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Effect of Aerobic Training with Inspiratory Muscle Strength Training On Agility in District Level Football Players

Shreya Deshak[1], Swati D. Kajbaje[2],
[1]*Assistant Professor, MPT, Dept. of Physiotherapy, Tilak Maharashtra Vidyapeeth, Pune-4110372*
[2]*Final Year Student, Dept. of Physiotherapy, Tilak Maharashtra Vidyapeeth, Pune-411037*
Corresponding Author: Dr Shreya Deshak (PT)

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ABSTRACT: Introduction: Team sport athletes, like footballers, need technical, tactical and physical skills to succeed. For that they require a high level of aerobic fitness to generate and maintain power output during repeated high-intensity efforts and to recover. An aerobic exercise develop player's aerobic capacity. Also, Inspiratory muscles strength training' may directly help to facilitate the greater efficiency in match play performance. But there is a limited study on how aerobic training and inspiratory muscle strength training effects on agility in football players. **Methodology:** A study was carried out in various football clubs in Pune. Amongst 43 players, 30 players were selected according to inclusion and exclusion criteria and were randomly divided into 2 groups. Group A (n=15) which received Inspiratory muscle strength training with aerobic training and Group B (n=15) which received aerobic training, both the trainings given thrice a week, for 4 weeks. Players were evaluated pre and post treatment for Inspiratory muscle strength by IMT device and Agility by Illinois agility test. **Results:**15 subjects were grouped in Group A which had a mean age of 19.01±1.36 years, 15 were grouped in Group B which a mean age of 19.46.±1.18 years, Statistical analysis showed that out of 30 subjects inspiratory muscle strength in-between Group A was 8.667 ± 0.89 and Group B was 8.200±1.47 with P value 0.0001.Illinois Agility test in-between Group A was 15.40±0.79 and Group B was 17.11±0.82 with P value 0.0001.C**onclusion:** This study concluded that Inspiratory muscle strength training gives an additional effect on improving agility in district level football players.

Keywords: Football, aerobic training, Inspiratory muscle strength, Sports, agility.

I. INTRODUCTION

Football, also known as Soccer, is one of the most widely played and complex sports in the world, where players need technical, tactical, and physical skills to succeed. [(1)]A football player changes direction every 2–4 seconds and makes 1,200–1,400 changes of direction during a game. Thus agility is a fundamental physical quality for the optimal performance of football players. [(2)]

Agility is a common term that is used by strength and conditioning practitioners and is often considered the basic element of many sports and activities. [(2)]Agility is generally defined as the ability to change direction of the body rapidly, without losing balance, using a combination of strength, power, and neuromuscular coordination. Although rapid actions constitute a smaller percentage (about 11%) of player movement, on average, a player will turn 50 times throughout a match. Rapid activity often occurs in the crucial seconds of the game and can make the difference between scoring and conceding a goal. Thus, agility is very important in soccer, and the ability of soccer players to produce fast paced variable actions is known to impact soccer performance.[(2)]

In most research, the term agility has been applied to describe any quick and effective combination of breaking, changing direction, and accelerating again while maintaining motor control in either a vertical or horizontal direction in response to a stimulus (i.e., an opposing player's movements, movement of the ball).[(2)] In addition, the game requires other intense actions such as decelerations, kicking, dribbling, and tackling.

All these efforts exacerbate the physical strain imposed on the players and contribute to making football highly physiologically demanding.[(3)] Team sport athletes require a high level of aerobic fitness in order to generate and maintain power output during repeated high-intensity efforts and to recover. [(4)]

Aerobic exercise (also known as cardio) is physical exercise of relatively low intensity that depends primarily on the aerobic energy-generating process. Aerobic literally means "living in air", and refers to the use of oxygen to adequately meet energy demands during exercise via aerobic metabolism. Generally, light-to-moderate intensity

activities that are sufficiently supported by aerobic metabolism can be performed for extended periods of time. Team sport athletes require a high level of aerobic fitness in order to generate and maintain power output during repeated high-intensity efforts and to recover. Aerobic training works on developing the players' aerobic capacity.

But, the ability to tolerate a high cardio respiratory load during soccer, coupled with the capacity to retain sufficient energy to sprint when required, presents an intriguing physical challenge. It has been suggested that soccer players pace themselves during match play to avoid the debilitating consequences of fatigue, and it is possible that greater functionality of inspiratory muscles may directly facilitate either the maintenance of higher workloads or greater efficiency in match play performance.[9]There is considerable evidence that inspiratory muscle strength training improves pulmonary function, quality of life and exercise performance in healthy athletic populations.[12]

II. MATERIAL AND METHODS

Selection of subjects: An experimental study was conducted. Amongst 43 players, 30 football players with age group 18-35 years and year of experience more than 1 year in sports club were selected according to the inclusion and exclusion criteria.

