stress athletes is more suitable for different body?

Coutt A. J. et al (2007) examined the relationship between blood lactate and RPE work in paid footballers. The study of 20 non-professional footballers who lived in the practice and pre-season match was used. The aim of this study was to investigate the relationship between heart rate, blood lactate practice with RPE works when performing aerobic exercises, especially football. The results showed that the combination of heart rate and blood lactate during football games a stronger relationship with the perceived pressure to measure blood lactate and heart rate measurement without understanding the working pressure. These findings suggest that the use of RPE enterprises (RFE) as a contributing factor used in determining the appropriate intensity during exercise [18]. Alper S. E. Hazir Thir in 2007 in his research showed that young footballers physiological reactions similar effect under more pressure playing in different positions [3]. Weston M. et al in 2004, as reported in their study that athletes who are active in sports and intense pulsed can be intense cross-training programs to be used in your weekly schedule and design [23]. Therefore, this study examined the effect of three different patterns of physical activity batch, continuous and intermittent changes and blood lactate accumulation and understand the working pressure in football players investigated. To answer to the main question that the pressure of work due to changes in lactate and understand the physiological stress of training methods more favorable to the main apparatus and protective body into a footballer? Can be used to select the most effective strategies suggested exercises in the training model used for football and earn better athletic performance.

EXPERIMENTAL SECTION

In this quasi-experimental study, the researchers used the resulting changes in applying the independent variable dependent variable in the experimental groups compared with each other. A total study sample included 20 adult elite male soccer players who were playing in Division III Hamedan province that physical characteristics and physiological parameters in Table 1 are shown.

Table 1: Statistics physical characteristics and physiological sample

| Range | Maximum | Minimum | Standard Error | Standard Deviation | Mean | Descriptive Statistics Variable |
|-------|---------|---------|----------------|--------------------|--------|---------------------------------|
| 4/00 | 24/00 | 22/00 | 0/47 | 2/18 | 23/50 | Age(Year) |
| 37/00 | 197/00 | 162/00 | 4/59 | 9/52 | 179/50 | Height (cm) |
| 29/20 | 85/42 | 60/45 | 4/12 | 8/59 | 75/25 | Weight(Kg) |
| 15/00 | 67/20 | 55/00 | 2/26 | 4/75 | 55/27 | (ml/kg/min) Aerobic power |
| 1/75 | 5/25 | 3/54 | 0/52 | 0/62 | 6/87 | (w/kg) Anaerobic power |
| 35/42 | 69/25 | 42/00 | 3/25 | 7/15 | 55/50 | (b/min) Resting heart rate |

After preliminary studies, sampling, testing and identification of specific groups and to develop tools, collect research data, patient satisfaction health through physical fitness and qualifications to participate in the research questionnaire were evaluated, and the health confirmed their readiness to cooperate with the investigation. Within a week of training, participants were acquainted with the manner of implementation of the protocol, then the test sample 20-member group under the influence of a condition of the exercise protocols were tested. In order to do interval training protocols, cross-sectional and longitudinal of the subjects before and immediately after carrying out the relevant protocols were measured and recorded heart rate and blood lactate. Each participant will also standardized questionnaire to determine RPE works [18] also was completed by subjects and the subjects were asked their nutritional status and physical activity level during the 24 hours before each session to maintain normal field operations research and to refrain from taking drugs, then sample of 20 students in the experimental group were

affected by the experimental conditions were the following exercise protocols to do so before your workout protocols rate monitor devices connected to them was that during training activities to begin out.

Implementation of interval training protocols

This protocol includes pre-designed and standardized track running distance of 280 m [140×2] m the athlete had to make it by 80 to 85 percent of maximum heart rate and repeat until fatigue. The right time is recorded by the stopwatch for the distance traveled and the number of the period is recorded [17].

Implementing intermittent exercise protocol

The exercise protocol included roundtrip 40-meter sprints [2×20] meters that are designed to break 10 seconds each time traveling back and forth direction of 5 m done, run by the rhythm of the audio frequency is determined to be distributed to participants. The rhythm and intensity gradually increased running distance and must be passed in less time. Activities until the moment of fatigue and inability to keep participants will continue [14].

