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Original Article

Effect of Proprioceptive Training with Eye–Hand Coordination Activities on Agility Performance Among Male Cricket Players

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What is already known on this topic?

- *This study builds on existing evidence that agility is vital in cricket and is influenced by neuromuscular and visual–motor coordination.*
- *While previous research has explored the individual benefits of proprioceptive and eye–hand coordination training, their combined impact on cricket players' agility had not been sufficiently studied.*

What this study adds on this topic?

- *The present research demonstrates that a structured intervention combining these elements significantly improves agility compared to standard training. These findings highlight the importance of integrating proprioceptive and coordination-based exercises into cricket training programs for enhanced performance and injury prevention.*

ABSTRACT

Objective: This study aimed to evaluate the effect of proprioceptive training combined with eye–hand coordination activities on agility performance in male cricket players compared to a regular cricket training program.

Methods: A true experimental study was conducted with 50 male cricket players (aged 15-20 years) randomly assigned to an experimental group (n = 25) and a control group (n = 25). The experimental group underwent a 24-week intervention incorporating proprioceptive training and eye–hand coordination exercises alongside regular cricket training, while the control group followed only the standard training regimen. Both groups trained for an equal total weekly duration. Agility performance was assessed using the T-Agility test before and after the intervention. Statistical analysis was performed using paired and independent *t*-tests along with effect size (Cohen's *d*) and post-hoc power analysis.

Results: The experimental group showed a significant improvement in agility performance, with a reduction in T-Agility test time from 12.72 ± 1.44 seconds to 9.84 ± 0.80 seconds ($P < .001$, $d = 2.476$, power = 100%). The control group also demonstrated an improvement (12.67 ± 1.33 seconds to 12.50 ± 1.25 seconds, $P = .011$, $d = 0.132$, power = 9.7%), but the magnitude of change was significantly greater in the experimental group (post-test $P < .001$, $d = 2.530$, power = 100%).

Conclusion: The findings indicate that proprioceptive training combined with eye–hand coordination activities significantly enhances agility in cricket players compared to regular training alone. These results highlight the importance of integrating targeted neuromuscular and coordination exercises into cricket training programs for performance optimization and injury prevention, with potential applications in sports rehabilitation and occupational therapy.

Keywords: Agility, cricket, eye–hand coordination, occupational therapy, proprioceptive training, sports performance

Introduction

Agility is a critical performance attribute in cricket, influencing players' ability to execute quick directional changes, maintain balance, and react efficiently to dynamic game scenarios. Cricket, a globally recognized sport, demands high levels of agility, particularly in fast-paced formats like Twenty20, where players must accelerate, decelerate, and change direction rapidly to optimize their performance.[1,2]The ability to move swiftly with precision not only enhances an athlete's effectiveness in batting, bowling, and fielding but also minimizes the risk of sports-related injuries.[3,4] Given the growing intensity of modern cricket, training strategies aimed at improving agility are of paramount importance.

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Agility is a multifaceted skill influenced by neuromuscular coordination, balance, reaction time, and cognitive processing.[5,6] Recent research highlights that proprioceptive training, which enhances body awareness and control, significantly contributes to agility improvements by refining postural stability and neuromuscular response.[7,8] Additionally, eye–hand coordination—an essential component of cricket—plays a vital role in skill execution, particularly in batting, fielding, and wicketkeeping, where rapid visual tracking and precise motor responses are required.[9,10] Despite individual studies supporting the effectiveness of proprioceptive training and eye–hand coordination activities, limited research has examined their combined effect on agility performance in cricket players.

Training interventions incorporating proprioceptive exercises have demonstrated significant improvements in agility and movement efficiency across various sports. For instance, studies on football and hockey players have shown that proprioceptive drills enhance balance and reaction time, leading to superior agility performance.[11,12] In cricket, specific agility-enhancing programs, such as plyometric and ladder training, have been found to improve movement precision and reaction times.[13,14] Similarly, balance training interventions have proven effective in young cricketers, highlighting their potential for agility enhancement.[15] However, while proprioceptive training has been widely recognized for its benefits in motor skill development, its integration with eye–hand coordination activities remains underexplored in the context of cricket training.

