Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XIV, ISSUE 1, 2014, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengace Learning, Cabell's Directories

Science, Movement and Health, Vol. XIV, ISSUE 1, 2014
January 2014, 14 (1): 60-65
Original article

EFFECT OF LINEAR AND EXPONENTIAL TAPERFOR TWO WEEKS ON IRON LEVEL AND1500M RUNNING TIME FOR YOUTH

HAMDY OSMAN[1], ABEER ESSA[2]

Abstract

Purpose. Iron is the most studied minerals in athletes. Approximately, 25% of female and 10% of male athletes have iron deficiency.The main purpose of this study was to examine the effects of linear and exponential taperfor two weeks on iron level and1500m running time for youth

Methods. The sample consisted of (22) runner of 1500m running (15 ± 1.36 years old; 160 ± 5.2 cm height; and 51 ± 6.14 kg weight), members of the army team club. The training experience of all the participants ranged from 5 to 8 years. Subjects were required to read and complete a health questionnaire and informed consent document; there was no history of coronary heart disease, diabetes or recent surgery.

Results. The T-test showed no significant changes between pre-and post-training scores for all variables (P≤ 0.05). However no significant differences were shown between the post-training scores in all variables for the two groups (P≥ 0.05).

Conclusions. Although The T-test showed no significant changes between pre-and post-training scores for all variables (P≤ 0.05).And however no significant differences were shown between the post-training scores in all variables for the two groups (P≥ 0.05). The improvement in linear taper is highest theimprovement in exponential taper.

Key words: linear taper, exponential taper, iron level, 1500m running

Introduction

Became sporting achievements and realized indices and shatter before going to the competition on the sports fields, thanks to the findings of scientific studies and research, thus becoming the competitions are in scientific laboratories.

Sports movement has seen in recent decades, a big jump made the limits of human capacity beyond all barriers and rise to the figures in the past of pure imagination.

This is the great development witnessed in games and sports did not come from a vacuum or by accident, but came to be crowned all scientific efforts and field that have occurred in those games and sports thanks to the findings of the medical sciences, health and social services that take them sport everything would benefit in the ways of evolution.

In this regard, mention (Bosch, 2008) that every observer of the evolution of levels of sports in the world and ponder those renderings realizes that the sports training great significance in the preparation, formulation and development of human capabilities, with its various dimensions in order to blow as much as he can of the capabilities and within the rights of the energies in the direction of the desired goal.

The problem of rationing training load of the biggest problems of sports training, where is considered the basic process that depends upon the success of the coach in achieving training objectives, and is therefore a process leading in the case of successful adaptation to physiological and raise the level of performance, in the case of failure will not be achieved level athlete desired (Powers, Howley, 1997)

It has proven modern scientific studies that the incidence of adaptation in athletes cannot be pushed to the top of the potential and capabilities of the player therefore overstate the increase training loads can lead to a slight improvement in performance or may also lead to failure in the adaptation processes or the occurrence of so-called training overload and the low level of performance.

In this sense , the training load when codified depends on many factors, the most important of the intensity and duration of exercise and how to work the muscle , as well as the potential of the player , physical and physiological age and diversity training and growth phase that passes (Maughan, et al.1997).

All of these factors must take into account when rationing training load or when planning for physical loads, and in conformity with the physiological and biological capacity of the swimmer.

And refers (Marcelo, et al. 2007) because it was believed before 1960 that most of the training severe season training, must be performed during the few weeks leading up to the tournament, but knew now that the pre- tournament must reduce the training and called a truce gradual, and through the application lead swimmers unplug the performance of them during the competition.

According (Laurent, et al. 2007) that in the end stage reaches the summit and before the date of the competition or tournament crucial, there is a

[1] Faculty of physical education– Benha University- EGYPT
[2] Faculty of physical education for girls – Helwan University- EGYPT
CORRESPONDENCE AND REPRINT REQUESTS: Email:amr297@yahoo.com

transitional period in particular, intended to give a chance and enough rest for the player, to get rid of the effects of intensive training, which underwent during his stage reach the summit.

(Marcelo, et al. 2007) that the aim of calming the summit is to reduce the doses of training to achieve the best performance in the competition , in order to reduce the incidence of stress and allowing the swimmer to compete in case restore hospitalization , taking into account not significantly reduce the training may negatively affect the performance.

And refers (Laurent, et al. 2007) noted that the consensus among the coaches have conflicting about the importance of calm subsidiary, some believe it is inconsistent with the training, and it is hinder swimmers from reaching the top of their performance at the end of the season, while others believe it is useful for swimmers, where it has the benefits of physiological and psychological.