Implementing Continuous exercise protocol

This protocol includes the four main pattern common in football activities walking, running software, running with long strides and running with maximum speed during a football game between two ordinary time was 45 minutes. Since the implementation of each of these movements in various research footballers has been determined for various performance levels can be extracted and implemented. This exercise should be done at a distance of 4/380 yards. After 45 min, 150 min time to rest there, so that walking 2 minutes 42 seconds, 42 seconds smooth running, 24 seconds and 12 seconds faster-paced running high this time 5 minutes, which is a total of 9 times 45 minutes to arrive at the desired time. This pattern after 15 minutes, rest for 45 minutes we repeat [22]. Sub-standard pollution standard temperature 37 ± 2 ° C and humidity of $30 \pm 6\%$ and by the end of the study, field and laboratory data obtained both before and after the implementation phase of training protocols and analyzed by relevant statistical tests groups.

To check whether the normal distribution of the data that were collected before and after the training protocol test Kolmogorov-Smirnov test was used. In this test, the normal distribution was confirmed that resulted in quantitative data using parametric statistics about the relative scale and distance. Descriptive statistics in order to gain command and control Chart Statistics All were used. To test the hypotheses Parametric ANOVA One-way, One Sample T-test and post hoc Tuckey test data and test the relative scale and distance Kruskal-Wallis Test and Friedman's post hoc test for nominal and ordinal data scale was used. To analyze the data collected before and after the training protocols and comparison between the variables of interest and statistical tests to evaluate and test research hypotheses commands and computer software SPSS 16 for Windows was used. Because scale distribution of data and distributes it was normal amount of blood lactate, Parametric tests were used and because data on the perceived exertion ratings were the work of non-parametric statistics were used.

RESULTS

Descriptive and inferential statistics show that the amount of blood lactate immediately after physical activity in all three training protocols batch, and continuous periodic significant level ($P \leq 0.05$) there are considerable differences, so reject the null hypothesis and theory Alternate realized that the impact of these three protocols will be training on alternative energy systems. Information Table [4] shows that between the blood lactate immediately after the two protocols periodic training and continuing physical activity and blood lactate after the race teams in Europe at the significant level ($P \leq 0.05$) There is a considerable difference. But the blood lactate immediately after physical exertion and blood lactate during exercise protocol interrupted after the race teams in Europe at the significant level ($P \leq 0.05$) There is no significant difference. Information Table [5] shows that the perceived pressure to undertaking physical activity in all three exercise protocol immediately after withdrawal, periodic and continuous significant level ($P \leq 0.05$) There are significant differences, the null hypothesis is rejected and the researcher's hypothesis of the different amount of pressure on the body of the three test subjects' exercise protocol instead. Tests are based on assumptions so that if the null hypothesis than the significance level ($P \leq 0.05$) was rejected the hypothesis of the researchers that there is a difference between the exercise protocol was replaced by an assumption of zero.

Table 2: blood lactate levels before and immediately after exercise training protocols withdrawal, periodic and continuous by lactometer meters per mmol/L measured

| Range | Maximum | Minimum | Standard Error | Standard Deviation | Mean | Descriptive Statistics | |
|-------|---------|---------|----------------|--------------------|--------|--|---------------------|
| | | | | | | [Training Protocols [Before And After Exercise | |
| 1/80 | 3/80 | 0/90 | 0/22184 | 0/72807 | 1/25 | before | Intermittent |
| 2/45 | 11/25 | 9/20 | 0/2587 | 0/72535 | 8/5500 | after | |
| 1/27 | 3/35 | 1/35 | 0/11676 | 0/37545 | 1/8500 | before | continuous |
| 3/75 | 6/65 | 3/25 | 0/45614 | 1/25651 | 5/9500 | after | |
| 1/25 | 3/25 | 1/25 | 0/19825 | 0/34252 | 1/8000 | before | continuous |
| 3/65 | 8/85 | 7/25 | 0/36668 | 0/84325 | 7/4500 | after | |

Table 3: Comparison of blood lactate immediately after physical activity three intermittent exercise protocol, frequency and continuity by lactometer according mmol / L measured

