

Science, Movement and Health, Vol. XX, ISSUE 1, 2020
January 2020, 20 (1): 40 - 45
Original article

EFFECT OF CONCURRENT TRAINING ON FREE RADICALS AND CERTAIN PHYSICAL & SKILLFUL VARIABLES FOR YOUTH SOCCER

MOHAMED SAAD¹, MOHAMED ABDELMOHDY², POPA CRISTIAN³

Abstract

Objective. The alternation of strength and endurance training has aroused a growing interest in the scientific community for a few years. The reason is twofold: on the one hand, there is evidence that a properly planned concurrent training helps increase athletic performance in certain specialties. And on the other hand, until recently, the recommendations on physical activity and health focused mainly on the suitability of practicing physical activity preferably of low intensity and long duration, known as endurance training, cardiovascular and, in a conceptual error, aerobic training. The aim of this investigation was to explore the effect of concurrent training on free radicals and certain physical & skillful variables for youth soccer.

Methods. Twenty youth Soccer players from Mansoura club. (experimental group 10 players and control group 10 players). The experimental group were receiving eight-weeks intervention of concurrent training program. The control group were receiving eight-weeks intervention of traditional training. All data collected before and after the program for the experimental and control groups. The researcher conducted the average in High, weight and age.

Results. The results showed significant differences were observed between post-tests for experimental group and control group in all Parameters of Leg & Back Strength, Leg & Arm power, kick distance, shooting, and malondialdehyde in urine [MDA].

Conclusion. In conclusion, our data suggest that (8) weeks of training with the concurrent training could improvement of the Leg & Back Strength, Leg & Arm power, kick distance, shooting, and decreased level of malondialdehyde in urine.

Keywords: Concurrent Training, Malondialdehyde, Power, Soccer .

Introduction

Soccer sport develops a remarkable development in all parts of the world day after day, due to the fact that workers in its field take the scientific method as a path for them in its various fields, whether in the field of training, management, medical or physical therapy or any other field that helps to improve the level of players and the team.

Therefore, Soccer is the most popular sport on the local and international levels, which is performed by men and women, children and adults with different levels of experience and has embraced all scientific efforts and practical experiences towards the development of the technical level of this game, and the performance of skills is characterized by strength and speed together and is accomplished in the form of collective action. A high degree of understanding and mastery, and this requires the players high physical capabilities that enable them to face fatigue and continue to exert effort and give on the field, and in light of this the player is prepared from a young age in terms of quantity and quality, which qualifies him to be a player with physical and skill competence, etc. Fold enables it to accomplish

individual and collective duties, good conduct and the speed of decision-making during the divergent positions throughout the time of the game.

(A. Hassan, 2004) indicates that the special physical abilities in Soccer constitute an important and essential factor to raise the level of skill performance, as the physical abilities aim to identify certain physical elements that play a prominent role in the player's mastery of basic skills, and Soccer as one of the collective sports activities is It is technical sports that contain a large number of motor skills that need a large amount of physical capabilities and abilities for each is carried out in a good style and sound technical performance.

(A. Al-Bosati, 2001) states that the physical data of the kinetic activity of the Soccer player during the match indicate a continuous dynamic of the fitness elements in general represented by aerobic and anaerobic endurance and both speed and strength of various kinds as well as flexibility and agility, and the higher the level of these elements the higher the player's ability To exert effort and give throughout 90 minutes without a

¹Faculty of Physical Education, Benha University, EGYPT

² Faculty of physical education, Al-Arish University, EGYPT

³Faculty of Physical Education and Sport, Ovidius University of Constanta, Romania
Email: amr297@aswu.edu.eg

Received 8.10.2019 / Accepted 6.11. 2019

drop in the technical level (skill - plan.)

(A. Hassan, 2004) notes that the skill performance plays a large role in modern football in achieving positive results for the team and directly affects the process of mastery and success of the way the team plays, which leads to confusion of the opponent and his inability to control the course of play and performance. And that the skill setting in football aims to teach the basic skills that the player uses during matches and competitions and try to master and install them so that the highest levels can be achieved.

