EFFECT OF AGILITY LADDER TRAINING AND AGILITY TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AMONG MALE KHO-KHO PLAYERS.

Dr.R.Arjunan
Associate Professor, Department of Physical Education and Health Sciences, Alagappa University, Karaikudi.

Abstract- *The purpose of the study was to find out the effect of ladder agility training and agility training on selected physical fitness variables among school male Kho-Kho players. To achieve the purpose of the study thirty male Kho-Kho players were selected from Government Higher Secondary School, Madukoor, Thanjavur district. The age of the selected players ranged 14 to 16. A pre and post test randomized group design was employed for this investigation. The thirty subject selected were further randomly divided into three groups consisting of 10 subject each. Group and 1 and 2 were experimental groups. Experimental group 1 underwent ladder training, experimental group underwent agility training. Third group was control group and this group was not allowed to participate in any training programme. The experimental period was eight weeks. Prior and after the experimental period test were conducted to assess the selected dependent variables. The selected dependent variables were agility, speed and leg strength. To assess agility shuttle run test conducted. To assess speed 50 meter run test was conducted. To assess leg strength wall sit test was conducted. Agility ladder training improves agility, speed and leg strength. Agility training also improves agility, speed and leg strength. However agility ladder training is superior in developing agility and speed. Hence it is recommended to use ladder agility for Kho-Kho Players.*

Keywords- *Agility training, Agility, Speed, Leg Strength, Kho-Kho.*

Introduction
Agility is the ability to maintain and control correct body position while quickly changing direction through a series of movements (Twist & Benicky, 1995). This may be required of forwards in order to maneuver around defensive players near the goal. Likewise, defensive players may benefit from these drills for the opposite reason. (Buttifant, Graham, & Cross, 2002) .

Quickness is the ability to read and react to a situation; it is a multidirectional skill that combines explosiveness, reactiveness, and acceleration (Moreno, 1995). Kho-Kho may specifically require responses that are initiated from a dead stop position (Alves, Rebelo, Abrantes, & Sampaio, 2010; Chelly, Fathloun, Cherif, Amar, Tabka, & Van Praagh, 2009).

Speed, agility and quickness are a system of training aimed at the development of motor abilities and the control of body movement through the development of the neuromuscular system (Lennemann, Sidrow, Johnson, Harrison, Vojta, & Walker, 2013; Yap, & Brown, 2000). It aims to improve the Kho-Kho players ability to perform explosive multi directional movements by reprogramming the neuromuscular system, so that it can work more efficiently (Young, Davies, Farrow, & Bahnert, 2013). According to Jovanovic, Sporis,, Omrcen, & Fiorentini, (2011), ladder and agility training will remove mental blocks and thresholds and will allow the athlete to exert maximal force during controlled and balanced movement patterns, which are specific to their sport (Lennemann, Sidrow, Johnson, Harrison, Vojta, & Walker, 2013). By considering the energy systems involved in the athlete's sport, the specificity of the movement patterns, muscle action, the speed and range of motions performed and the specific needs of the athlete, ladder and agility training can provide a highly specific and detailed training method that will help the performer reach their goals (Polman, Bloomfield, & Edwards, 2009; Milanovi , Sporiš, Trajkovi , James, & Šamija, 2013; Milanovi , Sporiš, Trajkovi , Sekuli , James, & Vu kovi , 2014). In this modern era, few scientific studies have been conducted to investigate effective methods of developing speed and agility and leg strength conditioning among school Kho-Kho players.

Methodology
The purpose of the study was to find out the effect of ladder agility training and agility training on selected physical fitness variables among school male Kho-Kho players. To achieve the purpose of the study thirty male Kho-Kho players were selected from Government Higher Secondary School, Madukoor, Thanjavur district. The age of the selected players ranged 14 to 16. A pre and posttest randomized group design was employed for this investigation. The thirty subject selected were further randomly divided into three groups consisting of 10 subject each. Group and 1 and 2 were experimental groups. Experimental group 1 underwent ladder training, experimental group underwent agility training. Third group was control group and this group was not allowed to participate in any training programme. The experimental period was eight weeks. Prior and after the experimental period test were conducted to assess the selected dependent variables. The selected

Research Paper
Impact Factor :3.029
Peer Reviewed & Indexed Journal

IJMSRR
E- ISSN - 2349-6746
ISSN -2349-6738

dependent variables were agility, speed and leg strength. To assess agility shuttle run test conducted. To assess speed 50 meter run test was conducted. To assess leg strength wall sit test was conducted.

