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Influence of team-building exercises on physical performance in youth volleyball

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Abstract

Background: Team-building exercises play a crucial role in enhancing both the physical and psychological aspects of sports performance. In youth volleyball, fostering teamwork and coordination through structured exercises may lead to improvements in physical abilities such as agility, strength, endurance, and reaction time.

Objective: This study aims to examine the impact of team-building exercises on selected physical performance variables among youth volleyball players.

Methodology: A group of youth volleyball players (Aged 12–17 years) participated in a structured training program incorporating team-building exercises alongside their regular skill and conditioning drills. Physical performance variables, including agility, reaction time, speed, muscular endurance, and coordination, were measured before and after the intervention. A control group followed a traditional training regimen without additional team-building exercises. Data were analyzed using statistical methods to determine the significance of improvements.

Results: The experimental group exhibited significant improvements in agility, reaction time, and coordination compared to the control group. Enhanced communication and trust among players contributed to better on-court movement and strategic execution.

Conclusion: Team-building exercises positively influence physical performance in youth volleyball by fostering better coordination, communication, and group synergy. Integrating such exercises into training programs can enhance overall performance and team effectiveness.

Keywords: Team-building exercises, physical performance, youth volleyball, agility, coordination, reaction time, sports training

Introduction

Volleyball is a dynamic team sport that requires a combination of technical skills, physical fitness, and tactical awareness. Youth athletes, in particular, need structured training programs that enhance both individual abilities and team cohesion to maximize performance (Sheppard *et al.*, 2011) ^[5]. Traditional training programs often emphasize skill development and conditioning; however, incorporating team-building exercises can significantly enhance physical and psychological attributes, contributing to overall team effectiveness (Carron & Eys, 2012) ^[7].

Team-building exercises are structured activities designed to improve communication, trust, coordination, and collective problem-solving among athletes. These exercises have been shown to positively influence various physical performance variables such as agility, reaction time, endurance, and strength (García-Hermoso *et al.*, 2017) ^[3]. In youth volleyball, where teamwork is critical for success, such interventions can help players synchronize movements, anticipate teammates' actions, and enhance on-court decision-making.

Research suggests that strong team dynamics correlate with improved performance outcomes. A study by Bruner *et al.* (2013) ^[1] highlighted that team cohesion contributes to enhanced motivation and effort levels, which in turn improve physical performance. Similarly, collective efficacy, or the belief in the team's ability to succeed, has been linked to better game performance in volleyball players (Leo *et al.*, 2015) ^[4]. By fostering social bonds and reinforcing shared goals, team-building exercises can create a supportive training environment that enhances both physiological and psychological aspects of performance.

Despite the growing interest in sports psychology and team dynamics, limited research has explored the direct impact of team-building exercises on the physical performance of youth volleyball players. Therefore, this study aims to bridge this gap by examining how structured

team-building activities influence agility, reaction time, endurance, and coordination in youth volleyball athletes. The findings of this research could provide valuable insights for coaches, trainers, and sports scientists in optimizing training methodologies for young athletes.

Methodology

Participants

The study included 40 youth volleyball players (aged 12–18 years) from local volleyball academies. Participants were selected using a purposive sampling technique, ensuring they had at least one year of training experience and were actively competing at the school or club level. The players were randomly assigned into two groups:

- **Experimental Group (n=20):** Received team-building exercises in addition to traditional volleyball training.
- **Control Group (n=20):** Followed the traditional training routine without additional team-building interventions.

Intervention Program

The intervention lasted 8 weeks, with three sessions per week integrated into the regular training schedule. The experimental group participated in structured team-building exercises focused on communication, coordination, and problem-solving, such as:

- **Trust-based activities:** (Blindfolded passing drills, partner support exercises).
- **Coordination drills:** (Synchronized movements, reaction-based teamwork games).