(H. Amr, & AL. Naglaa, 2019) indicate that the continuous and increasing emphasis towards reaching the sporting achievement, led the scientists to search for training methods that have positive effects on performance, and simultaneous training is one of these methods that drew attention in recent times.

They add that the first to address concurrent training is Robert Hickson (1980), announcing the start of an innovative training theory called the Interference theory, by which the benefits of both resistance training and endurance training can be maximized at the same time.

(H. Laura, 2011) believes that some athletes think that adding endurance training to strength training may bring them double gains from strength training and endurance training at the same time as training.

The combination of aerobic and strength exercise within the same program is what is known as concurrent training. This is the paradigm followed by the American College of Sports Medicine (ACSM) in its recommendations for healthy exercise. But what happens at the sports level?

The principle of specific adaptation stipulates that "adaptations are dependent on the task performed" and, therefore, combining tasks may not be the best strategy if maximum performance is to be achieved.

The alternation of strength and endurance training has aroused a growing interest in the scientific community for a few years. The reason is twofold: on the one hand, there is evidence that a properly planned concurrent training helps increase athletic performance in certain specialties. And on the other hand, until recently, the recommendations on physical activity and health focused mainly on the suitability of practicing physical activity preferably of low intensity and long duration, known as endurance training, cardiovascular and, in a conceptual error, aerobic training. However, it has been a while since different agencies and experts advise combining endurance training with strength training as the best means of maintaining good health and functional status. Strength and

endurance training are both fundamental pillars of physical activity recommendations for adults by international organizations such as WHO.

On the other hand, in most sports specialties it is necessary to train both endurance and strength in different manifestations, to improve performance. Even in endurance and endurance sports, the latest evidence suggests that proper strength training improves different aspects of endurance performance, such as running economy or speed in the last part of the test, breaking down old arguments that said that strength training decreased endurance adaptations, and vice versa. Today we know that this is so, if the approach strategy is wrong, but that if the training of these two capacities (concurrent training) is properly designed, your functional level and performance will be positively affected.

Concurrent training offers many advantages over unidirectional training, if it is posed correctly. (GJ. Bell, et al. 2000)

Although according to Wilson et al., This does not happen if resistance training is high intensity interval, being able to maintain strength and hypertrophy gains, accompanied by a development of resistance and an improvement in body composition.

Concurrent bicycle training maintains better adaptations of strength, power and hypertrophy than concurrent race training.

Concurrent running training achieves greater improvements in fat weight loss and increases in VO₂Max than concurrent bicycle training. (CT. Putman, et al. 2004)

So, it seems clear that we must develop specific methodological systematics to best combine the training of these two capacities. (KA. Murach, & JR. Bagley 2016)

In the last 30 years, a greater interest has been developing every day for the problems related to oxidative stress, free radicals, reactive oxygen species and antioxidants, all given by the importance they have in biochemistry, biology and medicine.¹ Medical sciences are taking a significant step forward in the knowledge of very varied diseases, in their pathophysiology, their treatment and more importantly, in their prevention. (KH. Cheesman & TF. Slater 1998)

In the usual way, oxygen is in its most stable form (O₂), with the electrons that form the bond (p), anti-binding with the same spin, that is, in what is known as triplet state, so oxygen is poorly reactive with a low physiological temperature reaction rate; however, by purely chemical reactions, by enzymatic actions or by the effect of ionizing radiation, a series of chemical species or prooxidant substances (highly reactive molecules or free radicals) that are capable of giving rise to

multiple reactions with other compounds present can be produced In the body, they eventually produce cellular damage. From the above, it is understood that, although oxygen is essential for the metabolism and functions of the organism, the many toxic effects it possesses should not be forgotten. (I. Fridowich, 1987; B. Halliwell 2000).

Oxidative stress or damage has been defined as the exposure of living matter to various sources that produce a break in the balance that must exist between prooxidant substances or factors and the antioxidant mechanisms responsible for eliminating these chemical species, whether due to a deficit of these defenses or by an exaggerated increase in the production of reactive oxygen species. All this results in alterations of the structure-function relationship in any specialized organ, system or cell group; therefore it is recognized as a general mechanism of cellular damage, associated with the primary pathophysiology or the evolution of an increasing number of entities and syndromes of medical-social interest, involved in the genesis and consequences of such events.(BN. Ames, et al. 1993).

