

Agility and Balance Development Using Functional Training for Basketball Youth Athlete

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ABSTRACT

The authors note that functional training with 21 mins AMRAP can development of agility and balance for basketball youth athletes. This study involved 24 volunteers, aged 13-15 years, where two experimental groups were taken randomly, the treatment group [AMRAP (n=12)], [control (n=12)]. The AMRAP group was given functional training treatment 3 times a week for 6 weeks. The result of agility and balance was tested in 2 tests (balance beam test and side step test). The authors conduct an analysis of scientific and methodological literature with quantitative research method. Taking into account the results of a study of the initial indicators of agility and balance in basketball youth athletes, a methodology for the development of agility and balance with the help of interval functional training using TRX, BOSU and ViPR. Independent T-Test and ANOVA one way were performed to compare the balance and agility between groups. The results showed that trained groups with 21 mins AMRAP using functional training had higher level of balance that significant improvement ($p < 0.05$) and showed a significant improvement ($p < 0.05$) in agility. Findings highlight the importance of functional training to alleviate agility and balance.

Keywords: Basketball athlete, functional training, balance, agility

1. INTRODUCTION

Functional Training is a developing model of interval /intermittent training because it has the benefit of increasing the biomotor components of strength, endurance, flexibility, balance, power, speed, agility so that activities always involve more than 3 muscle groups and involve the core muscle. Good physical condition is the key to success in various sports. Improving athlete performance is needed every year, so coaches are required to design training programs according to the needs / specifics of the sport and according to the needs of each individual athlete (measured/ game) [i]. Do physical activity (sports) by utilizing media that can be done at one time so that it can help increase other biomotoric components such as strength, endurance, power, speed, agility [ii]. Physical condition components such as endurance, strength, power, speed, agility, balance,

coordination, flexibility are needed in sports with multidirectional movements such as basketball, rugby, softball, football, basketball, badminton, tennis [iii]. In several sports with linear movements such as athletics, swimming, jumping scenic, fin swimming requires strength, endurance, power and speed training components [iv] the components of physical conditions are very influential in supporting performance [24]. Through a functional training program, coaches can create physical conditioning training programs for athletes starting from general preparation, competition preparation and competition [v]. Combining the multidimensional nature of the balance skill with functional training can recommendations and the need for motor skill development. Using progressive overload methods, the exercises can be intensified through normal methodology or a change in stability or complexity. Such techniques have been shown to be an effective means of improving performance in a variety of sports. Functional training has

the advantage of activating several muscle groups, especially the core or core muscles (so that the risk from athletes to prevent injury will be optimal, why is that? [vi]functional training has a significant difference but the results are almost the same as the treatment of traditional weight training models, the difference lies in the tools, muscle focus, training models, training objectives and the many benefits obtained in one time training, for example: [vii]Football is a team sport that competes with high intensity, it can also be seen that football Basketball and judo are among the sports that have a high risk of injury compared to other sports, because they include sports with high intensity and body contact. So, over time, training models have started to have many innovations and variations, one of which is functional training, athletes / people trying to play [12]. But another research [25] reported research concludes that the balance function relationship is improved through standard traditional resistance training, then it seems that critical dimensions of what is clearly an important motor skill have not been considered.

So the focus on the above problems, will be conducted research on the functional training program with the title of agility and balance development using functional training for basketball youth athlete [20,21,26]. Therefore, because (a) in competitive sports athletes like basketball, football, volley et al are not able to perform the conditioning program for more than a month or so and (b) we intended to observe eventual training-induced changes within a “realistic” time period, we believe that a training period of six weeks is suitable for the purpose of our study [20].

2. METHOD

2.1 Design and Sample

This was a quantitative study with experiment using two group pre test and post test with control group design. This study was conducted from June- July 2020. The participants were gathered from basketball club and community in Surabaya, East Java, Indonesia. A total sample of 24 males from 78 youth athletes populations aged 13-15 years old participated in this study. Where two experimental groups were taken randomly, the treatment group [AMRAP (n=12)], [control (n=12)]. The AMRAP group was given 21 mins functional training (TRX, BOSU and ViPR) treatment in 3 times a week for 6 weeks. The results of agility and balance was tested in 2 tests; balance beam test to balance result and side step test to agility.

2.2 Data Collection

AMRAP group participants carry out a functional training program with training zone coach (Parama Kustrapsila). He is guide the participants to training that has been compiled with a duration of 21 minutes exclude warming up and cooling down. They do 15 minutes of warming up, 21 minutes of circuit training using the

AMRAP (as many rounds as possible) interval training method where the rules are that participants must complete the number of repetitions of each training medium in 3 posts with the following training program: BOSU V-sit ups, VIPR side balance, TRX Single leg balance, with a constant repetition range (constant load) 12 reps per post and performed in a fast and precise way, then end with 15 minutes cooling down. Control group participants carry out an exercise program that has been compiled with a duration of 60 minutes with no rules of each training following training plan in 6 weeks without BOSU V-sit ups, VIPR side balance, TRX Single leg balance.

2.3 Data Analysis

Data were analyzed using statistical software. Independent T-Test was performed to compare between two groups, while ANOVA one way was performed to compare between multiple groups. Chi Square test was applied to describe the demographic characteristic of the respondents. Data measurement were presented in mean and standard deviation ($\bar{x} \pm SD$). The significance level was set at $\alpha < 0,05$ and all tests were two tailed

3. RESULT AND DISCUSSION

The functional training program with the AMRAP model showed significant improvements ($p < 0.05$) in balance. The functional training program with the AMRAP model showed a significant ($p < 0.05$) improvement in agility. There was a significant difference ($p < 0.05$) between the agility and balance. Collectively, these results suggest that the 21 minutes AMRAP using functional training programs are equally beneficial for improving balance and agility.