Training Schedule
Training schedule for ladder training and agility training are presented in table1 and 2.

Table 1- Ladder Training Schedule

Training Days		Duration		
Mondays, Wednesdays and Fridays		1st 2nd week	3rd 4th 5th week	6th 7th 8th week
Sl.No.	Total Duration with specifications	45 min.	45 min.	45min.
1	Warm-Up	10 min.	10 min	10 min.
2	Ladder forward running	5 min.	5 min.	5 min.
3	Ladder high knee running	5 min.	5 min.	5 min.
4	Ladder sideward running	5 min.	5 min.	5 min.
5	Ladder one leg hop	5 min.	5 min.	5 min.
6	Ladder both leg jump	5 min.	5 min.	5 min.
7	Warm down	10 min.	10 min.	10 min.

Table 2 Agility Training Schedule

Training Days		Duration		
Mondays, Wednesdays and Fridays		1st 2nd week	3rd 4th 5th week	6th 7th 8th week
Sl.No.	Total Duration with specifications	45 min.	45 min.	45min.
1	Warm-Up	10 min.	10 min	10 min.
2	forward running	5 min.	5 min.	5 min.
3	Backward running	5 min.	5 min.	5 min.
4	Sideward running	5 min.	5 min.	5 min.
5	Zigzag running	5 min.	5 min.	5 min.
6	Side touch running	5 min.	5 min.	5 min.
7	Warm down	10 min.	10 min.	10 min.

Results
The influence of independent variable on each dependent variable were analyzed and presented in this section.

Speed
In table 3 the Analysis of Covariance results are presented. Table 3 shows the pre-test, post-test and adjusted post-test mean values on speed. The pre-test mean values of ladder training, agility training and control group on leg strength were 6.97, 7.68, and 7.90 respectively. The obtained 'F' value was 27.91, which was significant at 0.05 level of confidence with 2 and 27 degrees of freedom. The post-test mean values of ladder training, agility training and control group on speed were 6.87, 7.26, and 7.93 respectively. The obtained 'F' value was 38.83, which was significant at 0.05 level of confidence with 2 and 27 degrees of freedom. The adjusted post-test mean values of ladder training, agility training and control group on speed were 6.87, 7.12, and 7.59 respectively. The obtained 'F' value was 62.44, which was significant at 0.05 level of confidence with 2 and 26 degrees of freedom. The results of the study indicate there was significant difference among the adjusted post test means of ladder, agility training and control groups on speed.

Table - 3, Analysis of covariance for the pre, post and adjusted post-test data on speed of control, ladder, and agility training groups (scores in seconds)

	Ladder training group	Agility training group	Control group	Source of variance	Sums of Squares	Df	Mean squares	F
Pre-test								
Mean	6.97	7.68	7.90	Between sets	4.73	2	2.37	27.91*
				Within set	2.28	27	0.09	
Post-test								

Research Paper
Impact Factor :3.029
Peer Reviewed & Indexed Journal

IJMSRR
E- ISSN - 2349-6746
ISSN -2349-6738

Mean	6.87	7.26	7.93	Between sets	5.74	2	2.87	38.83*
				Within set	51.20	27	0.07	
Adjusted Post-test								
Mean	7.39	7.12	7.59	Between sets	1.05	2	0.53	62.44*
				Within set	0.22	26	0.01	

*Significant at 0.05 alpha: Table value required at 0.05 for 2&27 and 2&26 are 3.35 & 3.37 respectively

As the obtained analysis of covariance 'F' ratio on speed was significant to find out the paired mean difference, the Scheffe's post hoc test was employed and the results are presented in table 4. Table 4 shows the mean difference values between ladder training and agility training, agility training and control group, and ladder training and control group on speed. These values are 7.39, 7.12 and 7.59 respectively. The confidence interval needed for significance was 0.42. The result showed that there is no significant difference between ladder training and agility training groups and ladder training and control group as the confidence interval was less. Whereas significant differences were observed on strength between agility training group and control group as confidence interval is high.