While sees (Bosch, 2008) to be one - thousandth of a second become determine the winner in swimming competitions, so to calm the summit has become a major and essential role in implementing training programs, where it is located the biggest burden in creating gradually swimmer to compete strongly.

(Marcelo, et al. 2007) that most of the studies that have addressed the cooling-off period the summit indicate that the highest gains can be achieved when reducing the size of the training rate of 41 - 60% of the total value before applying to calm the summit, and the size of the training can be reduced by reducing the duration of the module or reduce the occurrences training , and this is the preferred strategy used when most of the trainers, bearing in mind that the lack of occurrences of training does not lead to a significant improvement in performance, and therefore, the best strategy used is to reduce the size of the training and not reduce duplicates, and if he wants to coach reduce duplicates must to keep on not less iterations for 80% or more of their value before applying to calm the summit, with an emphasis on the low volume of training should not be at the expense of the intensity of training , it is clear that the intensity is the main indicator of the stability of adjustment during the application of calming the summit, and therefore, the most appropriate strategy for the application of calm Summit training is constant intensity , low volume training increased by 41 - 60% , and duplicates at least 80 % .

He noted researcher and a difference in the most appropriate time periods for the application of calm summit While indicating (Viru, Viru, 2000) that the most suitable period of 2-3 days , because the aim of calming the summit is to compensate glycogen muscle, which lost during the training program , and this has clear benefits in endurance races for players regard, but it may not happen the same effect as swimmers, because the continuity of performance in races run no parity racing swimming competitiveness, in addition to the high levels of glycogen muscle is required in racing swim, because the period of performance fairly short compared to races running and thus does not happen during those short periods depletion of large amounts of muscle glycogen , therefore period rest of 2-3 days is sufficient to compensate for the lost glycogen in the muscles.(Rinehardt, et al. 2000) indicated that the two-week period is sufficient and that in the study conducted by the entitled Effects calm Summit on swimmers university , and the strength of the sample (13) swimming college , they perform (8) weeks exercises bearing antenna above the maximum (percentage enemy 8.8% and the proportion of pregnancies antenna above the maximum 34.8%) and then followed by the calm summit for two weeks (percentage running 13.5% and the proportion of pregnancies antenna above the maximum 5.6%) was the most important results that the speed threshold distinguishing anaerobic threshold velocity increased during the performance (8) weeks exercises bearing antenna Far above from 1.014 to 1.131 m / s did not have any impairment occurs during the cooling - off period the summit , in addition to the lack of changes in maximum of VO2peak oxygen consumption and creatine kinase and lactate CK dual hydrogen LDH and average power and muscle strength . , And is consistent with the study (Kenitzer, 1998) entitled period ideal to calm the summit with swimmers depending on the levels of lactic acid , and the strength of the sample (15) Swimming Pool Distributors equal to (5) swimmer pool short , (5) swimmer distance medium , (5) swimmer long distance, was measured lactic acid after the performance of pool 4 x100 m , and it was the most important results that the levels of lactic acid began to stability after two weeks of calm summit and then began to decline after this period, the researcher recommends not to exceed a period of calm Summit for weeks, depending on the levels of lactic acid.(Sue, et al.1998) noted that the most appropriate period to calm the summit is four weeks and it is proven in his study titled responses blood for Training and calm the summit to swimmers competitions and their relationship to the level of performance , and the strength of the research sample (8) swimmers high level , they have training for a period of (12) week strongly high, and (4) weeks to calm the summit, was carried out measurements of blood during the first week before and after the official tournament , and it was the most important results that the levels of hemoglobin and iron in the blood , improved after training and maintained stability during the period of calm the summit, and the number of red blood cells improves through training and increased during period Altabernj increase significantly, and improved levels of white blood cells after training and fall during the cooling - off period the summit. (Mujika, et al. 2002) indicated that the most appropriate period to calm the summit is (6) days and this is proven in his study entitled physiological responses and the level of performance for the six days of calm summit of distance runners medium, and the strength of the research sample (9) runners -distance medium (800 m), were divided into two groups, the first group was

strong (5) runners have applied occurrences severely high , and the second (4) runners had to perform iterations strongly medium, and for a period of (18) a week followed by a calm summit for (6) days , and it was the most important results improved level of performance level Allimvusaat and Allecosaat and Altesteron the first set by the application of high frequencies strongly (maximum size) compared to the second group has to perform strongly iterations Medium (size Medium). (Marcelo, et al. 2007) that the most appropriate period to calm the summit is a (11) day, and this is proven in his study entitled Effects calm the summit on the strength of swimming and the level of performance of swimmers after the performance of a training program for a period of (10) weeks, and the strength of the sample (14) swimmer enrolled in the Brazilian swimming , they perform a training program for a period of (8.5) week and (11) days to calm the summit, was measured lactic acid after the performance of maximum effort at the end of the training program (8.5) week , and measured the level of performance of the pool 200m freestyle , and it was the most important results and an improvement in the speed of swimming amounted to 3 % after a cooling - off period the summit and the high level of lactic acid from 6.79 to 7.15 mmol , and the stability of the power pool.