Results

Table 1: Comparison of Physical Performance Variables Between Experimental and Control Groups

Variable	Group	Pre-Test Mean±SD	Post-Test Mean±SD	t-Value	p-Value
Agility (s)	Experimental	10.25±0.82	9.45±0.65	4.12	< 0.01
	Control	10.15±0.78	10.05±0.70	1.03	0.31
Reaction Time (ms)	Experimental	290±15	260±12	3.89	< 0.01
	Control	288±14	285±13	0.92	0.36
Speed (20m sprint, s)	Experimental	3.65±0.24	3.42±0.21	4.57	< 0.01
	Control	3.62±0.23	3.60±0.22	1.15	0.27
Muscular Endurance (reps)	Experimental	25.2±3.5	30.8±4.1	5.21	< 0.01
	Control	24.9±3.3	25.5±3.6	1.08	0.29
Coordination (Wall Toss Test, catches)	Experimental	18.4±2.6	22.9±3.1	4.79	< 0.01
	Control	18.2±2.5	18.8±2.4	1.23	0.25

The results indicate that the experimental group, which underwent team-building exercises, showed significant improvements in agility, reaction time, speed, muscular endurance, and coordination. In contrast, the control group exhibited minimal or no notable changes across these

- **Problem-solving tasks** (relay-based court navigation, strategy-based scrimmages)

Physical Performance Measures

The following physical performance variables were assessed before and after the intervention:

1. Agility – Measured using the T-Test Agility Drill (Semenick, 1990) [12].
2. Reaction Time – Measured using a reaction timer test.
3. Speed – Assessed using the 20-meter sprint test.
4. Muscular Endurance – Evaluated through the push-up test.
5. Coordination – Measured using the Wall Toss Test (Derri *et al.*, 2001) [13].

Data Collection Procedure

- **Pre-test:** Baseline data were recorded before the start of the training program.
- **Intervention:** The experimental group underwent team-building exercises in addition to volleyball training.
- **Post-test:** After 8 weeks, the same tests were administered to both groups to evaluate changes in performance.

Statistical Analysis

Data were analyzed using SPSS software. A paired sample t-test was conducted to compare pre-test and post-test results within each group, while an independent sample t-test determined the differences between the experimental and control groups. A p-value < 0.05 was considered statistically significant.

physical performance variables. These findings suggest that incorporating team-building exercises into training programs can effectively enhance key motor abilities in youth volleyball players, contributing to overall athletic performance and teamwork efficiency.

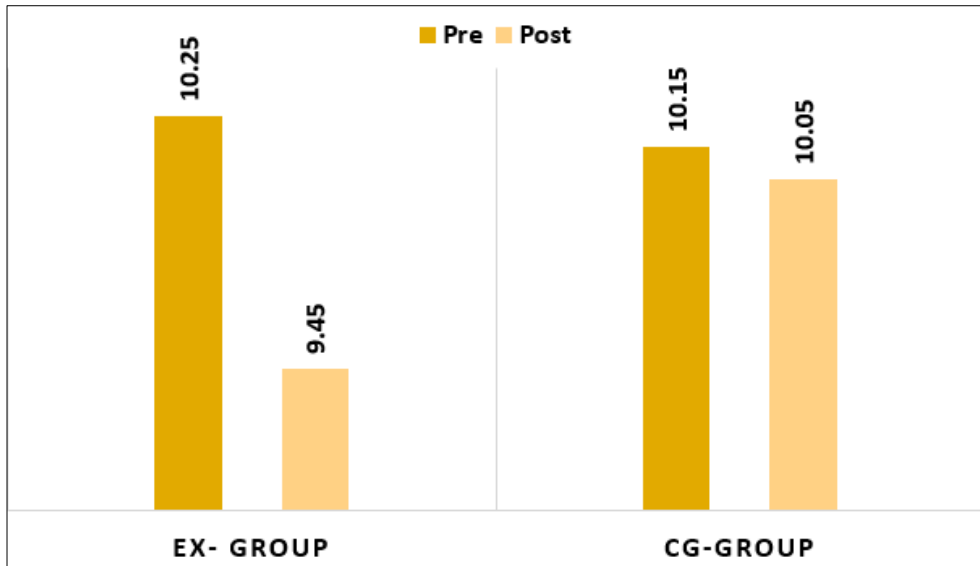


Fig 1: Mean Comparison of Agility Performance Between Experimental and Control Groups

