

Effects of ten weeks selected training on some physical fitness components of Mati-Arba Minch U-17 male football project players

Abraham Derbachew, Sisay Mengistu (phd) Esayas Hailu*

Lecture at Department of Sport Science, Arba Minch University Arba Minch, Ethiopia.

Lecture at Department of Sport Science, Hawassa University, Hawassa, Ethiopia

Lecture at Department of Sport Science, Hawassa University, Hawassa, Ethiopia

Corresponding Author: Abraham Derbachew

Abstract: The aim of the recent study was to investigate “effect of 10 weeks selected training on physical fitness components of Mati-Arba Minch U-17 male football project players”. In order to achieve the intended objective Experimental design is implemented. For this study thirty Mati-Arba Minch U-17 male football project players, who had been fulfilled the health history questionnaire are included as the study sample, and grouped to Experimental Group (EG) and Control Group (CG), in the first group EG (N=15), mean age 16.2 ± 0.45 years old players are assigned randomly to the treatment condition and followed ten week intervention program for three days per week, 60 minutes per session. They were engaged in plyometric, Circuit, Interval training, static, dynamic and ballistic stretching exercise. While the other section CG (N=15) players of corresponding age, mean 16.5 ± 0.33 years also assigned to serve as control group and continue their regular training. The selected physical fitness variables are speed, agility, and flexibility, to see the actual changes, 35 yard run test, T-test, sit and reach test used as measuring tool. Paired sample t-test is used to analyze the data, in line to this level of significance was set at $p \leq 0.05$. Results showed EG have significantly improved speed performance, pre 5.07 ± 0.24 s to post 4.98 ± 0.27 s ($p=0.01$), and a significant improvement in agility, pre 9.97 ± 0.29 s to post 9.91 ± 0.31 s ($p=0.02$). Moreover, they also showed an improvement in flexibility, pre 16.6 ± 5.20 to post 19.7 ± 4.96 cm ($p=0.00$), major finding in the study is the significant improvement on speed, agility and flexibility in the intervention group. This is due to the effect of selected training program they were engaged in, and the investigator noticed that the suggested training program has positive effect on developing and promoting the speed, agility and flexibility of football players.

Key words: Agility, Flexibility, Physical Fitness, Speed.

Date of Submission: 21-10-2018

Date of acceptance: 05-11-2018

I. INTRODUCTION

Background of the Study

Football is a widely popular sport, (5), with nearly 300 million people playing worldwide. (11) Football is about eleven players on the pitch at one time but these eleven individuals have different needs with regards to fitness. For example external midfield player could take forty high-speed sprints in one game while a holding midfield player might only manage twelve high-speed sprints in a game. The coach and the sports scientists can design training which tolerates the demand of game. One size does not fit all so it to find the right loads with regards to intensity, frequency and volume. To succeed in elite football, players require a high level of physical fitness to cope with the demands of the game (15).

Soccer requires players to perform numerous actions that require speed, agility, flexibility and endurance, complete numerous jumps during a 90- minute match (10). In fact, earlier studies identified that higher levels of Speed (15), Agility (13), and Flexibility (9), are crucial in success football match performance

Speed

During a soccer match, players cover about 10 km in total, which includes a sprint every 90 seconds (11% of overall activity) with each action lasting on average of 2 to 4 seconds and covering a distance of 15 m (17). In line to this fact during the first 15 minutes of game players can cover 700 meters of high speed running, However this statistics not true for all players, some players may engage only two hundred meters. External midfield players can take as many as 47 sprints in a game with distances ranging from 20 to 45 meters with speeds up to 30 km/h, whereas holding midfield players have shown that they can make 11 sprints in a game which only last up to 16 meters but speed never reached 30 km/h, on the other hand, Sprints have

different classifications; Fast sprints come under the title of explosive movements which last up to zero points in five seconds, for instance leading sprints are gradual and go from slow to fast. Players in different positions use different sprints (2).

