



EFFECT OF LADDER AND PLYOMETRIC TRAINING ON PHYSICAL FITNESS PARAMETERS AMONG KHO-KHO PLAYERS AT ANR COLLEGE, GUDIVADA

¹**Veerla Gopi**
Physical Director,
ANR College, Gudivada
Krishna University

²**Movva Vinod,**
Research Scholar,
University College of Physical
Education & Sports Sciences
Acharya Nagarjuna University, A.P.

³**Prof. P.P.S. Paul Kumar,**
Principal,
University College of Physical
Education & Sports Sciences,
Acharya Nagarjuna University, A.P.

Abstract

The objective of this study was to examine the impact of ladder and plyometric training on specific physical fitness indicators among Kho-Kho players from ANR College, Gudivada. Thirty male Kho-Kho players, aged 18 to 22, were randomly divided into two groups: the Ladder Training Group (LTG, n=15) and the Plyometric Training Group (PTG, n=15). Both groups completed a planned 8-week exercise regimen, 5 days per week. The physical fitness tests included agility, speed, explosive power, and cardiorespiratory endurance. There were testing before and after. We used paired and independent t-tests at the 0.05 level of significance to look at the data. Both training methods showed a lot of improvement, although PTG showed the most improvement in explosive power while ladder training showed the most improvement in agility. The results indicate that ladder and plyometric training regimens are beneficial in improving physical fitness among Kho-Kho players.

Keywords: Kho-Kho, Ladder Training, Plyometric Training, Physical Fitness, Agility, Explosive Power

Introduction

Being physically fit is very important for playing sports, especially team sports like Kho-Kho that need speed, agility, endurance, and strength. Conventional training techniques frequently neglect sport-specific conditioning. Ladder and plyometric training have become more popular because they are good at improving speed, neuromuscular coordination, and explosive strength (Bompa & Haff, 2009). Although Kho-Kho players are well-liked, there isn't much research on them. This study seeks to address that deficiency by assessing the impact of ladder and plyometric training on several physical fitness components in Kho-Kho players.

Review of Literature

1. Agility Training: Agility ladder drills enhance the coordination and foot speed (Sáez de Villarreal, 2015).
2. Plyometric Training: Explosive power and vertical jump performance improve significantly with plyometrics (Markovic & Mikulic, 2010).
3. Game Performance: Conditioning that is specialized to a sport can improve performance metrics and lower the chance of injury.

Methodology

Subjects

Thirty male Kho-Kho players from ANR COLLEGE, GUDIVADA participated in the study. Inclusion criteria:

- Age 18–22
- At least 2 years of playing experience
- Free from injury

Subjects were randomly divided into:

Group	Training Type	n
LTG	Ladder Training	15
PTG	Plyometric Training	15

Training Protocol

Duration: 8 weeks

Frequency: 5 days/week

Session Duration: 60 minutes

Ladder Training group:

- High knee drills
- In-out drills
- Lateral shuffle
- Cross-overs

Plyometric Training group:

- Box jumps
- Bounds
- Hurdle hops
- Split squat jumps

Variables Measured

1. Agility: T-Test (seconds)
2. Speed: 30 m Sprint (seconds)
3. Explosive Power: Vertical Jump (cm)
4. Cardiorespiratory Endurance: Yo-Yo Test (meters)

Data Collection & Analysis

Pre- and post-test scores were collected. Statistical analysis was done using *paired t-test* (within groups) and *independent t-test* (between groups) at $p < 0.05$ significance.

Results

Descriptive Statistics

Variable	Group	Pre-Test Mean	Post-Test Mean	Mean Difference
Agility (s)	LTG	11.45 ± 0.32	10.98 ± 0.28	0.47
	PTG	11.50 ± 0.35	11.10 ± 0.30	0.40
Speed (s)	LTG	4.72 ± 0.15	4.50 ± 0.12	0.22
	PTG	4.75 ± 0.18	4.42 ± 0.14	0.33
Explosive Power (cm)	LTG	42.30 ± 3.15	46.10 ± 2.90	3.80
	PTG	42.55 ± 3.20	48.90 ± 3.10	6.35
Endurance (m)	LTG	1200 ± 45	1310 ± 40	110
	PTG	1180 ± 50	1280 ± 44	100

Paired t-Test Results (Within Group)

