

Effect of Functional Calisthenics Training on Agility, Explosive Power and Endurance in Kabaddi Players: An Experimental Study

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Abstract :

BACKGROUND: Kabaddi is a high-intensity contact sport requiring agility, explosive power and endurance. Functional calisthenics uses body-weight movements that may improve strength, coordination and sport-related physical performance. This study examined the effect of a structured calisthenics programme on selected physical fitness parameters in kabaddi players.

OBJECTIVE: To study the effect of functional calisthenics training on agility, explosive power and endurance in male kabaddi players.

METHODS: An experimental one-group pre-test/post-test study was conducted in Sangli district. Thirty-four male kabaddi players aged 18–25 years with at least one year of playing experience were included. Participants completed a six-week functional calisthenics programme five days per week, with each session lasting approximately 45–60 minutes. Explosive power, endurance and agility were assessed using the Vertical Jump Test, 12-Minute Cooper Test and Illinois Agility Test, respectively. Normally distributed outcomes were analysed using paired-sample t-tests and the non-normally distributed agility outcome using the paired Wilcoxon signed-rank test.

RESULTS: Mean vertical jump increased from 45.50 ± 3.91 cm to 48.56 ± 3.99 cm (mean difference 3.06 cm; $p=0.001$; effect size 1.98). Mean Cooper Test distance increased from 2290.29 ± 178.62 m to 2444.71 ± 179.13 m (mean difference 154.41 m; $p=0.001$; effect size 1.63). Mean Illinois Agility Test time decreased from 17.06 ± 0.78 s to 16.26 ± 0.71 s (mean difference 0.79 s; $p=0.001$; effect size 0.86).

CONCLUSION: Six weeks of functional calisthenics training were associated with significant improvements in explosive power, aerobic endurance and agility among the participating male kabaddi players. Controlled studies with larger and more diverse samples are needed.

KEYWORDS: Kabaddi; calisthenics; agility; explosive power; endurance; vertical jump; Cooper test; Illinois Agility Test.

INTRODUCTION

Kabaddi is a high-intensity contact sport that requires agility, explosive power, muscular strength, balance, coordination, and endurance. Players frequently perform rapid movements such as sprinting, dodging, lunging, jumping, and tackling, making good physical conditioning essential for performance.

Functional calisthenics training uses body-weight exercises that resemble natural and sport-specific movements, helping improve functional strength, coordination, and dynamic stability.⁽¹⁾ Exercises such as squats, lunges, push-ups, jumps, core exercises, and mobility drills can help Kabaddi players develop the strength, agility, explosive power, and endurance required during matches.

Kabaddi players must repeatedly change direction while maintaining balance and control. Explosive lower-limb power is important for quick starts, jumps, and tackles, while endurance helps players maintain performance during repeated high-intensity activities. Functional calisthenics may improve these physical qualities through better muscular control, neuromuscular coordination, and movement efficiency.^(2,3)

Calisthenics training is also practical because it requires minimal equipment and can be easily implemented in schools, community settings, and sports training facilities. Physiotherapists can play an important role in designing safe and progressive exercise programs to improve performance and reduce the risk of sports-related injuries.⁽⁴⁾

Although calisthenics is increasingly used in sports conditioning, limited research has specifically examined its effects on agility, explosive power, and endurance in Kabaddi players. Therefore, the present study aims to investigate the effect of a planned functional calisthenics training program on selected physical fitness parameters in Kabaddi players. The findings may help physiotherapists, coaches, and sports professionals develop effective and practical training programs for improving Kabaddi performance.

NEED OF THE STUDY.

Kabaddi requires rapid changes of direction, explosive movements and sustained physical effort. Because calisthenics requires minimal equipment and can be progressively modified, it may be a practical conditioning strategy. The present study was undertaken to examine its effect on agility, explosive power and endurance in kabaddi players.

AIM- This study aims To study the effect of functional calisthenics training on agility, explosive power and endurance in kabaddi players.

OBJECTIVES- The objectives are To assess the effect of functional calisthenics training on agility using the Illinois Agility Test., To determine the effect of functional calisthenics training on explosive power using the Vertical Jump Test and To evaluate the effect of functional calisthenics training on endurance using the 12-Minute Cooper Test.