Table -4, Scheffe's post hoc test for the differences between paired means on speed

Ladder training group	Agility training group	Control group	Mean difference	Confidence interval
7.39	7.12	-	0.27	0.42
	7.12	7.59	0.47*	0.42
7.39	-	7.59	0.20	0.42

*Significant at 0.05 alpha

Agility

In table 5 the Analysis of Covariance results on agility are presented. Table 5 shows the pre-test, post-test and adjusted post-test mean values. The pre-test mean values of ladder training, agility training and control group on agility were 11.12, 10.88 and 11.49 respectively. The obtained 'F' value was 5.63, which was insignificant at 0.05 level of confidence with 2 and 27 degrees of freedom. The post-test mean values of ladder training, agility training and control group on agility were 11.77, 10.28 and 11.57 respectively. The obtained 'F' value was 32.69, which was significant at 0.05 level of confidence with 2 and 27 degrees of freedom. The adjusted post-test mean values of ladder training, agility training and control group on agility were 10.43, 10.42 and 11.26 respectively. The obtained 'F' value was 37.54, which was significant at 0.05 level of confidence with 2 and 26 degrees of freedom. The results of the study indicate there was significant difference among the adjusted post test means of ladder, agility training and control groups on agility.

Table - 5, Analysis of covariance for the pre, post and adjusted post-test data on agility of control, ladder, and agility training groups (scores in seconds)

	Ladder training group	Agility training group	Control group	Source of variance	Sums of Squares	Df	Mean squares	F
Pre-test								
Mean	11.12	10.88	11.49	Between sets	2.51	2	1.25	5.63*
				Within set	6.01	27	0.22	
Post-test								
Mean	10.77	10.28	11.57	Between sets	11.18	2	5.59	32.69*
				Within set	4.62	27	0.17	
Adjusted Post-test								
Mean	10.43	10.42	11.26	Between sets	3.22	2	1.61	37.54*
				Within set	1.12	26	`0.04	

*Significant at 0.05 alpha: Table value required at 0.05 for 2&27 and 2&26 are 3.35 & 3.37 respectively

As the obtained analysis of covariance 'F' ratio was significant to find out the paired mean difference on agility, the Scheffe's post hoc test was employed and the results are presented in table 6. Table 6 shows the mean difference values between ladder training and agility training, agility training and control group, and ladder training and control group. These values are 0.87, 4.70 and 5.57 respectively. The confidence interval needed for significance was 1.22. The result showed that there is no

Research Paper
*Impact Factor :**3.029***
Peer Reviewed & Indexed Journal

IJMSRR
E- ISSN - 2349-6746
ISSN -2349-6738

significant difference between ladder training and agility training groups as the confidence interval was less. Whereas significant differences were observed between ladder training and control group, and agility training group and control group as confidence interval is high.

Table 6, Scheffe's post hoc test for the differences between paired means on agility

Ladder training group	Agility training group	Control group	Mean difference	Confidence interval
10.43	10.42	-	0.01	0.82
-	10.42	11.26	0.84*	0.82
10.43	-	11.26	0.94*	0.82

*Significant at 0.05 alpha

LEG Strength
In table 7 the Analysis of Covariance results are presented. Table 7 shows the pre-test, post-test and adjusted post-test mean values. The pre-test mean values of ladder training, agility training and control group on leg strength were 42.20, 43, and 43 respectively. The obtained 'F' value was 0.23, which was insignificant at 0.05 level of confidence with 2 and 27 degrees of freedom. The post-test mean values of ladder training, agility training and control group on leg strength were 48.40, 48.10, and 43.40 respectively. The obtained 'F' value was 13.67, which was significant at 0.05 level of confidence with 2 and 27 degrees of freedom. The adjusted post-test mean values of ladder training, agility training and control group on leg strength were 48.78, 47.90, and 43.21 respectively. The obtained 'F' value was 79.70, which was significant at 0.05 level of confidence with 2 and 26 degrees of freedom. The results of the study indicate there was significant difference among the adjusted post test means of ladder, agility training and control groups.

Table- 7, Analysis of covariance for the pre, post and adjusted post-test data on leg strength of control, ladder and agility training groups (scores in seconds).