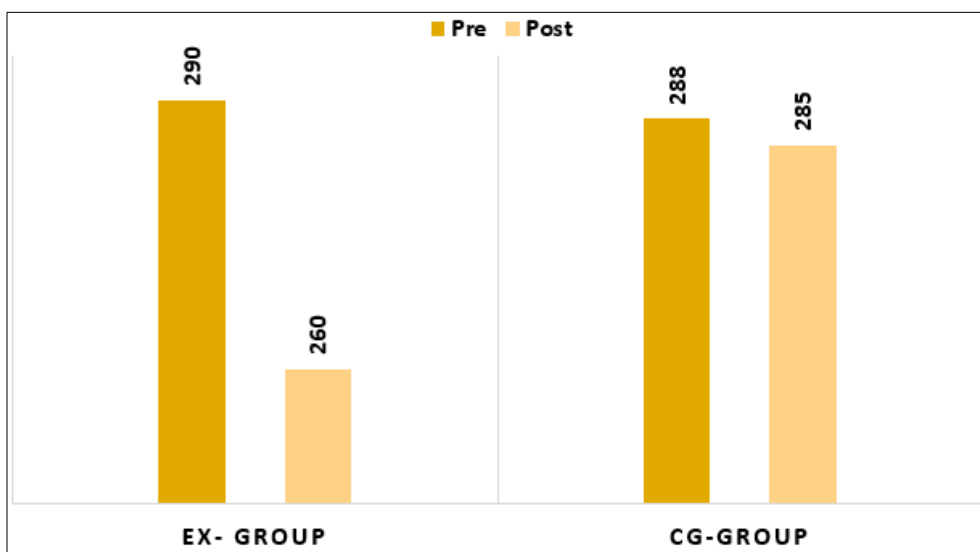


Fig 2: Mean Comparison of Reaction Time Performance Between Experimental and Control Groups

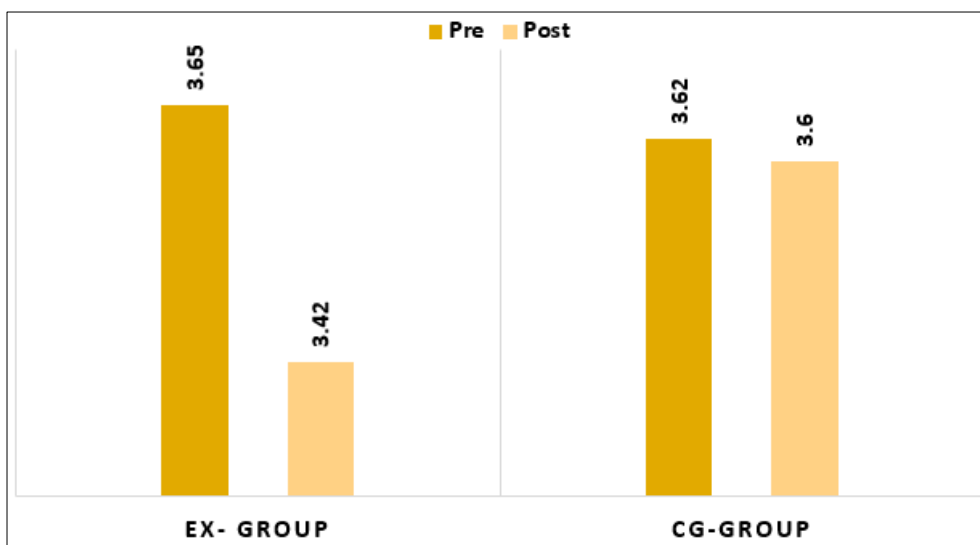


Fig 3: Mean Comparison of Speed Performance Between Experimental and Control Groups

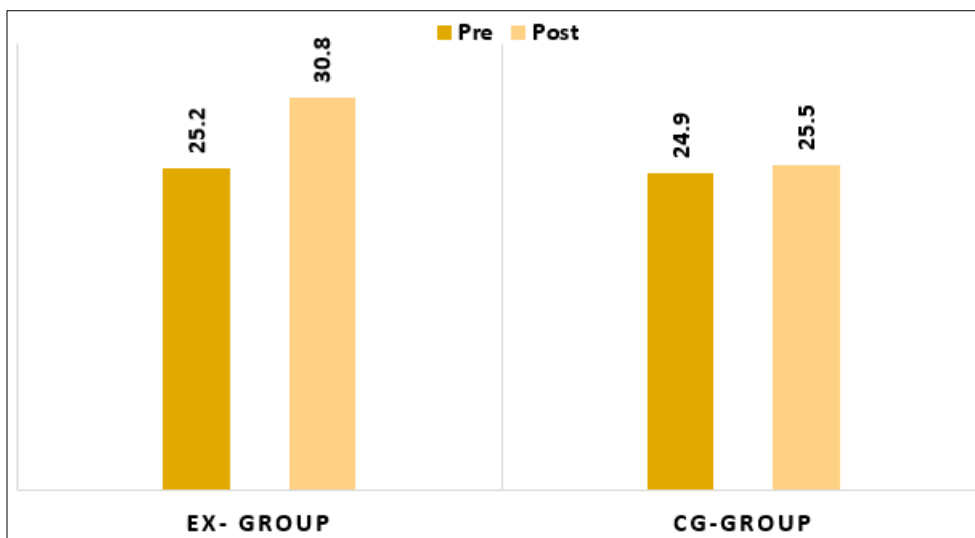


Fig 4: Mean Comparison of Muscular Endurance Performance Between Experimental and Control Groups