MATERIALS AND METHODS

An experimental one-group pre-test/post-test study was conducted over six months in Sangli district. Thirty-four male kabaddi players aged 18–25 years were included. Participants had at least one year of kabaddi playing experience, were physically fit and free from acute injury, were willing to follow the training schedule, and were available for pre- and post-testing. Participants with recent musculoskeletal injury or fracture, neurological, cardiovascular or respiratory disorders, participation in another strength or conditioning programme, contraindications to exercise, or inability/unwillingness to continue were excluded. Written informed consent and ethical clearance were obtained.

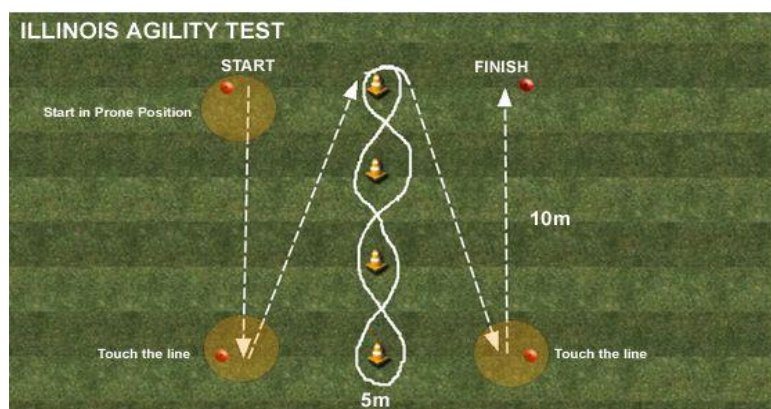
Materials included a stopwatch, cones, measuring tape, marker cones, vertical jump board or chalk, whistle, recording sheets and a suitable sports ground. Explosive power was assessed using the Vertical Jump Test; endurance using the 12-Minute Cooper Test; and agility using the Illinois Agility Test. All tests were performed before and after the intervention.

Participants completed functional calisthenics training for six weeks, five days per week, with sessions lasting approximately 45–60 minutes. Each session included a 10-minute warm-up, 30–40 minutes of calisthenics and a 10-minute cool-down. The programme included push-ups, squats, lunges, planks, burpees, jump squats, mountain climbers and jumping jacks, with progressive intensity across the six weeks. The warm-up consisted of light jogging and dynamic stretching, while the cool-down included static stretching and deep breathing.

OUTCOME MEASURES

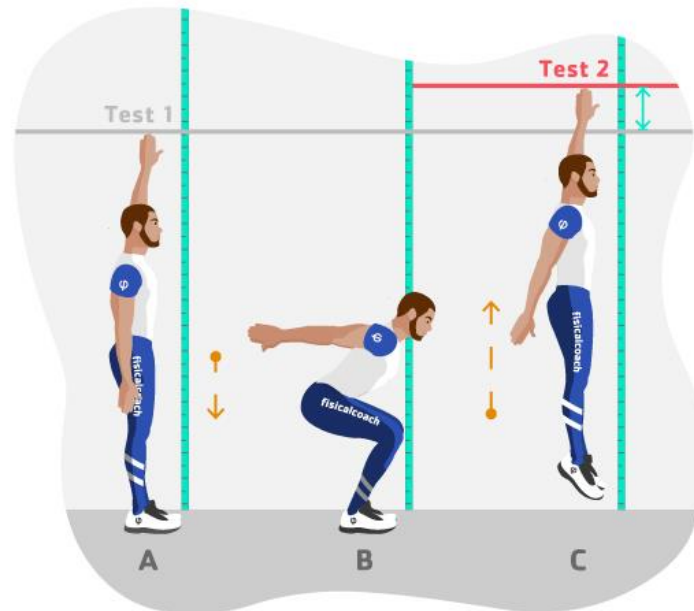
1. Illinois Agility Test

- A field-based test used to measure agility and change of direction speed.
- Conducted on a 10 m × 5 m course with cones arranged in a zig-zag pattern.
- The participant sprints and weaves through cones as fast as possible.
- Time is recorded using a stopwatch.
- Test is performed before and after the training program.
- A valid and reliable measure for assessing agility in athletes.