Agility

Among the different physical qualities needed are the ability to perform straight-line sprint and positive and negative acceleration with rapid changes of directions, often referred to as agility (14). By the nature of the game, there are rapid sharp cutting movements and changes in direction at speed during a match; Football player changes direction every 2 to 4 seconds and makes 1200 to 1400 changes of direction over the course of 90 minutes (7).

Flexibility

Astrid J and Jiri Dvořák (4) stated that Thigh strain is the common football injury, which linked with poor flexibility. In 2014 FIFA World Cup; a total of 104 injuries were reported; which is equivalent to an average of 1.68 injuries/match from this 15/17 (88.2%) of thigh strains occurred without contact due to poor muscle flexibility.

As Mazumdar (12) suggested that for a football player to give good performance she/he must possess speed, agility, and flexibility even though the six components of physical fitness affect the performance of a player. However, so far in Ethiopia, especially in Arba Minch town there is no obvious data, records and tangible record that revealed, which training program should be done to having better speed, agility, and flexibility. Therefore, the present study was undertaking with an innate objective of investigating the effect of 10 weeks plyometric, Circuit, Interval, static and dynamic stretching training on speed, agility and flexibility of Mati-Arba Minch U-17 male football project players.

Therefore, the following questions were taken into consideration to be answered.

1. What are effects of 10 weeks selected training on the speed of Mati-Arba Minch U-17 male football project players?
2. What are effects of 10 weeks selected training on Agility Mati-Arba Minch U-17 male football project players?
3. What are effects of 10 weeks selected training on Flexibility of Mati-Arba Minch U-17 male football project players?

II. MATERIAL AND METHODS

Study area and participant

The study was carried out in Arba Minch town on Mati-Arba Minch U-17 male football project. Found in Southern Nations, Nationalities, and Peoples Region, Ethiopia. Geographically it is located at 6°01'59" N, latitude and 37°32'59" E, longitudes and it is situated at elevation 1269 meters above sea level. Mati-Arba Minch U-17 male football project players were source population. Thirty healthy individuals, free from injury and drug abuse players with the mean age of 16.2 ± 0.45 years were selected as study sample by employing census sampling technique. To this end, samples were randomly assigned to experimental group (EG =15) and Control group (CG=15).

Study Design

The randomized Experimental design was employed, it is best suited for the notion that two or more groups are equal on relevant characteristics before and treatment is applied to one of the groups. Also, in order to judge whether the training program has been in effect, the groups may usually be compared before and after the training program.

Therefore, the study had been two groups (EG and CG). Participants who were fulfilled the health history questionnaire was randomly assigned to this groups. The pre and post-test on speed, agility, and flexibility were administered for the study group. After written consent is obtained, the Experimental group (EG) players begin special training designed by researcher where CG precedes their regular training. In this study, the investigator has undermined confounding and extraneous variables that may influence both the independent and dependent variables, such as; Extra exercise, rest and sleep, nutrition, motivation and weather condition by assumption. To this end, the effect of training was evaluated by 35 yard sprint test. Davies, (2002), T-Test and Sit and Reach Test. (18).

Exercise Training Protocol

After clear orientation has been giving to the participant the Experimental group was engage designed training. The duration of the exercises session was 60 minutes with a frequency of three days per week for ten weeks. The single training session consists of 10 minutes of warm-up, 5 minutes stretch, 30 minutes main activity, 5 minutes of cool down exercises and 5 minutes active rest respectively. Apart from this warm up session consists activity like incremental, synchronized movement of hands and legs, arm circles different types

of stretching exercise, Buttock kicks, stepping, buttock kicks, walking, high knees and with steeping the knees in four direction, main session consists Dynamic, Static and Ballistic stretching, plyometric training ,rope jumping, sprints with changes-of-directions-drill, Zig-zag run., strength training hollow & Acceleration sprints, shuffle run, short-burst high-intensity sprint, straight-line sprints, Suicide, leg press, chest press, incline run, shuttle run activities and lastly cooling down.