Inclusion criteria: Players between age group of 18-35 years, only male players were included in the study, players playing for more than 1 year and the players willing to participate. Exclusion criteria: Any recent injuries to lower limb, any systemic injury, irregular practice session and players with intermittent practice.

Material: Demographic data sheet, Consent form, Stopwatch, Cones, Measuring tape, Mat, IMT device.

PROCEDURE:

Permission was taken from the institutional ethical committee. Different football clubs were approached and permission was obtained prior to the study. Explanation of the experiment was explained to the participants. Players willing to give consent to participate in the study was included. A pilot study was conducted and errors were resolved with approval of the guide. Players were randomly divided into 2 groups, group A (n=15) which received inspiratory muscle strength training with an aerobic training and group B (n=15) which received aerobic training thrice a week, for 4 weeks. Players were evaluated pre and post treatment for Inspiratory muscle strength by IMT device and Agility by Illinois agility test.

IMT Device procedure:

IMT device was used to check the inspiratory muscle strength in the players. The players were explained about the IMT device and the use of the device. A nose clip was given to the players and asked to close the nose with that clip. Then the players were asked to put the mouth piece of IMT device in mouth and asked to do inspiration and expiration and the resistance was increased till the player feels the resistance. 1 RM was noted on the recording sheet.

Illinois Agility Test:

On command, from a standing position athlete sprints 9.2 m, turns and returns back to the starting line, then, he swerves in and out of four markers, completing two 9.2 m sprints to finish the agility course. No technical advice was given as to the most effective movement technique. Athletes were instructed to complete the test as quickly as possible. They were instructed not to cut over the markers but to run around them. If a subject failed to do this, the trial was stopped and re-attempted after the requisite recovery period.

Aerobic training –

60 minutes session with 10 minutes warm up and 10 minutes cool down for 4 days/week for a period 6 weeks aerobic training was given.

Protocol: Warm up with a steady jog for 10 minutes, Jog for 60 sec, Run hard for 90 seconds, jog for 45 sec, Sprint for 10 sec, Run backwards for 30 sec, walk for 30 sec, run hard for 60 sec. Repeat 3-4 times.

Inspiratory muscle strength training – 10 minutes of trunk muscles, upper and lower limbs stretching, 10-minute warm-up with a series of 10 repetitions and one-minute intervals.

Protocol: IMT was performed after 10 minutes of rest after warm-up, consisting of a series of 30 repetitions and increasing pressure levels from the fourth training session.[22]

Breathing exercises like Sectional Breathing, Yogic Bellows Breathing (Bhastrika Pranayama), Alternate Nostril Breathing with Voluntary Internal Breath Retention was given for 10 minutes.[9]

Data was collected and statistically analysed.

Statistical technique: Paired t-test was used for with-in the groups passing normality test and unpaired T- test non-parametric for values not passing normality and Unpaired t-test was done in-

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between groups and the data was statically analysed.

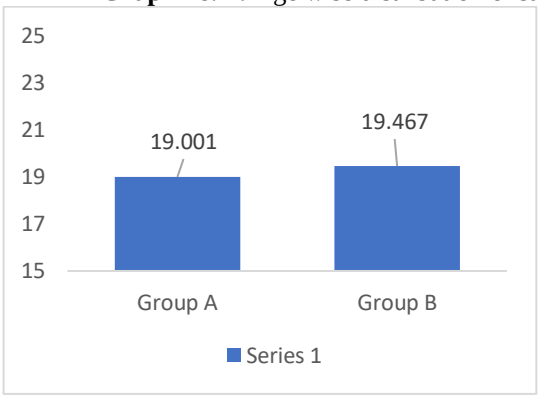
III. RESULTS:

The present study was done on 30 players, which are divided in 2 groups.