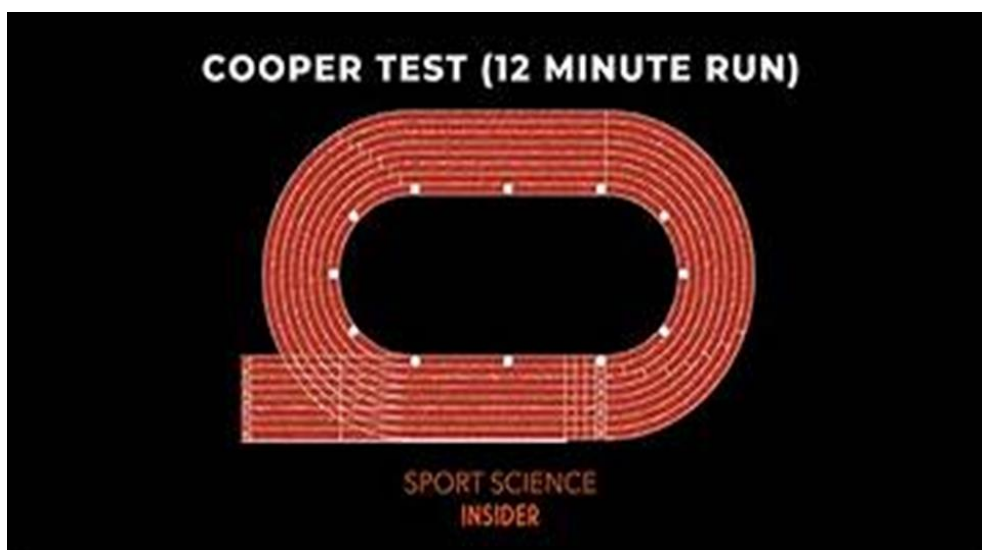
2. Vertical Jump Test

- Used to measure explosive lower-body power.
- The participant stands side-on to a wall and marks the highest reach with one hand.
- Performs a maximum vertical jump, marking the highest point reached.
- Jump height is calculated as the difference between standing reach and jump reach.
- Conducted pre- and post-intervention to assess improvement in power.



3. 12-Minute Cooper Test

- A field endurance test measuring aerobic capacity.
- Participants run or walk as far as possible within 12 minutes on a 400 m track.
- Total distance covered is recorded in meters. Used to estimate VO_2 max and endurance level.
- Administered before and after the training period.



STATISTICAL ANALYSIS

Data were analysed using PSPP/JASP as reported in the project. Descriptive statistics were expressed as mean and standard deviation. Normality was assessed using the Shapiro–Wilk test. Vertical Jump and Cooper Test data were analysed using paired-sample t-tests, while Illinois Agility Test data were analysed using the paired Wilcoxon signed-rank test. Effect sizes were reported using Cohen’s d for the paired t-test outcomes and a standardized correlation coefficient for the Wilcoxon analysis. A p-value <0.05 was considered statistically significant.

RESULTS

Thirty-four male kabaddi players participated. The recorded age distribution ranged from 18 to 25 years, with a reported mean age of 21.14 ± 2.45 years. Significant pre- to post-training improvements were observed in all three outcome measures.

Outcome	Pre-test Mean $\pm$ SD	Post-test Mean $\pm$ SD	Mean Difference	Effect Size	Test value	p-value
Vertical Jump (cm)	45.50 ± 3.91	48.56 ± 3.99	3.06	1.98	42.245	0.001
Cooper Test (m)	2290.29 ± 178.62	2444.71 ± 179.13	154.41	1.63	29.744	0.001
Illinois Agility Test (s)	17.06 ± 0.78	16.26 ± 0.71	0.79	0.86	5.014	0.001

Table 1. Pre- and post-training comparison of physical fitness outcomes

Vertical jump increased by 3.06 cm ($p=0.001$). Cooper Test distance increased by 154.41 m ($p=0.001$). Illinois Agility Test time decreased by 0.79 s ($p=0.001$), indicating improved agility.

DISCUSSION

Kabaddi is a physically demanding sport that requires agility, explosive power and endurance for activities such as sprinting, jumping, rapid changes of direction, raiding and tackling. Functional calisthenics training consists of dynamic body-weight exercises that can improve muscular control, coordination and functional performance. The present study was undertaken to determine the effect of functional calisthenics training on agility, explosive power and endurance in kabaddi players aged 18–25 years.⁽¹⁾

The present study included 34 male kabaddi players. The participants were between 18 and 25 years of age, with the majority belonging to the younger age groups.

For vertical jump, the pre-intervention mean was 45.50 ± 3.91 cm, which increased to 48.56 ± 3.99 cm after intervention. The mean difference was 3.06 cm and the paired sample t-test showed a statistically significant difference ($p=0.001$). The effect size was 1.98, indicating a large effect.⁽³⁾ The Vertical Jump Test was used to assess the players’ explosive power of the lower limbs. After the functional calisthenics training, the players showed better jumping performance, which may be due to improved muscle coordination, better activation of the leg muscles and improved ability to produce force quickly. The mean vertical jump increased showing an improvement in lower-limb explosive power.