Data Management and Analysis

To ensure the quality of data, only standardized measuring instrument and test were used. To minimize the mistakes during data collection, continuous video record and photograph was used and the assistant fitness test collectors were trained on how to use test equipment’s and measurements for five days by the investigator. Before further statistical analysis, the normal distribution was checked. Paired t-test was used to compare mean value of pre and post training result whereas the difference between groups was tested independent T-test. The analysis was conducted by SPSS -V 20 and in commenting on the analysis results, significance was rated through $p < .05$ level

III. RESULTS AND DISCUSSION

Speed

Variable	EG				CG			
	(M ± SD)		MD	Sig.	(M ± SD)		MD	Sig.
PT	PoT			PT	PoT			
Speed	5.07 ± 0.24	4.98 ± 0.27	-0.09	0.01	5.06 ± 0.48	5.02 ± 0.45	-0.03	0.62

Table1: 35 yard run (Speed test) result (sec)

After ten weeks of training EG revealed significant improvement in speed (35 yard test), EG decreased their total time they spend to finish a given distance from pre5.07 ± 0.24 s to 4.98 ±0.27 s, with mean difference -0.09 s ($p < 0.01$), Thus, there was significant improvement in speed performance of EG. Whereas the CG improved their speed on 35 yards run a speed test, the time was decreased by -0.03 sec in mean value from 5.06 to 5.02 (they perform better than pre-test). However the improvement is not significant, ($p < 0.62$), the above results clearly showed that selected training can improve football player’s speed performance within 10 weeks. Thus, it can be stated that a 10 week selected training program produced significant improvement in speed performance of football players.

The results of the current study are in line with junior male soccer players following programs consisting of short-sprint training (14), and conform to positive effect in female soccer players of similar age. Most experiments have been conducted on males, with programs combining strength and speed training (17). Reports of male youth athletes aged 14 to 18 years have shown an enhanced effect on sprint with high-intensity speed training (6, 14) found that a 10-week training program, with one hour per week shuttle sprint training, produced significant improvement in 30 yard sprint. The research results agree to results of Previous studies, those studies have also suggested that speed training have an improvement on players acceleration, and also it was concluded that in speed training, it is important to improve as many fast motor units as possible, which are more suitable for fast movements. The gains in sprint performance occurred in the initial acceleration and speed-maintenance phases. The ability to accelerate quickly from a stationary position will provide a competitive advantage for athletes. (3).

The result of this study finding is not consistent with the finding of (20) they showed that the passive stretching negatively influences the level of performance in serial sprints. Athletes were enrolled in an experiment where they achieved 15 minutes stretching session of the flexor and extensor muscles of the hip, followed by sprints of 40 meters. The stretching group saw its total time increased by 0.14 seconds (thus performed less quickly), whereas the CG which did only a slow race between then sprints did not present any significant increase in the time of the race (+ 0,03 s). But the result of this study finding showed us that it may be occurred due to ineffective training load or lack of specificity (6, 14).

Agility

Variable	EG				CG			
	(Mean ± SD)		MD	Sig.	(Mean ± SD)		MD	Sig.
	PT	PoT	PT		PT	PoT		
Agility	9.97 ± 0.29	9.91 ± 0.31	-0.06	0.02	10.1 ± 0.49	10.1 ± 0.34	-0.01	0.87

Table 2: T-test Agility result (sec)

For instance, after 10 weeks selected type of training the EG decreased the time from pre to post in Agility, the mean value clearly shows, they spend a given distance from 9.97 ± 0.29 s to 9.91 ± 0.31, with mean difference -0.06 s (p<0.02), there was significant difference between PT and POT. whereas, in Control Group the mean value decreased by 0.01 s from 10.1 ± 0.49 s to 10.1 ± 0.34 s, but it is not significant; (p<0.87). Therefore, it can be stated that the rationale behind the improvement of EG in agility performance was due to the exercise that they took in the selected training schedule.

A lot of research findings also indicated that plyometric training can be an effective training technique to improve an athlete’s agility. This study finding was consistent with the finding of (13), who conducted the study on the effects of a 6-week plyometric training program on agility, a study result revealed that six weeks plyometric exercises program can significantly improve the performance players agility. The result of this finding was in line with the finding of a study conducted by (21) conducted a study on the effects of a 12-week conditioning program involving speed, agility, and quickness (SAQ) training and its effect on agility performance in young soccer players. This study suggests that SAQ training is an effective way of improving agility, with and without the ball, for young soccer players.