Despite the growing evidence supporting the individual benefits of proprioceptive training and eye–hand coordination exercises on athletic performance, their combined effect on agility in cricket players has not been adequately investigated. Most existing studies have examined these components in isolation or in sports other than cricket, limiting the direct applicability of findings to cricket-specific performance demands. Given the unique perceptual–motor requirements of cricket that integrate rapid visual processing, precise hand control, and dynamic postural adjustments, there is a clear need to explore an integrative training approach. Therefore, the present study aimed to evaluate the combined effect of proprioceptive training and eye–hand coordination activities on agility performance among male cricket players. It was hypothesized that male cricket players undergoing proprioceptive training combined with eye–hand coordination activities would demonstrate significantly greater improvements in agility performance compared to players receiving standard cricket training alone. By examining agility outcomes through a structured intervention program, this study seeks to contribute to existing sports science literature and offer practical recommendations for performance enhancement in cricket.

Methods

A true experimental study with a pre-test and post-test control group design was conducted to examine the effect of proprioceptive training combined with eye–hand coordination activities on agility performance in male cricket players. The study protocol was reviewed and approved by the Institutional Ethics Committee of SIMATS University prior to the commencement of data collection (Reg. No.: SCOT/ISRB/087/2024 and Date of approval: August 1, 2024).

Participants were first screened using the Physical Activity Readiness Questionnaire, a standardized tool designed to identify individuals requiring medical evaluation before engaging in physical activity.[16] The screening process ensured that all participants met the eligibility criteria of being male cricket players aged 15-20 years with at least 6 months of cricket training experience, while those with recent lower-limb injuries, previous surgeries, or cardiovascular conditions were excluded. After screening, 50 eligible participants were obtained and randomly assigned into 2 groups: the experimental group (n = 25), which received proprioceptive and eye–hand coordination training, and the control group (n = 25), which followed only their standard cricket training program (Table 1). Agility performance was assessed using the T-Agility test, a widely validated measure with high reliability (intraclass correlation coefficient: 0.81-0.99).[17]

Both groups trained for the same total weekly duration, with the experimental group replacing a portion of routine conditioning with proprioceptive and eye–hand coordination activities to ensure equivalent training volume. The experimental group completed a 24-week structured intervention program, conducted 3 times per week with each session lasting 60 minutes. Each session included a 10-minute warm-up (dynamic stretching and sport-specific drills), followed by 20 minutes of proprioceptive training and 20 minutes of eye–hand coordination activities, and concluded with a 10-minute cool-down (static stretching and deep breathing). The intervention was delivered progressively across foundation, development, and performance phases (Table 2). Proprioceptive training targeted balance, joint position sense, and postural control, while eye–hand coordination activities focused on visual tracking, reaction time, and manual precision. Training intensity and task complexity were systematically progressed across phases to optimize neuromuscular and visual–motor integration and enhance agility. The proprioceptive component was based on established evidence supporting its role in improving balance, neuromuscular control, and agility through sensorimotor integration.[7,8,12] The eye–hand coordination component was developed using sport-specific visual–motor training principles shown to improve reaction time, visual tracking, and manual precision in fast-ball sports.[9,10]

Participants in the control group continued with their standard cricket training program, which was conducted 3 sessions per week, with each session lasting 60 minutes, matching the total training duration of the experimental group. The standard training regimen comprised batting practice drills, bowling drills, fielding skill training, endurance running, and general strength conditioning exercises. This training structure is consistent with commonly adopted conventional cricket conditioning programs and aligns with the American College of Sports Medicine guidelines for youth athletic training and conditioning.[16,17]

Post-intervention agility assessments were conducted during weeks 23-24, at least 48 hours after the final training session, to minimize the effects of acute fatigue or arousal and to reflect true chronic training adaptations. Statistical analysis was performed using IBM SPSS version 23.0. Paired t-tests were used for within-group (pre–post) comparisons, and independent t-tests were applied for between-group post-test comparisons. In addition to P-values, effect sizes (Cohen's d) and post-hoc power analysis were computed for all major outcomes to enhance the interpretation of both statistical and clinical significance. Statistical significance was set at $P < .05$, with $P < .01$ considered highly significant.