For the 12-minute Cooper test, the pre-intervention mean distance was 2290.29 ± 178.62 m, which increased to 2444.71 ± 179.13 m post-intervention.⁽¹⁾ The mean improvement was 154.41 m and the difference was statistically significant ($p=0.001$). The reported effect size of 1.63 indicates a large effect. This suggests improvement in aerobic endurance following the training programme. The 12-minute Cooper Test was used to assess the players’ aerobic endurance and ability to sustain physical activity for a longer duration. After the functional calisthenics training, the players were able to cover a greater distance, which may be due to improved cardiovascular efficiency, better muscular endurance and improved ability of the body to use oxygen during exercise. The mean distance increased showing an improvement in aerobic endurance.

CONCLUSION

Six weeks of functional calisthenics training were associated with significant improvements in agility, explosive power and endurance among the 34 male kabaddi players studied. The programme used accessible body-weight exercises and may be a practical component of physical conditioning. Controlled trials with larger and more diverse samples are required.

LIMITATIONS

- Only 34 male kabaddi players aged 18–25 years were included.
- The study was conducted in a limited geographical area.
- The training period was relatively short.
- Diet, sleep and daily physical activity were not fully controlled.
- Only three field-based outcome measures were used.
- The one-group pre–post design limits causal inference in the absence of a concurrent control group.

FUTURE RECOMMENDATIONS

- Conduct studies with larger sample sizes.
- Include female players and different age groups.
- Use longer training and follow-up periods.
- Compare functional calisthenics with other sports-conditioning methods.
- Include additional physiological, functional and sport-specific performance measures.
- Use randomized controlled designs where feasible.

REFERENCES

1. Marwat NM, Aslam H, Hussain A, et al. Calisthenics training: effects on physical fitness (coordination, flexibility and endurance) of Kabaddi players. *PalArch's Journal of Archaeology of Egypt/Egyptology*. 2021;18(1):5212-5220.
2. Chan EWM, Reenaviviony Tony F, Rosly NH, et al. Effect of 6-weeks calisthenic training on physical fitness: a case study report. *Fitness, Performance & Health Journal*. 2024;3(1):6-13.
3. Santos AAP, Gomes WNP, Santos RS, Landim LADS. Calisthenics: a review. *Research, Society and Development*. 2020;9(10). doi:10.33448/rsd-v9i10.9371.
4. Ricardo W, Kumaidah E, Adyaksa G. The effect of calisthenic exercise on leg explosive power. *Diponegoro International Medical Journal*. 2023;4(2).
5. Wang X, Soh KG, Samsudin S, et al. Effects of high-intensity functional training on physical fitness and sport-specific performance among the athletes: a systematic review with meta-analysis. *PLoS One*. 2023;18(12):e0295531. doi:10.1371/journal.pone.0295531.
6. Panihar U, Rani D. The effect of calisthenics training on physical fitness parameters and sports specific skills of soccer players: a randomized controlled trial. *Advances in Rehabilitation*. 2022;36(2):23-31.
7. Bascón-Seda A, et al. "Effects of Training Interventions on Physical Fitness and Performance in Kabaddi Players: A Systematic Review." *Sports*. 2026;14(1):37. This systematic review included 10 studies and 458 kabaddi players and examined training effects on variables including strength, speed, agility, endurance and sport performance.
8. Gunasekar T, Balamurugan S. "Effects of Plyometric Training on Selected Motor Components in Semi-Professional Kabaddi Players – A Randomised Control Study." *Indian Journal of Physiotherapy and Occupational Therapy*. 2021;15(3):184–192. This study examined agility, sprinting and explosive power in semi-professional kabaddi players and reported significant improvements following plyometric training.
9. Xiao W, Soh KG, Wazir MRWN, et al. "Effect of Functional Training on Physical Fitness Among Athletes: A Systematic Review." *Journal of Sports Science and Medicine*. 2021. The review examined functional training and reported evidence concerning speed, muscular strength, power, balance, agility and muscular endurance in athletes.
10. Hachana Y, Chaabène H, Nabli MA, et al. "Test-Retest Reliability, Criterion-Related Validity, and Minimal Detectable Change of the Illinois Agility Test in Male Team Sport Athletes." *Journal of Strength and Conditioning Research*. 2013;27(10):2752–2759. doi:10.1519/JSC.0b013e3182890ac3. This study examined the reliability and validity of the Illinois Agility Test in male team-sport

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