In the opinion of the researchers and the existence of an agreement on strategic training used in the cooling-off period the summit , a constant intensity and reduce the size training , and this was confirmed by (Laurent, et al. 2007) that most of the studies that have addressed the cooling-off period the summit indicate that the highest gains can be achieved when reducing the size of the training rate of 41 - 60% of the total value before applying to calm the summit,
and the size of the training can be reduced by reducing the duration of the module or reduce the occurrences of training , and this is the preferred strategy used when most of the trainers, bearing in mind that the lack of occurrences of training does not lead to a significant improvement in performance , and thus The best strategy used is to reduce the size of the training and not reduce duplicates, and if he wants to coach reduce duplicates they must maintain a minimum frequencies of 80 % or more of their value before applying to calm the summit, with an emphasis on the low volume of training should not be at the expense of intensity training , it is clear that the intensity is the main indicator for the stability of adjustment during the application of calming the summit, and therefore, the most appropriate strategy for the application of calm summit is a constant training intensity , low volume training increased by 41 - 60% , and duplicates at least 80 % .

He adds Shipley and others that the period of four weeks preceding the contest was a marathon should be focusing on the intensity of training , not size, and this was confirmed by studies that addressed the cooling-off period the summit before the marathon where noted that the intensity of training is more effective than running distances in miles , if it wants to raise his fitness effectively in a four - week period preceding the competition was a marathon , the training intensity is the best option to achieve this.

Four different types of tapers have been described and usedin the past in an attempt to optimize sports performance. Theseare visually described in Figure 1. The training load during thetaper is usually reduced in a progressive manner, as implied bythe term taper. This reduction can be carried out either linearlyor exponentially. As shown in Figure 1, a linear taper impliesa higher training load than an exponential taper. In addition, anexponential taper can have either a slow or a fast time constantof decay, the training load being higher in the slow decay taper.

Linear Taper: Implies a higher training load than exponential taper.

Exponential Taper (Slow Decay): The training load is higher than the fast decay taper, as well as a slower decrease in volume.

Exponential Taper (Fast Decay): Faster decrease in volume. Lower training load decreases faster in fast decay.

Step Taper: Non-progressive standardized reduction of the training load. (Mujika, 1998)

This already illustrated the importance of apical period of calm before the marathon, and not familiar with most of the coaches of their importance and how to apply scientific method with their athletes. In addition to the importance of iron in the body where it can be able to experience the physical intensity of pregnancy during the competition, which helps to regulate the training, so that commensurate with the abilities of the players for their access to high -level sports.

Iron is the most studied minerals in athletes. Approximately, 25% of female and 10% of male athletes have iron deficiency (Resina, et al. 1991). A higher prevalence than in the general population, where it is around 8% among females, although in both athletes and non-athletes there is a rising tendency in suffering from iron deficiency. The prevalence of iron deficiency anemia among athletes has been estimated to be similar to the sedentary population, that is, around 3%. The aim of this study was

Materials and Methods

Experimental Approach to the Problem

Two experimental groups (experimental-1 and experimental-2) performed a pre and post training designed intervention in which iron level and1500m running time were recorded. The experimental-1 group (11youth runner) trained 2 hours per day 5 times a week on linear taper for two weeks. The experimental-2 group (11 youth runner) trained 2 hours per day 5 times a week on Exponential taper for two weeks. All the experimental groups completed a linear or Exponential taper for two weeks to see whether this type of training modality would have a positive or negative or no effect on iron level and1500m running time.

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Samples

The sample consisted of (22) runner of 1500m running (15 ± 1.36 years old; 160 ± 5.2 cm height; and 51 ± 6.14 kg weight), members of the army team club. The training experience of all the participants ranged from 5 to 8 years. Subjects were required to read and complete a health questionnaire and informed consent document; there was no history of coronary heart disease, diabetes or recent surgery.

Training Protocol

The 2-weeks in-season training program consisted of.

Intensity

Maintain training intensity during taper to avoid de-training. It is through the reductions in the other variables (volume, frequency and duration) that recovery should be achieved.

Frequency

Reducing the training frequency to no less than 80 per cent of pre-taper values, to avoid de-training and 'loss of feel', especially in technique-dependent sports.

Volume

Reductions of 50–70 per cent in total training volume have been reported.