	Ladder training group	Agility training group	Control group	Source of variance	Sums of Squares	DF	Mean squares	F
Pre-test								
Mean	42.20	43	43	Between sets	4.27	2	2.13	0.23
				Within set	253.60	27	9.39	
Post-test								
Mean	48.40	48.10	43.40	Between sets	157.27	2	78.63	13.67*
				Within set	155.70	27	5.77	
Adjusted Post-test								
Mean	48.78	47.90	43.21	Between sets	178.23	2	89.12	79.70*
				Within set	29.07	26	1.12	

*Significant at 0.05 alpha: Table value required at 0.05 for 2&27 and 2&26 are 3.35 & 3.37 respectively

As the obtained analysis of covariance 'F' ratio was significant to find out the paired mean difference, the Scheffe's test was employed and the results are presented in table 8. Table 8 shows the mean difference values between ladder training and agility training, agility training and control group, and ladder training and control group. These values are 0.87, 4.70 and 5.57 respectively. The confidence interval needed for significance was 1.22. The result showed that there is no significant difference between ladder training and agility training groups as the confidence interval was less. Whereas significant differences were observed between ladder training and control group, and agility training group and control group as confidence interval is high.

Table -8, Scheffe's post hoc test for the differences between paired means on leg strength

Ladder training group	Agility training group	Control group	Mean difference	Confidence interval
48.78	47.901	-	0.87	1.22
-	47.901	43.21	4.70*	1.22
48.78	-	43.21	5.57*	1.22

*Significant at 0.05 alpha

Conclusions

Agility ladder training improves agility, speed and leg strength. Agility training also improves agility, speed and leg strength. However agility ladder training is superior in developing agility and speed. Hence it is recommended to use ladder agility for Kho-Kho Players.

References

1. Alves, J. M. V. M., Rebelo, A. N., Abrantes, C., & Sampaio, J. (2010). Short-term effects of complex and contrast training in soccer players' vertical jump, sprint, and agility abilities. The Journal of Strength & Conditioning Research, 24(4), 936-941.
2. Buttifant, D., Graham, K., & Cross, K. (2002). AGILITY AND SPEED IN SOCCER PLAYERS ARE TWO DIFFERENT PERFORMANCE PARAMETERS. Science and football IV, 329.
3. Chelly, M. S., Fathloun, M., Cherif, N., Amar, M. B., Tabka, Z., & Van Praagh, E. (2009). Effects of a back squat training program on leg power, jump, and sprint performances in junior soccer players. The Journal of Strength & Conditioning Research, 23(8), 2241-2249.
4. J Bloomfield, R Polman, P O'DONOGHUE (2007) Effective speed and agility conditioning methodology for random intermittent dynamic type sports. The Journal of Strength & Conditioning Research, 2007
5. Jovanovic, M., Sporis, G., Omrcen, D., & Fiorentini, F. (2011). Effects of speed, agility, quickness training method on power performance in elite soccer players. The Journal of Strength & Conditioning Research, 25(5), 1285-1292.
6. Lebedev, S. I. (2013). Determining the level of high-speed abilities of young soccer players aged from 10 to 12 years. Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu, 6.
7. Lennemann, L. M., Sidrow, K. M., Johnson, E. M., Harrison, C. R., Vojta, C. N., & Walker, T. B. (2013). The influence of agility training on physiological and cognitive performance. The Journal of Strength & Conditioning Research, 27(12), 3300-3309.
8. Little, T., & Williams, A. G. (2005). Specificity of acceleration, maximum speed, and agility in professional soccer players. The Journal of Strength & Conditioning Research, 19(1), 76-78.
9. Milanovi , Z., Sporiš, G., Trajkovi , N., James, N., & Šamija, K. (2013). Effects of a 12 week saq training programme on agility with and without the ball among young soccer players. Journal of sports science & medicine, 12(1), 97.
10. Milanovi , Z., Sporiš, G., Trajkovi , N., Sekuli , D., James, N., & Vu kovi , G. (2014). Does SAQ training improve the speed and flexibility of young soccer players? A randomized controlled trial. Human movement science, 38, 197-208.
11. Polman, R., Bloomfield, J., & Edwards, A. (2009). Effects of SAQ training and small-sided games on neuromuscular functioning in untrained subjects. Int J Sports Physiol Perform, 4(4), 494-505.
12. Thomas, K., French, D., & Hayes, P. R. (2009). The effect of two plyometric training techniques on muscular power and agility in youth soccer players. The Journal of Strength & Conditioning Research, 23(1), 332-335.
13. Yap, C. W., & Brown, L. E. (2000). Development of speed, agility, and quickness for the female soccer athlete. Strength & Conditioning Journal, 22(1), 9.