Table 1. Demographic Distribution Based on Age for Control Group and Experimental Group

		No. of Players in			
S. No.	Age of the Players (Years)	Control Group	%	Experimental Group	%
1	15	2	8	4	16
2	16	3	12	3	12
3	17	7	28	4	16
4	18	3	12	4	16
5	19	4	16	6	24
6	20	6	24	4	16

Table 2. Intervention Protocol

Phase	Weeks	Number of Sessions	Objective	Proprioceptive Training Activities	Eye–Hand Coordination Activities
Pretest phase	1-2	6	To assess baseline performance level	Pretest performed (T-Agility test)	
Foundation phase	3-8	18	To build baseline proprioception, coordination, and agility	Single-limb stance with multi-directional reach, Squat jumps, box jumps, split jumps	Ball-transfer drills, basic juggling tasks
Development phase	9-14	18	To enhance proprioceptive control and visual–motor coordination	Hexagonal balance drills, single-leg dynamic balance, multi-directional lunges	Reaction-ball drills, target throwing with visual cues, unpredictable ball tracking exercises
Performance phase	15-22	24	To optimize proprioception and eye–hand coordination	Balance and throw drills on wobble boards, single-leg squats	Fast-paced multi-ball catching drills, advanced juggling tasks, visual reaction tracking
Posttest phase	23-24	6	To assess post-intervention performance level	Posttest (T-Agility test) performed	

Informed consent was secured from all participants before data collection, ensuring adherence to research ethics and participant safety.

Results

The study analyzed the effect of proprioceptive training combined with eye–hand coordination activities on agility performance in male cricket players using the T-Agility test as the primary outcome measure. There was no statistically significant difference in mean age between the control and experimental groups at baseline ($P = .676$), confirming that both groups were demographically comparable (Table 3). The effect size was negligible ($d = 0.118$), and the statistical power for detecting age differences was low (10.8%), consistent with the absence of meaningful baseline age variation. There was no significant difference in baseline agility scores between the control and experimental groups ($P = .901$), confirming baseline equivalence. The control group showed a statistically significant but clinically minimal improvement in agility ($P = .011$, $d = 0.132$, power = 9.7%). In contrast, the experimental group demonstrated a highly significant and clinically large improvement in agility performance ($P < .001$, $d = 2.476$, power = 100%). Post-test comparison between groups also revealed a highly significant difference ($P < .001$) with a very large effect size ($d = 2.530$) favoring the experimental group and 100% statistical power, confirming the strong effectiveness of the combined proprioceptive and eye–hand coordination intervention (Table 4).

Discussion

The present study examined the combined effects of proprioceptive training and eye–hand coordination activities on agility performance among male cricket players. The findings demonstrated that while the control group showed a statistically significant improvement, the experimental group exhibited a substantially greater and clinically meaningful enhancement in agility performance. These results clearly indicate the superiority of an integrated sensorimotor training approach over conventional cricket conditioning alone.

The findings of this study are in agreement with previous research demonstrating that proprioceptive training significantly improves balance, neuromuscular control, and agility in athletes. Studies conducted among football, hockey, and cricket players have consistently reported that proprioceptive and balance-based training enhances postural stability, reaction time, and movement efficiency, which directly contribute to improved agility performance.[7,8,11,12,15] Additionally, agility-focused interventions such as ladder and plyometric training have been shown to improve movement precision and change-of-direction ability in cricketers.[13,14] These findings help explain the improvements observed in the control group while also supporting the markedly superior gains seen in the experimental group.