Variable	LTG	PTG
Agility	$p = 0.001^*$	$p = 0.004^*$
Speed	$p = 0.002^*$	$p < 0.001^*$
Explosive Power	$p < 0.001^*$	$p < 0.001^*$
Endurance	$p < 0.001^*$	$p < 0.001^*$

*Significant at $p < 0.05$

Independent t-Test (Between Groups Post-Test)

Variable	<i>T</i>	<i>p</i>
Agility	1.12	0.27 (ns)
Speed	2.10	0.04*
Explosive Power	3.77	<0.001*
Endurance	1.01	0.31 (ns)

Significant differences observed for Speed and Explosive Power between groups.

Discussion

Both ladder and plyometric training significantly improved physical fitness among Kho-Kho players:

- Agility: Greater gain in Ladder group, consistent with literature on neuromuscular adaptations in footwork drills.
- Speed: PTG exhibited superior improvement, attributed to explosive training enhancing stride frequency.
- Explosive Power: Markedly higher in the plyometric group, aligning with plyometrics' role in enhancing concentric force production.
- Endurance: Both groups improved, likely due to overall training volume and intensity.

These results confirm that functional, sport-specific training enhances performance and can be recommended as part of regular conditioning programs.

Conclusion

Ladder and plyometric training are good ways to get better at the physical skills needed to do well in Kho-Kho. Plyometric training made people faster and more powerful, whereas ladder training made people more agile. To help athletes grow the best way possible, coaches and trainers should use both strategies.

Practical Implications

- Integrating ladder drills enhances agility and coordination.
- Plyometric exercises improve explosive strength and speed.
- A combined training model could produce synergistic benefits.

Limitations and Future Research

- Small sample size
- Short duration (8 weeks) Future studies should include larger samples and gender comparison, along with performance metrics during actual competitions.

References

1. Bompa, T., & Haff, G. (2009). *Periodization: Theory and Methodology of Training*. Human Kinetics.
2. Sáez de Villarreal, E. (2015). *Enhancing Agility*. Journal of Strength & Conditioning Research.
3. Markovic, G., & Mikulic, P. (2010). *Plyometrics in Sports Performance*. Sports Medicine.
4. Chu, D. A. (1998). *Jumping into Plyometrics*. Human Kinetics, Champaign, IL.
5. Miller, M. G., Herniman, J. J., Ricard, M. D., Cheatham, C. C., & Michael, T. J. (2006). The effects of a 6-week plyometric training program on agility. *Journal of Sports Science & Medicine*, 5(3), 459–465.
6. Sheppard, J. M., & Young, W. B. (2006). Agility literature review: Classifications, training and testing. *Journal of Sports Sciences*, 24(9), 919–932. <https://doi.org/10.1080/02640410500457109>
7. Faigenbaum, A. D., & Myer, G. D. (2010). Resistance training among young athletes: Safety, efficacy and injury prevention effects. *British Journal of Sports Medicine*, 44(1), 56–63.
8. Young, W. B., McDowell, M. H., & Scarlett, B. J. (2001). Specificity of sprint and agility training methods. *Journal of Strength and Conditioning Research*, 15(3), 315–319.
9. Thomas, K., French, D., & Hayes, P. R. (2009). The effect of plyometric training techniques on muscular power and agility in youth soccer players. *Journal of Strength and Conditioning Research*, 23(1), 332–338.
10. Gamble, P. (2013). *Strength and Conditioning for Team Sports*. Routledge, London.
11. Zatsiorsky, V. M., & Kraemer, W. J. (2006). *Science and Practice of Strength Training*. Human Kinetics.
12. Singh, H., & Singh, J. (2016). Effect of plyometric training on speed and explosive power of college level athletes. *International Journal of Physical Education, Sports and Health*, 3(2), 229–232.
13. Kumar, S., & Kumar, A. (2017). Impact of ladder training on agility among university players. *International Journal of Physical Education, Sports and Health*, 4(4), 124–127.
14. Sharma, R., & Manna, I. (2018). Effect of combined plyometric and agility training on selected physical fitness variables of intercollegiate athletes. *Journal of Physical Education and Sport*, 18(2), 681–686.
15. Indian Council of Sports Science Research (ICSSR). (2015). *Scientific Training Methods for Indian Sports*. New Delhi.