| sum of squares, mean squares, degrees of freedom, the value of F, significant | 95 % confidence interval | | sig | Standard error | deviation | Inferential statistics Comparing training protocols |
|---|--------------------------|-------------|-------|----------------|-----------|---|
| | Lower limit | Upper limit | | | | |
| SS _B =84.165 | 3/0466 | 6/0543 | 0/001 | 0/51514 | 4/1521 | interval |
| SS _W =24.156 | 0/6056 | 2/6252 | 0/001 | 0/51514 | 1/6500 | continuous |
| SS _t = 125.415 | -6/2563 | -4/0520 | 0/001 | 0/51514 | -5/15100 | Intermittent |
| df _B = 5 | -4/4554 | -2/4526 | 0/001 | 0/51514 | -2/25000 | continuous |
| df _W = 29 | -3/6252 | -0/8542 | 0/001 | 0/42520 | -2/62000 | Intermittent |
| df _t = 28 | | | | | | |
| ms _B = 44.562 | | | | | | |
| ms _W =0.856 | 2/4257 | 4/5236 | 0/001 | 0/42520 | 2/55700 | interval |
| F= 52.63 | | | | | | |
| Sig =0.001 | | | | | | |

Table 4: Statistical information related to the blood lactate immediately after the implementation of training protocols withdrawal, periodic and continuous and European teams with Lactometer and in terms of average blood lactate mmol / L measure

| range | maximum | minimum | standard error | standard deviation | mean | Descriptive statistics Training protocols |
|-------|---------|---------|----------------|--------------------|--------|---|
| 2/30 | 10/40 | 8/10 | 0/21970 | 0/69474 | 8/9400 | Intermittent |
| 3/50 | 6/50 | 3/00 | 0/35604 | 1/12591 | 4/8900 | interval |
| 2/60 | 8/90 | 6/30 | 0/26669 | 0/84334 | 7/3300 | continuous |
| 4/70 | 11/40 | 6/70 | 0/54497 | 1/72334 | 8/6100 | European teams |

Table 5: Understanding the working pressure measured immediately after the implementation of intermittent exercise protocols, frequency and continuity in terms of scale by RPE Scale 20-6

| range | maximum | minimum | standard error | standard deviation | mean | Descriptive statistics Training protocols |
|-------|---------|---------|----------------|--------------------|---------|---|
| 5/00 | 17/00 | 12/00 | 0/38540 | 2/25608 | 15/2550 | Intermittent |
| 5/00 | 14/00 | 10/00 | 0/35841 | 3/33512 | 13/5520 | interval |
| 4/00 | 14/00 | 12/00 | 0/35564 | 0/95672 | 14/2965 | continuous |

Table 6: Comparison of perceived exertion to measure exercise after running a batch protocols, frequency and continuity in terms of scale by RPE Scale and 20-6

| Sig. | Degrees of freedom | Chi-Square | Avg. Ranking | Descriptive statistics Training protocols |
|-------|--------------------|------------|--------------|---|
| 0/001 | 19 | 14/315 | 22/45 | Intermittent |
| | | | 8/55 | interval |
| | | | 14/95 | continuous |

DISCUSSION AND CONCLUSION

By analyzing the blood lactate immediately after exercise training protocols batch, and continuous periodic found that the accumulation of lactate after exercise protocol is interrupted for more than two periodic training and continuing. The result of the findings Bible (2008) and Mc Cartney.et al in 1986 that the power is interrupted while working to maximize muscle metabolism examined confirmed [20, 19]. Due to increased accumulation of lactate in

the blood, leading athletes of aerobic energy system to the anaerobic system and greater use of anaerobic glycolysis as a result of increased CP and more pyruvate is converted into lactic acid and lactate blood lactate slightly higher than the secondary threshold (4 mmol) accumulates [17]. These findings and the results obtained show that the athlete during exercise physiological withdrawal tolerate high pressure and by doing Training with such intensity and pattern can lead to adaptations needed to withstand lactic acid and lactate curve to achieve the right and thus prevent their premature fatigue. Wishing lactate curve to the right, clearing lactate increased its production decreases. It also improves mitochondrial respiration to harvest and consume more oxygen. The number of mitochondria and oxidative enzymes to reduce lactate production and increased clearance increases [1]. In light of the foregoing, the acquisition of such amenities is very important for athletes. The achievement of these adaptations in regular physical training at a high intensity workout that requires time and cost is higher [7]. That's why athletes like football can plan and execute exercises withdrawal spend your time and lower costs in preparation for the tournament. The main cause intermittent exercise greater efficiency in terms of physiological and exercise science, the pressure close to or even equal to his entering competitions to athletes and training area efficiency [PZ] or training up zone (MZ). The best area for exercise training has been shown to cut sports athletes such as football players and bring these sports to fitness and business physiological adaptations to training, exercise performance and maximum is in the region [22]. The findings of Krustup. et al in 2003 to examine the physiological responses, as well as their reliability and validity of the exercise protocol yo-yo performance and value exercises a form of physical activity is interrupted intermittently and in particular to confirm that the football players [14]. Matthew Watson et al. (2004) also intense exercise special influence of football on the readiness of football players tested and the results showed that athletes who are active in sports and extreme withdrawal can be severe and interrupted his training in your weekly schedule to include [23]. This finding also confirms the effectiveness of training interrupted for footballers. It considered unprofessional [4]. According to these findings, we can conclude that intermittent training method is efficient and effective way to footballer.