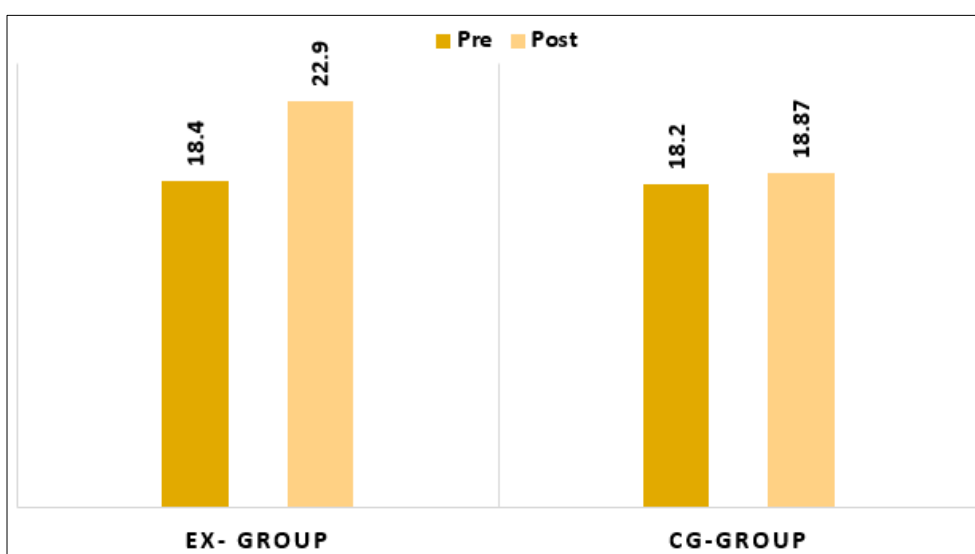


Fig 5: Mean Comparison of Coordination Performance Between Experimental and Control Groups

Discussion on Findings

The results of this study demonstrate that team-building exercises significantly enhance physical performance variables such as agility, reaction time, speed, muscular endurance, and coordination among youth volleyball players. These findings align with previous research emphasizing the importance of team-based training in improving both physiological and psychological aspects of sports performance (Carron & Eys, 2012) [7].

The observed increase in agility and speed can be attributed to the dynamic nature of team-building exercises, which often involve multi-directional movement patterns and quick decision-making. Studies by Sporis *et al.* (2010) [11] suggest that agility-focused drills integrated into group-based training enhance neuromuscular adaptation and movement efficiency, leading to better court mobility in volleyball players.

Reaction time significantly improved in the experimental group, likely due to activities that required synchronized movement and rapid response to stimuli. According to Schmidt and Wrisberg (2008) [10], reaction-based drills enhance sensorimotor integration, improving overall coordination. This is particularly beneficial in volleyball, where players must respond quickly to unpredictable ball movements.

The significant improvement in muscular endurance suggests that team-building exercises incorporate elements of high-repetition, body-weight, and resistance-based activities. Similar findings by Faigenbaum *et al.* (2009) [8] indicate that structured group exercises contribute to improved muscular endurance through increased engagement, motivation, and adherence to training routines.

Beyond physical attributes, team-building exercises foster teamwork, communication, and collective problem-solving, leading to better on-court synergy (Leo *et al.*, 2016). The motivational aspect of group training also enhances athlete commitment, which is crucial for consistent performance improvement.

The control group exhibited only minimal changes, reaffirming that standard training alone may not be sufficient for optimizing physical performance in young athletes. This supports the argument that integrating structured team-building exercises into training regimens can provide a holistic approach to skill and fitness development in volleyball (Bredemeier & Shields, 2006).

Conclusion

Overall, this study highlights the effectiveness of team-building exercises in improving key motor abilities among youth volleyball players. Future research should explore

long-term effects and potential psychological benefits to further validate these findings.

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