The significantly greater improvement observed in the experimental group can be attributed to the combined inclusion of eye–hand coordination activities along with proprioceptive training. Agility in cricket requires rapid visual information processing, anticipatory postural control, and precise motor execution under time constraints. Eye–hand coordination training enhances visual tracking, reaction time, anticipation, and movement accuracy, all of which are essential for effective batting, fielding, and wicketkeeping.[9,10] The integration of visual–motor activities with proprioceptive exercises likely enhanced

Table 3. Statistical Comparison of Mean Age Between Groups

S. No.	Group	N	Mean	SD	*t*	*df*	*P*	Effect Size (Cohen's *d*)	Power
1	Control	25	17.88	1.641	0.420	48	.676	0.118	10.8%
2	Experimental	25	17.68	1.725					

Table 4. Comparison of T-Agility Test Scores with Effect Size and Power Analysis

Comparison	Group(s)	N	Mean ± SD	*t*	*df*	*P*	Effect Size (Cohen's *d*)	Power (%)
Baseline (pretest) between groups	Control	25	12.67 ± 1.325	−0.125	48	.901	0.036 (negligible)	6.4
	Experimental	25	12.72 ± 1.437					
Within control group (pre vs. post)	Pretest	25	12.67 ± 1.325	2.764	24	.011*	0.132 (very low)	9.7
	Posttest	25	12.50 ± 1.253					
Within experimental group (pre vs. post)	Pretest	25	12.72 ± 1.437	17.715	24	.000**	2.476 (very high)	100
	Posttest	25	9.84 ± 0.800					
Posttest between groups	Control	25	12.50 ± 1.253	8.919	48	.000**	2.530 (very high)	100
	Experimental	25	9.84 ± 0.800					

*Significant at 5% level.
**Significant at 1% level.

both perceptual awareness and motor execution, thereby producing the superior agility improvements observed in the experimental group.

From a mechanistic standpoint, proprioceptive training enhances afferent sensory input from muscles, joints, and the vestibular system, thereby improving sensorimotor integration within the central nervous system.[7,8] This leads to faster neuromuscular activation, improved joint stability, and more efficient postural adjustments during rapid directional movements. Studies on balance training in young cricketers have similarly demonstrated significant improvements in agility through enhanced neuromuscular control.[15] Eye–hand coordination training further improves visual–motor integration by enhancing reaction speed, timing, and manual precision, which are critical for performance in fast-paced ball sports such as cricket.[9,10] The combined stimulation of proprioceptive and visual–motor systems likely facilitated synergistic neuroadaptive responses, resulting in superior agility performance in the experimental group.

The practical implications of these findings are particularly important for youth cricket training. Traditional cricket conditioning primarily emphasizes strength, endurance, and technical skill development, with relatively limited structured attention to sensorimotor and visual–motor integration. The present results suggest that systematically incorporating proprioceptive and eye–hand coordination exercises into routine cricket training programs can significantly enhance agility without increasing overall training load. Given the substantial physical and cognitive demands of modern cricket, such evidence-based sensorimotor training may also contribute to improved performance and reduced injury risk.[1,6]

Beyond athletic performance, the findings also have meaningful relevance for rehabilitation and occupational therapy practice. Proprioceptive and eye–hand coordination training are fundamental components of neurorehabilitation, orthopedic rehabilitation, and pediatric therapy. The observed improvements in agility through combined sensorimotor training highlight its potential application in individuals recovering from lower-limb injuries, those with balance impairments, and children with developmental coordination disorders.[7,8,11,12,15] This supports the broader translational value of the present intervention beyond sports populations.

Importantly, the present study makes a unique contribution to the sports science literature by specifically examining the combined effects of proprioceptive training and eye–hand coordination activities on agility performance in cricket players. While previous studies have investigated these components independently, their integrated application within cricket training has remained relatively underexplored.

