

# Effects of Volleyball Mini-Tournaments on Teamwork, Motor Coordination, and Motivation in School-Age Children

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| Article Info                                                                                                                                                                                                                                                                                                         | Abstract                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>Article type:</b><br/>Research Article</p> <p><b>Article history:</b><br/>Received 06 March 2026<br/>Received in revised form 09 May 2026<br/>Accepted 26 May 2026<br/>Available online 29 June 2026</p> <p><b>Keywords:</b><br/>Team Sports,<br/>Child,<br/>Motor Skills,<br/>Motivation,<br/>Volleyball.</p> | <p><b>Introduction:</b> Team sports during childhood promote physical, social, and psychological development. Mini-tournaments, or short structured game formats, may enhance teamwork, motor coordination, and motivation, but empirical evidence in volleyball is limited.</p> <p><b>Objective:</b> To investigate the effects of volleyball mini-tournaments on teamwork, motor coordination, and motivation in school-age children.</p> <p><b>Method:</b> Seventy-two children (8–12 years; 38 boys, 34 girls) were assigned by class to a mini-tournament group (n=36) or a control group (n=36). The intervention consisted of two 40-minute volleyball mini-tournament sessions per week for 8 weeks, including small-sided matches emphasizing skill application, collaboration, and fair play. Teamwork was assessed using a validated observational checklist, motor coordination with the Körperkoordinationstest für Kinder (KTK), and intrinsic motivation using the Intrinsic Motivation Inventory (IMI) – Sports Version. Data were analyzed using ANCOVA.</p> <p><b>Results:</b> In the posttest, the mini-tournament group demonstrated significant improvements compared to controls: teamwork (<math>17.6 \pm 2.1</math> vs. <math>12.9 \pm 2.5</math>; <math>F=101.2</math>, <math>p&lt;0.001</math>, partial <math>\eta^2=0.59</math>), motor coordination (<math>98.2 \pm 8.0</math> vs. <math>91.9 \pm 8.5</math>; <math>F=85.4</math>, <math>p&lt;0.001</math>, partial <math>\eta^2=0.54</math>), and intrinsic motivation (<math>4.3 \pm 0.4</math> vs. <math>3.6 \pm 0.5</math>; <math>F=72.8</math>, <math>p&lt;0.001</math>, partial <math>\eta^2=0.50</math>).</p> <p><b>Conclusions:</b> Volleyball mini-tournaments significantly enhance teamwork, motor coordination, and motivation in school-age children. Structured, game-based interventions provide an efficient, engaging, and developmentally appropriate approach for promoting both physical and psychosocial outcomes in youth sports.</p> <p><b>Cite this Article:</b> Rezaei, F. (2026). Effects of Volleyball Mini-Tournaments on Teamwork, Motor Coordination, and Motivation in School-Age Children. <i>Physical Activity in Children</i>, 3(1), 9-14. <a href="https://doi.org/10.22034/pach.2026.577587.1086">https://doi.org/10.22034/pach.2026.577587.1086</a></p> |

## 1. Introduction

Participation in organized sports during childhood plays a crucial role in promoting physical, cognitive, and social development (1,2). Among these benefits, teamwork, motor coordination, and motivation are particularly critical. Teamwork allows children to develop collaborative problem-solving skills, communication, and social cohesion, which not only enhance sports performance but also contribute to social and emotional development (3,4). Motor coordination is essential for skill execution and overall physical competence, influencing performance in sports, physical education, and recreational activities (5,6). Motivation, especially intrinsic motivation, drives sustained engagement, encourages skill acquisition, and promotes long-term participation in physical activity (7,8). Therefore, identifying effective training approaches that simultaneously enhance teamwork, motor coordination, and motivation represents an important objective in youth sport programs.

Volleyball is a dynamic team sport that requires a combination of rapid movements, precise timing, hand-eye coordination, and strategic thinking (9). The game involves a variety of motor skills, including

jumping, spiking, passing, and digging, which demand fine and gross motor coordination, balance, and agility (10). Unlike solitary or drill-based training, volleyball emphasizes interpersonal coordination, as players must respond to the actions of teammates and opponents in real time (11). Despite these demands, traditional training methods in youth volleyball often emphasize repetitive technical drills, which may limit opportunities for children to develop teamwork, adaptive coordination, and decision-making skills within realistic game contexts.