Moreover this result matched with the finding of (16), the improvements observed is supposed induced by speed, agility, and quickness (S.A.Q) training on the basis of the results the impact of Speed, Agility and Quickness training has significantly contributed to improving the selected Physical Fitness Variables such as speed, agility muscular strength endurance, and explosive power (16)

Flexibility

Table 3: Sit and reach test Flexibility result (Cm)

Variable	EG				CG			
	(Mean ± SD)		MD	Sig.	(Mean ± SD)		MD	Sig.
	PT	PoT			PT	PoT		
Flexibility	16.6 ± 5.20	19.7 ± 4.96	3.1	0.00	21.8 ± 4.83	22.6 ± 4.9	0.73	0.24

In addition to this, there are statistically significant differences between in favor of the pre and post-measurements of the EG in sit and reach test (flexibility), The mean value of sit and reach test of this group was significantly increased from 16.6 cm to 19.7 cm, with the mean difference 3.1 cm, (p<0.00), this result showed that there was significant improvement over the pre-test, In the same way, the improvement was observed in Control Group (CG) from pre to post-test i.e. 21.86 to 22.60 (p<0.24). However, in this result, the improvement is not significant. Therefore, it can be stated that the rationale behind the improvement in flexibility on EG is due to the selected training that they took in the training schedule. The result clearly showed that selected training program can have a great effect on football players’ flexibility performance within 10 weeks.

These result of this study is in line with (9) who conducted effect of an eight-week program of static and dynamic stretching on the range of motion (ROM) of the joints of the lower limbs, the 20 m sprint, and the performance of the standing long jump (LJ) and the drop jump (DJ 20 cm) Statistical analysis indicated significant improvements after the stretching exercises of ROM. Results showed that the program has a positive effect on the ROM of the joints, as well as the speed and jumping ability of the subjects.

These results agree with those of Kokkonen, who reported that the distance of sit-and-reach test increased by 18.1%. The above-mentioned results are in accordance with those of Tabary, who reported that stretching the soleus resulted in a 20% increase in the number of sarcomeres in series. Those changes increased

muscle capability to a new functional length. In addition, Williams stated that 30 min of daily stretching is enough to increase the number of “in series” sarcomeres. Similar results about flexibility improvement were reported by Behm, who stated that flexibility improved by 11.8% in the sit-and-reach test, 19.7% in hip extension, and 13.4% in hip flexion after a four-week stretching training. Improvements in flexibility in the sit-and-reach test were also reported by Turki-Belkhiria, after eight weeks. The subjects of the two groups performed dynamic stretches during warm up. The first subgroup performed SDS, and the second one performed ADS. The improvement was 57.6% for SDS and 45.1% for ADS. No change was observed in the CG.

IV. CONCLUSION

- Plyometric training, Circuit training, Interval training and static and dynamic stretching exercise has shown a positive significant change in improving the selected physical fitness components of Arba Minch U-17 male football project players.
- Additionally training sessions with short-burst high-intensity sprint, straight-line sprints, sprints with changes-of-directions interval training and plyometric exercises interspersed with adequate recovery time result in improvements of both agility and in sprint performance in Arba Minch U-17 male soccer players.

Recommendation

- ☞ It is better the suggested training program have been tested to different age stages of football project players and state as part of the physical preparation, because of its significant influence on raising the level of the player on selected physical fitness.