The aim of this investigation was to explore the effect of concurrent training on free radicals and

Procedures

Leg & Arm powertests.

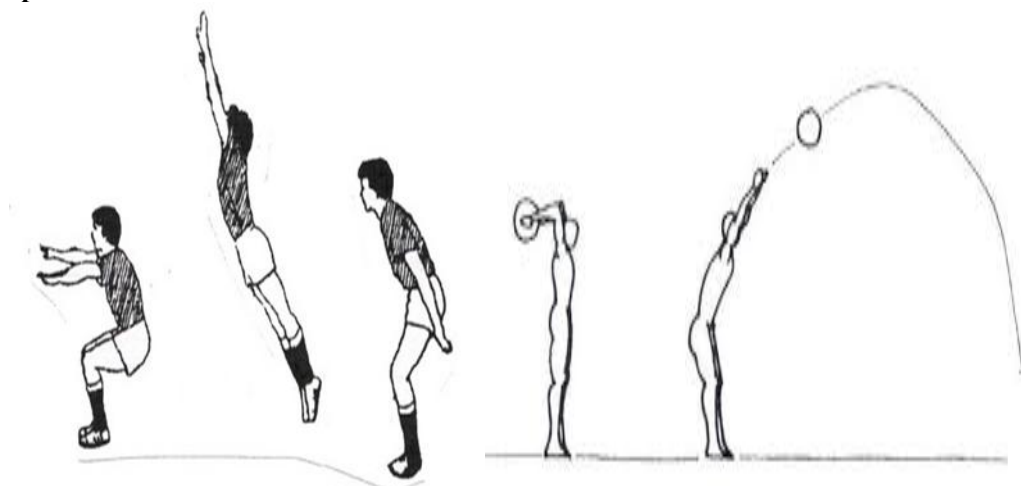


Fig (1) show Standing Broad Jump Test Fig (2) show medicine ball throw test

Leg & Back Strengthtests.

certain physical & skillful variables for youth soccer.

Experimental Approach to the Problem

Two groups (experimental and control) performed a pre and post training designed intervention in Leg & Back Strength, Leg & Arm power, kick distance, shooting, and malondialdehyde in urine [MDA]. The experimental group trained 90-120minutes per day 3 times a week on concurrent training for eight weeks. The control group trained on the traditional training. The experimental and control groups completed the training program to see whether this type of training modality would have a positive or negative or no effect on the variables.

Methods

Twenty youth Soccer players from Mansoura club. (experimental group 10 players and control group 10 players). The experimental group were receiving eight-weeks intervention of concurrent training program. The control group were receiving eight-weeks intervention of traditional training.

All data collected before and after the program for the experimental and control groups. The researcher conducted the average in High, weight and age.



Fig (3) show Leg StrengthTest



Fig (4) show Back Strengthtest

Statistical Analysis
 All statistical analyses were calculated by the SPSS statistical package. The results are reported as means and standard deviations (SD).

Student's t-test for Paired and independent samples was used. The level of significance was set at $p \leq 0.05$.

Results.

Table 1. Anthropometric characteristics of the subjects

Variables	Experimental group		Control group	
	Mean ± SD	Skewness	Mean ± SD	Skewness
Age (years)	18.86 ± 0.35	1.14	18.75±0.38	1.83
Height(cm)	173.7 ± 5.24	1.02	171.9± 5.59	0.65
Weight(kg)	72.67 ± 7.51	0.87	75.5 ± 6.09	0.86

Table 1 shows no significant differences were observed in the all characteristics of the subjects.