Statistical analysis

All statistical analyses were calculated by the SPSS statistical package. The results are reported as means and standard deviations (SD). Differences between two groups were reported as mean difference ±95% confidence intervals (meandiff ± 95% CI).Student's t-test for independent samples was used to determine the differences in fitness parameters between the two groups. The $p<0.05$ was considered as statistically significant.

Results.

Table 1. Mean ±SD and change % in Iron level and 1500m time for linear taper groupand Exponentialtaper group

Variables	linear taper group			T test	Exponential taper group			T test	T test between groups
	Pre	**Post**	**Change %**		**Pre**	**Post**	**Change %**		
Iron level	85.21 ±5.39	89.58 ±5.47	5.13	No sign	84.23 ±5.16	85.92 ±6.54	2.00	No sign	No sign
1500m time	4.33± 0.09	4.29± 0.11	0.92	No sign	4.34 ± 0.11	4.31± 0.12	0.69	No sign	No sign

Table 1. Shows the mean scores and percentage changes on Iron leveland 1500m time for the two experimental groups. The T-test showed no significant changes between pre-and post-training scores for all variables ($P\leq 0.05$). However no significant differences were shown between the post-training scores in all variables for the two groups ($P\geq 0.05$).

Discussion

The researchers have suggested various mechanisms for the important role of maintaining (or increasing) intensity during a taper. Those factors that are associated with a high-intensity low-volume taper include: total blood volume, red blood cell volume, citrate synthase activity (a marker for oxidative capacity), muscle glycogen concentrations and testosterone levels (Mujika, et al. 2002; Martin, Coe, 1997).

In this respect, it is interesting to note that testosterone has a good correlation with explosive lower body performances, such as the vertical jump (Mc-Ardle, et al.1996; Spodaryk, 1993; Sue, et al.1999).

The primary objective of tapering is to decrease the training stress to allow for the body to recover and eliminate fatigue. When the training impulse is decreased, fatigue decreases more rapidly than fitness, and increased performance results from the increasing difference between the two factors. Thus, in a well-designed taper, the body becomes rested (with all the associated benefits) and the athlete's fitness level is well maintained. In fact, improvements in performance during taper are significantly correlated with decreases in the negative influences of training (fatigue), but are not correlated with the positive influences of training (fitness) (Mukika et al. 1996). The effects of tapering on the various physiological systems in the body are reviewed below.

According to Nickerson et al (1990) iron deficiency in athletes is considered when the levels of ferritin are less or same to 12 ng/ml and transferrin saturation is less or same to 16% with a normal hemoglobin. Iron deficiency anemia goes joint with hemoglobin values <13 g/dl in males (Nickerson, et al.1990). These data are important to be checked before starting the sport term, because deficiency can be developed in these athletes who are in the limit values (Nickerson, et al.1990; Resina, et al. 1991). Athletes have several risk factors for anemia and iron depletion due to poor nutritional intake of iron, hemolysis caused by repeated foot strikes, blood and iron loss through menstruation, gastrointestinal and urinary tracts and iron through sweating (Dubnov, Constantini, 2004). To be more concert, intermittent sports based in aerobic-anaerobic exercise, like football or field hockey, are seemed to have more iron lost (Resina, et al. 1991). Exercise, above all jogging, causes a significant iron expense. Running has an essential role in football training (Ekblom, 1986). Hence, a mechanism of anemia usually related to running can also be expected

in ball players (Dubnov, Constantini 2004). Serum ferritin decreases because of protein-energy malnutrition, liver diseases, nephritic syndrome, neoplastic, while his hepaticas synthesis increases thanks to iron deficiency. On the other hand, serum ferritin concentration is reduced in case of an iron deficiency (Dubnov, Constantini, 2004). Unless after three days of intense exercise, athletes can have a false ferritin increased levels (Resina, et al. 1991).

Studies have looked at the effects of taper on blood parameters such as hemoglobin (oxygen carrying capacity of the red blood cells), hematocrit (the percentage of red blood cells in the blood) and red blood cell volume (the size of the red blood cells). Mujika (1997) found increases in all three parameters during taper that would suggest an improvement in aerobic capacity that would help endurance athletes. Researchers have also found increases in reticulocyte counts (new red blood cells), suggesting an increased erythropoiesis (red blood cell production) during taper. The increase in blood parameters may also help improve the buffering capacity of the blood through increased hemoglobin levels, which can increase the ability of the body to tolerate lactic acid produced in high intensity exercise.

Conclusion

Although The T-test showed no significant changes between pre-and post-training scores for all variables ($P \leq 0.05$).And however no significant differences were shown between the post-training scores in all variables for the two groups ($P \geq 0.05$). The improvement in linear taper is highest theimprovement in exponential taper.

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