By analyzing the blood lactate immediately after exercise training protocols withdrawal, periodic and continuous became clear that the accumulation of blood lactate after interval training is much lower than both continuous and discontinuous. The lactate threshold is the second of lactate (4 mmol) exceed the performance of subjects into training zone (PZ) that the area is good training for footballers. The results of the research findings Lopez J.G. Marroye JAR in 2004 on the impact of periodic training on the implementation of specific lactic acid football and footballers determine anaerobic threshold (test Prapst) did the Bible (2008) acknowledge [17, 20]. The results showed that the test Prapst in football as a valid field test used to determine anaerobic threshold. Helgerud J. et al in a 2001 study on the effect of aerobic exercise on improving the performance of footballers did their research findings showed that such training can be done in the VO₂max, lactate threshold, economy running, distance running, fast running number, Possession and the percentage increased significantly to create pressure during the race [11]. Creating higher pressure than the second threshold lactate (OBLA) by performing repetitive sprints to exhaustion by 80 to 85 percent of maximum heart rate, activity that puts athletes training in stage performance [11] PZ training or is MZ. The athletes push aerobic energy system of the anaerobic, anaerobic glycolysis increases and also led the lactate curve to the right, but not to the extent experienced a continuous and intermittent exercises. According to these findings, we can conclude that interval training method is efficient and effective way to footballer but its performance relative to both batch and continuous training less.

The blood lactate immediately after continuous exercise protocol was recorded and the results of the accumulation of lactic acid after the practice of periodic Protocol and to cut off protocol was less than 2 table. Given that the average concentration of lactate in the practice lactate higher than the second threshold (OBLA) It can be concluded that the implementation of the Protocol were also the subjects of aerobic energy system anaerobic system towards the increased use of CP and increase anaerobic glycolysis led and witnessed the arrival of students training to work-Fi zones (PZ) and maximum (MZ) will be [22]. One of the reasons that the exercise protocol in this study continue pushing for withdrawal has created more or less similar to practice. This is the kind of action implementation and execution time they had many similarities with the players in a football match. According to these findings, we can conclude that footballers can run this type of training adaptations leading to lactate curve to the right as well as pressure to earn more and less fatigue but it took longer and cost more than discontinuous exercises. Finally, due to this training method very similar to a football match, to determine how well the more the practice and the other two methods [withdrawal and periodic] Average blood lactate accumulation after each training protocol with an average blood lactate accumulation in ten European soccer team have been compared. Table 4 Average accumulation of lactate in the European Research Stolen T. et al had been set in 2005 and we also used similar findings [22]. The results show that intermittent training method is the most similarities in terms of the amount of pressure on the

participants and lactate concentration and conditions of the football match of the two methods periodic training and continuing.

The questionnaires RPE work or training after three protocols withdrawal, periodic and continuous was completed by subjects. RPE works of findings of each of the three subjects after exercise protocol were found. This information related to RPE our findings in the field of measuring the accumulation of lactate after three protocols approved training was consistent with them. Change the perception of work pressure after the implementation of three training protocols similar results from the intensity of the activity in each protocol provided. The subjects felt the most pressure after the exercise protocol then cut off after continuous and intermittent exercise protocol had experienced less stress. The results confirmed the findings Kutas et al in 2006. The findings show that the use of RPE enterprises (RPE) as cofactors and backup determine the severity of activities are available during and after exercise [8]. Kristen research have also Lagally KM et al in 2001, the rate of perceived exertion during exercise endurance work in women. The results show that the use of RPE can be a useful technique is to set the pressure endurance training. In addition, blood lactate and RPE during endurance exercise has been associated with muscle activity [25]. Given these findings and the results of blood lactate accumulation immediately after exercise three protocols temporary, intermittent and continuous work can be concluded that the perceived exertion that a simple, low-cost and can be used immediately to determine the severity athletes and determine the scope of activities they are used during training exercises.

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