Table no. 1: Age wise distribution of samples

	Group A Mean±SD	Group B Mean±SD
Age	19.001±1.363	19.467±1.187

Graph no. 1: Age wise distribution of samples

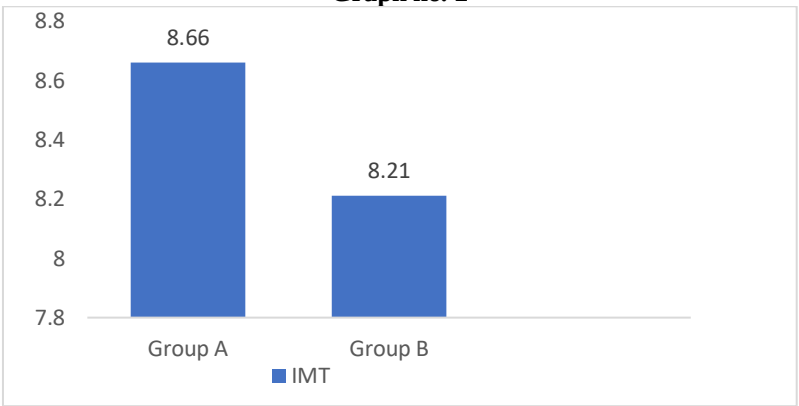


Interpretation: Graph no.1 shows that out of 30 subjects, 15 subjects were grouped in Group A had a mean age of 19.001±1.363, 15 were grouped in Group B which had a mean age of 19.467±1.187

Table no. 2: Post intervention Inspiratory muscle strength training in-between Groups

	Mean±SD
Group A	8.66±0.89
Group B	8.20±1.47

Graph no. 2



Interpretation: Graph no.2 shows in comparison, Group A (Inspiratory muscle strength training with aerobic training) which is significantly improved than Group B (aerobic training)

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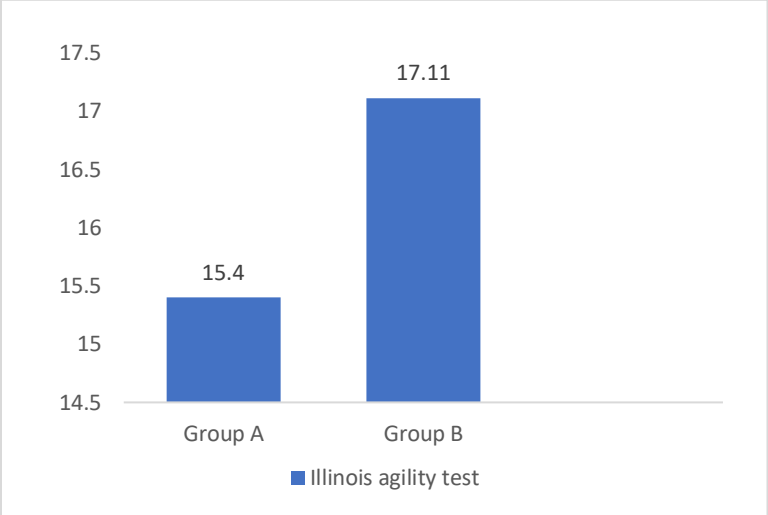
Table no. 3: Post intervention Illinois agility test in-between Groups

	Mean±SD
Group A	15.40±0.79
Group B	17.11±0.82

Graph no. 3



Interpretation: Graph no.3 shows in comparison, Group A (Inspiratory muscle strength training with aerobic training) which is significantly improved than Group B(aerobic training)

Table no. 4: Pre and post training mean values

	GROUP A		**GROUP B**	
	PRE	POST	PRE	POST
IMT mean±sd (H_2O)	5.40±1.54	8.66±0.89	5.53±1.55	8.20±1.47
P value	0.0001		0.0080	
Illinois Agility Test mean±sd	19.25±1.29	15.40±0.79	18.68±1.13	17.11±0.82
P value	0.0001		0.0001	

IV. DISCUSSION

In this study of Effect of Inspiratory muscle strength training on agility in district level football players, the sample size was taken from football clubs. Every individual's consent was taken by filling up the consent form. Only males were included for the study. Players were evaluated pre and post treatment for Inspiratory muscle strength by IMT device and Agility by Illinois agility.

30 samples were taken according to the inclusion and exclusion criteria out of which 15 subjects were grouped in Group A had a mean age of 19.01 years and 15 subjects were grouped in Group B had a mean age of 19.4 years shown in Table and graph no. 1.

According to the study by Helgerud.J, aerobic endurance in football players improved football performance. Regular inspiratory muscle training has shown improved endurance in players.

Inspiratory muscle strength training mainly focuses on increasing inspiratory muscle functions and it helps in less fatigability and breathlessness during the game.

According to the study by Guy, J. H (2014) concurrent IMT and twice-weekly pre-season football training for recreational players resulted in a significant improvement in exercise tolerance as detected by accumulative distance in a running test.

Aerobic training increases cardiovascular parameters such as heart size, blood flow capacity, and artery distensibility. These changes improves the capacity of the cardiovascular system to transport oxygen, resulting in faster muscle and pulmonary VO2 kinetics and higher VO2max. Thus, a greater amount of energy can be supplied aerobically, allowing a player to both sustain intense exercise for longer durations and also recover more rapidly between high-intensity phases of the game.