Fig (5) show Leg & Back Strength, Leg & Arm power, kick distance, shooting, and malondialdehyde in urine [MDA] between the posttests for the experimental group and control group

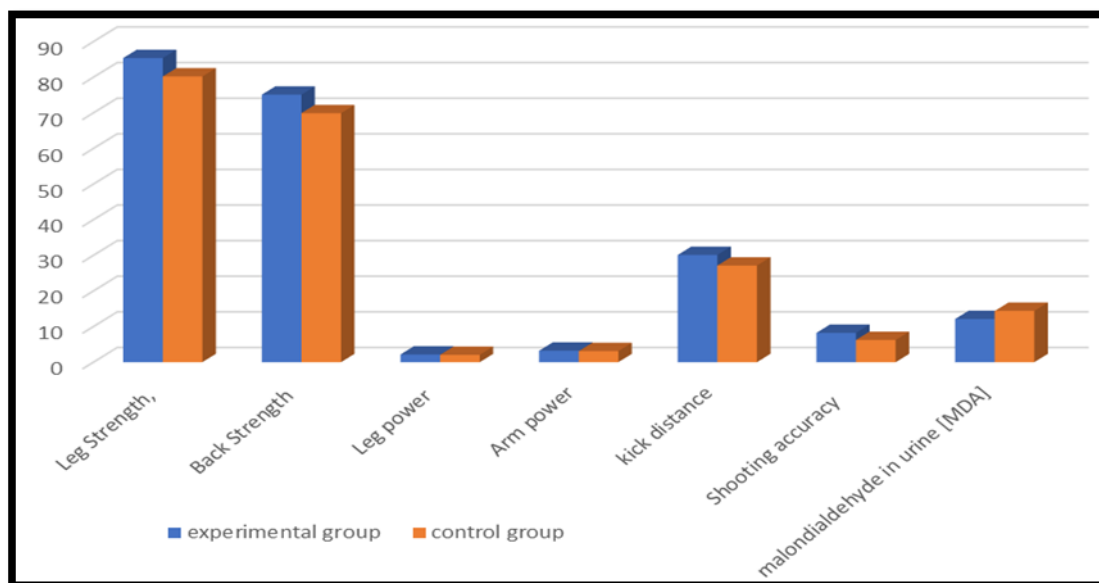


Fig (5) shows significant differences were observed between post-tests for experimental group and control group in all Parameters of Leg & Back Strength, Leg & Arm power, kick distance, shooting, and malondialdehyde in urine [MDA].

Discussion

The purpose of this article was to determine the effect of the concurrent training on free radicals and certain physical & skillful variables for youth soccer. After (8) weeks of training with the concurrent training, the Leg & Back Strength, Leg & Arm power, kick distance, shooting, increased for the posttests for experimental group relative to the pretests. And decreased level of malondialdehyde in urine.

The researcher attributes the occurrence of these changes to the good planning of the concurrent training and codification of training loads in a scientific manner appropriate

Some more recent studies have shown a reduced response in muscle growth with concurrent training, although it has only been seen in slow thigh fibers [3, 4]. However, as always to be critical and specify details, we must ask ourselves some things. It is quite true that these studies use quite high training volumes.

Strength training accelerates anabolism and muscle proteins gradually accumulate with the repetition of this (R.Ogasawara, et al. 1985) The mTOR mediates the adaptations produced with strength training. It activates cell growth by regulating several anabolic processes. (MN.Hall, 2008)

Some research with humans also suggests inhibition of muscle growth with concurrent training (L. Babcock, et al. 2012; VG. Coffey, et al.2009). There are studies that have shown that moderate intensity exercise performed after strength work does not inhibit mTORC1 in moderately trained subjects (W. Apro, et al.2013). Another recent research (JK. Pugh, et al. 2015) showed that there were no differences in the acute response between concurrent and strength training, and that mTOR activation was even amplified with concurrent training.

The result is an increase in the formation of many primary products (conjugated dienes and hydroperoxides) and secondary products (malondialdehyde [MDA], F2-isoprostanes, expired pentanes, ethane or exons). Although all of them have been used as markers of the peroxidation rate, the determination of secondary products as the sole measure of lipid oxidation has potential disadvantages. The measurement of conjugated dienes, hydroperoxides and MDA are probably the most used methods in the study of lipid peroxidation, but each of them has different specificity and reflects molecular phenomena that occurred in different phases of the peroxidation

process. (I. Medved, et al. 2004; KV. Kumar & MUR. Naidu.2002)

In conclusion, our data suggest that (8) weeks of training with the concurrent training could improvement of the Leg & Back Strength, Leg & Arm power, kick distance, shooting, and decreased level of malondialdehyde in urine.