REFERENCE

- [1]. Aagaard, P., & Andersen, J. L. (2010). Effects of strength training on endurance capacity in top-level endurance athletes. *Scandinavian Journal of Medicine & Science in Sports*, (20), 39-47.
- [2]. Bangsbo, J., Mohr, M., & Krstrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of Sports Sciences*, 24 (7), 665–674.
- [3]. Cecilia Geva, HalilTaskin, FatmaArslanet,al (2012) The Effects of 8-Week Speed Training Program on the Acceleration Ability and Maximum Speed Running at 11 Years Athletes. *Coll. Antropol.* (36) 3: 951–958
- [4]. Astrid J, and Jiri Dvořák, Football injuries during the 2014 FIFA World Cup, 2015. *British Journal of Sports Medicine* , (4).
- [5]. Haugen, T., & Seile, S. (2015). Physical and physiological testing of soccer players: why, what and how should we measure. *Sport Sci*, 19, 10–26.
- [6]. Jovanovic, M., Sporis, G., Omrcen, D., & Fiorentini F. (2011). Effects of Speed, Agility, Quickness Training Method on Power Performance in Elite Soccer Players. *Journal of Strength and Conditioning Research* (25:5) 1285-1292
- [7]. Jukic I, Milanovic L, Sporis G and Vucetic V (2010) Reliability and factorial validity of agility tests for soccer players. *Journal of Strength and Conditioning Research* 24 (3) 679 - 687
- [8]. Kocak M, Akkoyunlu Y, Taskin H (2005); 16-18 *Spor metre Beden Egitim Dergisi*, 3 (3): 105-109
- [9]. Konstantinos M, Christos P, Ioannis G, (2015) Effects of a Static and Dynamic Stretching Program on Flexibility, Strength, and Speed of School-Age Children. *International Journal of Applied Science and Technology* Vol. 5, No. 3;
- [10]. Krstrup, P., M. Mohr, H. Ellingsgaard, J. Bangsbo, 2005. Physical demands during an elite female soccer game: importance of training status. *J. Med Sci Sports Exerc.*, 37: 1242-1248.
- [11]. Luxbacher J (1998) *Complete Conditioning for Soccer*. London: McGraw-Hill
- [12]. Mazumdar, I., 2012. Comparative Relationship of Selected Physical Fitness Variables to Playing Ability.
- [13]. Michael G. Miller, Jeremy J. Herniman, et, al (2006) the “effects of a 6-week plyometric training program on agility” *Journal of Sports Science and Medicine* (5), 459-465;
- [14]. Mujika, I., Santisteban, J., & Castanga, C. (2009). In-season effect of short-term sprint and power training program on elite junior soccer players. *Journal of Strength and Conditioning Research* (23), 2581-2587.
- [15]. Polman et al (2004) Effective conditioning for female soccer players. *Journal of Sports Sciences*. 22 191-203
- [16]. R. Arjunan (2015) “effect of speed, agility and quickness (S. A. Q) training on selected physical fitness variables among school soccer players” *International Journal of Research in Humanities, Arts and Literature* Vol. 3, Issue 10,
- [17]. Rumpf, M.C., Cronin, J.B., Pinder, S.D., Oliver, J., & Hughes, M. (2012). Effect of different training methods on running sprint times in male youth. *Pediatric Exercise Science* (24), 170-186.

- [18]. Wells., K.F. and E.F. Dillon., 1952. The sit and reach. a test of back and leg flexibility. Research Quarterly, 23.115-118.
- [19]. Wiemann K., Klee A (2000).: Die Bedeutung von Dehnen und Stretching in der Aufwärmphase vor Höchstleistungen. Der Leistungssport, (4: 5–9.)
- [20]. Wiemann K., Klee A (2000).: Die Bedeutung von Dehnen und Stretching in der Aufwärmphase vor Höchstleistungen. Der Leistungssport, (4: 5–9.)
- [21]. Zoran Milanović, Goran Sporiš, Nebojša Trajković, Nic James and Krešimir Šamija (2013) “effects of a 12 week conditioning programme involving speed, agility and quickness (SAQ) training and its effect on agility performance in young soccer players”. PLOS ONE journal.pone.

Abraham Derbachew. “Effects of ten weeks selected training on some physical fitness components of Mati-Arba Minch U-17 male football project players.” IOSR Journal Of Humanities And Social Science (IOSR-JHSS). vol. 23 no. 10, 2018, pp. 50-55.