So, Inspiratory muscle strength training withaerobic training has a statistically significant influence on maximum oxygen consumption as it improves VO2max, exercise economy and lactate threshold.

V. CONCLUSION

Hence the study concluded that Inspiratory muscle strength training gives an additional effect in improving players' agility.

Limitation of study:

- Limited sample size.
- No follow up
- Only district level football players were included.
- Only male soccer players were evaluated in this study

ACKNOWLEDGEMENT

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REFERENCES

[1]. Jan Helgerud, Lars Christian Engen, (2001) et al. underwent a study on "Aerobic endurance training improves soccer performance" Med Sci Sports Exerc. Nov;33(11):1925-31.

[2]. Youne´ s Hachana ,et al. Validity and Reliability of New Agility Test among Elite and Subelite under 14-Soccer Players. April 2014 | Volume 9 | Issue 4 | e95773.

[3]. F. Marcello Iaia, Ermanno Rampinini, and Jens Bangsbo, High-Intensity Training in Football, International Journal of Sports Physiology and Performance, 2009, 4, 291-306© 2009 Human Kinetics, Inc.

[4]. Nicholas M. Stone ,Andrew E. Kilding. Aerobic Conditioning for Team Sport Athletes. Sports medicine. August 2009, Volume 39, Issue 8, pp 615–642|

[5]. Shreya Deshak, Ujwal L Yeole, Nikita Jadhav. Association of Inspiratory Muscle Strength with Sports Performance in Football Players. Journal of medical science and clinical research. Volume 07 Issue 03 March 2019

[6]. Abdelmohsen zakaria, ahmed and dalia mohamed saied hashem. Effect of using fartlek exercises on some physical and physiological variables of football and volleyball players. World journal of sport sciences 5 (4): 225-231, 2011

[7]. R. Muthu eleckuvan. Effectiveness of fartlek training on maximum oxygen consumption and resting pulse rate. International journal of physical education, fitness and sports ISSN: 2277: 5447 | vol.3. No.1 | march'2014

[8]. Pardeep Kumar. Effect of fartlek training for developing endurance ability among athletes. International Journal of Physical Education, Sports and Health 2015; 2(2): 291-293

[9]. Joshua H. Guy, Andrew M. Edwards (2014) et.al underwent a study on "Inspiratory Muscle Training Improve Exercise Tolerance in Recreational Soccer Players Without Concomitant Gain in Soccer-Specific Fitness"

[10]. Scott Walker and Anthony Turner, A One-Day Field Test Battery for the Assessment of Aerobic Capacity, Anaerobic Capacity, Speed, and Agility of Soccer Players. National Strength and Conditioning Association VOLUME 31 | NUMBER 6 | DECEMBER 2009

[11]. Tomas K. Tong, Julien S. Baker', Haifeng Zhang, Zhaowei Kong and Jinlei Nie. Effects of Specific Core Re-Warm-Ups on Core Function, Leg Perfusion and Second-Half Team Sport-Specific Sprint Performance: A Randomized Crossover Study. Journal of Sports Science and Medicine 2019 Sep; 18(3): 479–489

[12]. CAN ÖZGİDER, (2010) et al. underwent a study on "Four weeks of respiratory muscle training improves intermittent recovery performance but not pulmonary functions and maximum oxygen consumption (VO2 MAX) capacity in young soccer players".

[13]. Gumusdag.H., Unlu.C., Cicek.G., Kartal.A., Evli.F. (2013). The yo-yo intermittent recovery test as an assessment of aerobic-anaerobic fitness and game-related endurance in soccer. Physical Education and Sports School, Hitit University, Corum TURKEY. Vol. 5(3): 147-152.
[14]. Mohr M, Krustrup P, Bangsbo J. Match performance of high-standard soccer players with special reference to development of fatigue. J Sports Sci. 2003; 21(7): 519–528.
[15]. Bendiksen M, Bischoff R, Randers MB, Mohr M, Rollo I, Suetta C, Bangsbo J, Krustrup P. The Copenhagen Soccer Test: physiological response and fatigue development. Med SciSports Exerc. 2012; 44(8): 1595-603.
[16]. Paul, DJ, Bradley, PS and Nassis, GP (2015) Factors Affecting Match Running Performance of Elite Soccer Players: Shedding Some Light on the Complexity. INTERNATIONAL JOURNAL OF SPORTS PHYSIOLOGY AND PERFORMANCE, 10 (4). pp. 516-519. ISSN 1555-0265