References

- Al-Bosati, A. Soccer skills, Arabic book. 2001.
- Ames BN, Shigenaga MK, Hagen TM. Oxidants, antioxidants, and the degenerative disease of aging. *Proc Natl Acad Sci USA* 1993; 90:7915-22.
- Amr, H. & Naglaa, AL. concurrent training, Arabic book. 2019
- Apro W, Wang L, Ponten M, Blomstrand E, Sahlin K. Resistance exercise induced mTORC1 signaling is not impaired by subsequent endurance exercise in human skeletal muscle. *American journal of physiology Endocrinology and metabolism*. 2013 Jul 1;305(1): E22-32. PubMed PMID: 23632629. Epub 2013/05/02. eng.
- Babcock L, Escano M, D'Lugos A, Todd K, Murach K, Luden N. Concurrent aerobic exercise interferes with the satellite cell response to acute resistance exercise. *American journal of physiology Regulatory, integrative and comparative physiology*. 2012 Jun 15;302(12).
- Bell GJ, Syrotuik D, Martin TP, Burnham R, Quinney HA. Effect of concurrent strength and endurance training on skeletal muscle properties and hormone concentrations in humans. *European journal of applied physiology*. 2000 Mar;81(5):418-27.
- Cheesman KH, Slater TF. Free Radicals in Medicine. *Br Med Bull* 1998; 49:118-21.
- Coffey VG, Jemiolo B, Edge J, Garnham AP, Trappe SW, Hawley JA. Effect of consecutive repeated sprint and resistance exercise bouts on acute adaptive responses in human skeletal muscle. *American journal of physiology Regulatory, integrative and comparative physiology*. 2009 Nov;297(5): R1441-51.
- Fridowich I. The Biology of oxygen radicals. *Science* 1978; 201:875-88.
- Hall MN. mTOR-what does it do? *Transplantation proceedings*. 2008 Dec;40(10 Suppl): S5-8.
- Halliwell B. The antioxidant paradox. *The Lancet* 2000; 355:1179-84.
- Hassan, A. soccer training, Arabic book. 2004.



- Hickson RC. Interference of strength development by simultaneously training for strength and endurance. *European journal of applied physiology and occupational physiology*. 1980;45(2-3):255-63.
- Kumar KV, Naidu MUR. Effect of oral melatonin on exercise-induced oxidant stress in healthy subjects. *Indian J Pharmacol*, 34 (2002), pp. 256-9.
- Laura Hokka. serum hormone concentrations and physical performance during concurrent strength and endurance training in recreational male and female endurance runners, Master's thesis, *Science of Sport Coaching and Fitness Testing*, University of Jyväskylä, 2011.
- Medicine ACoS. ACSM's health-related physical fitness assessment manual: Lippincott Williams & Wilkins; 2013.
- Medved I, Brown MJ, Bjorksten AR, McKenna MJ. Effects of intravenous N-acetylcysteine infusion on time to fatigue and potassium regulation during prolonged cycling exercise. *J Appl Physiol*, 96 (2004), pp. 211-7.
- Murach KA, Bagley JR. Skeletal Muscle Hypertrophy with Concurrent Exercise Training: Contrary Evidence for an Interference Effect. *Sports Medicine*. 2016:1-11.
- Ogasawara R, Kobayashi K, Tsutaki A, Lee K, Abe T, Fujita S, et al. mTOR signaling response to resistance exercise is altered by chronic resistance training and detraining in skeletal muscle. *Journal of applied physiology (Bethesda, Md: 1985)*. 2013 Apr;114(7):934-40.
- Pugh JK, Faulkner SH, Jackson AP, King JA, Nimmo MA. Acute molecular responses to concurrent resistance and high-intensity interval exercise in untrained skeletal muscle. *Physiological Reports*. 2015 Apr;3(4).
- Putman CT, Xu X, Gillies E, MacLean IM, Bell GJ. Effects of strength, endurance and combined training on myosin heavy chain content and fibre-type distribution in humans. *European journal of applied physiology*. 2004 Aug;92(4-5):376-84.