Table 1. Pre Test Results

Group	Var	Mean	Median	Min	Max	Std. Dev	N	Depression Score	p-value
AMRAP	Balance	36,25	39,0	12	68				
	Agility	27,58	29,5	19	37				
Control	Balance	35,33	32,0	12	70				
	Agility	25,67	27,5	15	34				

Table 2. Score of normality pre test

Group	Var	Shapiro-Wilk			Ket
		Statistic	df	Sig.	
AMRAP	<i>Balance</i>	0,973	12	0,917	Normal
	<i>Agility</i>	0,967	12	0,847	Normal

Control	<i>Balance</i>	0,931	12	0,911	Normal
	<i>Agility</i>	0,937	12	0,831	Normal

Based on the table above, it is known that the pre-test results in all groups have obtained a significance value greater than 0.05. From these results it can be concluded that the overall data from the pre test results in all groups are normally distributed. Furthermore, after it is known that the pre test data is normally distributed, then the post test data will be analysed.

Table 3. Post Test Description and Result

Group	Variable	Mean	Median	Min	Max
AMRAP	<i>Balance</i>	54,41	34,51	33	92
	<i>Agility</i>	101,41	57,5	61	151
control	<i>Balance</i>	36,08	32	13	73
	<i>Agility</i>	63,17	59	39	99

*significant at 0,05

Exercise in physical activity is generally separated into two aspects of metabolism, namely aerobic and anaerobic. These exercises, of course, aim to improve aspects of physical condition, prevent and slow down the fatigue that is achieved during the match. Time constraints and the tight schedule of matches undertaken by an athlete make coaches have to make practical and applicable, safe, effective and efficient exercises. Furthermore, the coaches must make the training effective. Usually, exercises that use predominantly anaerobic energy such as weighting exercises and exercises that use predominantly aerobic energy are done separately [18]. Usually, weight training is done two or three times a week, with an intensity of 40% to 80% of the maximum load. In addition, exercise with the aim of increasing aerobic energy is recommended with an intensity of 150 minutes per week with a moderate intensity of 40% to 60% [16]. Functional training results demonstrated that improved postural control, strength and precise coordination in 5 weeks while traditional resistance training increased the energetic potential of trained musculature, which resulted in an overall increase in power qualities [11]. Functional training to regular strength training and presented evidence to support the potential benefits of functional training. Functional Training exercises was self-administered by the participants, but they were asked to perform eight to twelve repetitions (10-15) repetitions for trunk stabilization exercises) using the correct technique, which was controlled by the authors [17]. Several factors have been established as major determinants of strength performance, including the agility developed by joints in action, and the neural coordination of the movement [13,15,20,24].

Although this training protocol is scientifically proven to improve performance in athletes. But the reality that happens is that there is no full time to do one exercise with another due to the increasingly dense climate of competition in this era of modern sports. In designing a functional training exercise program, there are several contraindications that should be avoided in its implementation, such as people who are overweight, obese, do not exercise long, a history of previous injuries and people who have a history of diseases such as high blood pressure, heart disease [21]. This is because functional training exercises cause isometric contractions in the body [viii]. Basically, every human body has been equipped with the basic ability of sensors to maintain balance so that everyone is able to maintain their body balance simply in daily movements because there are three nervous systems that maintain human balance, namely sensory, central nerve and motor nerve [22] such as walking, running, pushing, jumping and others. This movement can help develop one's balance [15]. In the treatment, the exercise model movement using functional training media is expected to improve balance, abdominal muscle strength and core muscle endurance, including BOSU V-sit ups, VIPR side balance, TRX Single leg balance. These movements are variations of contact point movements and movements carried out in circuit training for 6 weeks.

The results showed good results and had a significant effect on improving balance. Functional training also has the effect of increasing the strength of the abdominal muscles, the involvement of muscles in movement is very important because the main thing is to help other organs in supporting one's body, especially the abdominal muscles, which are one of the parts that are always involved in the movement of a person's torso. Whatever the movement, it certainly requires abdominal muscle strength. For example, when making a leap into the air, of course, the abdominal muscles also work so that the body posture does not change to bend or bounce when doing this movement [10,12]. Correct posture when making movements is needed to avoid falls and wrong landings so as to prevent injury. Some parts of the abdominal muscles that will also be involved in the training process include: (1) transverses abdominus - the deepest muscle layer, (2) rectus abdominus - between the ribs and pubic bone at the front of the pelvis, (3) external oblique muscle - this muscle allows the oblique to rotate, (4) internal oblique-located within the pelvic bone, also this has an impact on increased core stabilization is one of the exercises aimed at fostering central body balance, flexibility and strength, especially the abdominal and back muscles [25,27]. This movement refers to the body's ability to maintain a body centre position and movement. Even core stabilization can also increase the endurance function of the extensor tract capacity, especially in the back pain of the lower joints or waist [3,19,21]. Core exercises can be done with various purposes including activating the muscles and correcting exercise function [ix]. Core movements can also increase various differences in stability and can develop balance, agility, power and muscle endurance.

4. CONCLUSION

The functional training research on high-intensity circuit training programs with AMRAP has conclusions; There is an increase in balance and agility. The ratio effectiveness for each variable is also different. The AMRAP model is effectively used to improve balance and agility. Giving a model in training shows the need or purpose of the training program. When doing functional training to increase balance and agility, the model used is AMRAP. The choice of model here takes into account the purpose of the basketball youth athlete training program.

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