Future research should examine the long-term retention effects of combined proprioceptive and visual–motor training across different age groups, competitive levels, and both genders. Large-scale, multicenter randomized trials are recommended to strengthen the generalizability of these findings. Additionally, future studies should explore the application of similar intervention protocols in rehabilitation populations and incorporate objective neuromuscular and reaction-time measures to further elucidate the underlying neurophysiological mechanisms of agility enhancement.

Limitations

This study is limited by its small sample size and single-location recruitment, which may affect the generalizability of the findings. Additionally, the long-term effects of the intervention and its impact under real-game conditions were not assessed.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of SIMATS University (Approval No.: SCOT/ISRB/087/2024; Date: August 1, 2024).

Informed Consent: Written informed consent was obtained from the participants who participated in this study.

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References

1. Pardiwala DN, Rao NN, Varshney AV. Injuries in cricket. *Sports Health*. 2018;10(3):217-222. [CrossRef]
2. Noakes TD, Durandt JJ. Physiological requirements of cricket. *J Sports Sci*. 2000;18(12):919-929. [CrossRef]
3. Soomro N, Strasiotto L, Sawdagar T, et al. Cricket injury epidemiology in the twenty-first century: what is the burden? *Sports Med*. 2018;48(10):2301-2316. [CrossRef]
4. McLeod G, O'Connor S, Morgan D, et al. Prospective reporting of injury in community-level cricket: a systematic review to identify research priorities. *J Sci Med Sport*. 2020;23(11):1028-1043. [CrossRef]
5. Paul DJ, Gabbett TJ, Nassis GP. Agility in team sports: testing, training and factors affecting performance. *Sports Med*. 2016;46(3):421-442. [CrossRef].
6. Negra Y, Chaabene H, Hammami M, et al. Agility in young athletes: is it a different ability from speed and power? *J Strength Cond Res*. 2017;31(3):727-735. [CrossRef]
7. Salot C, Sathya P. Effects of proprioceptive training on agility performance in male football players. *Indian J Physiother Occup Ther*. 2020;14(1):68-72.
8. Taskın C, Bıcer YS. The effect of an eight-week proprioception training program on agility, quickness and acceleration. *Turk J Sport Exe*. 2015;17(2):26-30. [CrossRef]
9. Nagaraj T. *Effect of General Specific and Combined Fitness Training on Selected Skill Related Fitness and Performance among Cricket Players* [Doctoral dissertation, 2017].
10. Mayengbam SS, Rajashekaran M. Analysis of game specific skill practices on hand-eye coordination and balance of cricket players. *Int J Multidiscip Res*. 2024;6(1). [CrossRef]
11. Nagabothu V, Johnson D. Effect of proprioceptive exercises with agility training on selected motor abilities physiological and skill related performance variables among hockey men players. *Mustansiriyah J Sports Sc*. 2024:441-448. [CrossRef]
12. Moreira NB, Alves RC, Ferandes DY, et al. Effect of proprioceptive training and central stabilization in physical fitness in young soccer players. *J Phys Educ Sport*. 2017;17(2):810.
13. Latif DD, Afzal DMF, Jabbar DR, et al. Dose response of plyometric training on agility in cricket players. *Pak J Rehabil*. 2023;12(2):124-129. [CrossRef]
14. Dave VR, Singh AK. Comparison of ladder training versus plyometric training on agility & speed among Vadodara cricket players: an experimental study. *Indian J Physiother Occup Ther*. 2024;18(2):91-97.
15. Kubal S, Padwal D. The effect of balance training on agility in young cricketers. *Int J Sci Res (IJSR0)*. 2016;5(10):485-492.
16. Pescatello LS, ed. *ACSM's Guidelines for Exercise Testing and Prescription*. Lippincott Williams & Wilkins; Philadelphia; 2014.
17. Ratamess N. *ACSM's Foundations of Strength Training and Conditioning*. Lippincott Williams & Wilkins; Philadelphia; 2021.