In response to these limitations, game-based approaches have increasingly been proposed as effective strategies for youth sport development. One such approach is the use of mini-tournaments, which consist of short, structured competitive matches involving small teams (12,13). These formats offer children the opportunity to experience realistic game scenarios, apply learned techniques, and collaborate with teammates under low-pressure conditions (14). Importantly, mini-tournaments can enhance motivation by making the learning environment more enjoyable, challenging, and socially engaging (15). Children are more likely to experience autonomy and

competence, which are key components of intrinsic motivation according to self-determination theory.

Several theoretical perspectives support the potential effectiveness of mini-tournaments in youth sport contexts. Ecological dynamics theory suggests that motor skill development emerges from the interaction between the individual, the task, and the environment (16,17). By engaging children in mini-tournaments, the environment provides affordances, opportunities for action, that challenge coordination, timing, and adaptability. Children must respond to unpredictable situations, such as varying ball trajectories or teammates' positioning, which promotes adaptive motor control and problem-solving. Similarly, motor learning theories emphasize the importance of contextual and variable practice for skill acquisition (18,19). Repetitive drills alone may improve technique but may not generalize to real-game performance; in contrast, mini-tournaments offer variability, requiring children to adapt to changing game dynamics, enhancing transfer of skills.

Motivation, another central outcome, can also be explained through self-determination theory, which highlights the importance of autonomy, competence, and relatedness for intrinsic motivation (20). Mini-tournaments can satisfy these psychological needs: children exercise autonomy by making decisions in-game, experience competence by successfully coordinating actions with teammates, and develop relatedness through social interactions (21,22). Research indicates that children who experience intrinsic motivation are more likely to engage in sustained physical activity, persist through challenges, and enjoy sports participation, which has implications for both short-term performance and long-term health behaviors (23,24).

Empirical studies have begun to examine the effects of game-based interventions on children's development (25-27). Research highlighted the importance of play and structured games in developing both social skills and physical competence (25). Studies in youth basketball and soccer have demonstrated that small-sided games and tournament formats improve teamwork, decision-making, and technical skills (12,28). In volleyball, preliminary evidence suggests that small-sided games enhance cooperative behaviors and in-game motor coordination, though research on structured mini-tournaments in school-aged children remains limited (14). Additionally, interventions targeting motivation through enjoyable, competitive formats have shown increases in intrinsic motivation and engagement, supporting the potential benefits of mini-tournaments beyond technical skill development (29). However, research specifically examining structured mini-tournaments in school-aged children remains limited. Furthermore, few studies have simultaneously investigated their effects on teamwork, motor coordination, and motivation within the same intervention.

Therefore, a key gap in the literature is the lack of research examining the combined influence of volleyball mini-tournaments on social, motor, and motivational outcomes in children. Addressing this gap is important for developing evidence-based training approaches that promote both skill development and positive sport experiences in youth.

The present study aimed to investigate the effects of volleyball mini-tournaments on teamwork, motor

coordination, and motivation in children aged 8-12 years. It was hypothesized that participation in a mini-tournament-based program would lead to significant improvements in teamwork behaviors, motor coordination, and intrinsic motivation compared with traditional practice sessions.

## 2. Methods

### 2.1. Study Design

This study employed a quasi-experimental, pre-post intervention design to examine the effects of volleyball mini-tournaments on teamwork, motor coordination, and motivation in children.

### 2.2. Participants

A total of 72 children aged 8-12 years were recruited from local primary schools, with inclusion criteria comprising an age between 8 and 12 years, absence of musculoskeletal or neurological impairments that could limit participation, and provision of parental consent and child assent, while exclusion criteria included participation in other structured team-sport programs, presence of chronic illnesses or recent injuries, and inconsistent school attendance; participants were assigned by class to either the intervention group (n = 36) or the control group (n = 36), with the groups balanced for age, sex, and baseline skill levels.

### 2.3. Intervention: Volleyball Mini-Tournaments

The intervention consisted of structured volleyball mini-tournaments conducted twice weekly for 8 weeks, integrated into school physical education classes:

- **Session duration:** 40 minutes
- **Structure:**
  - Warm-up (5-7 minutes): dynamic stretching, light ball handling
  - Mini-tournaments (30 minutes): children were divided into small teams (3-4 players), playing short matches (5-10 minutes each) in a round-robin format, rotating opponents to maximize engagement and participation
  - Cool-down (3-5 minutes): stretching, team discussion, and reflection on performance

Mini-tournaments emphasized skill application, teamwork, and fair play. Coaches provided positive feedback and encouraged collaborative decision-making and problem-solving within teams. Complexity and challenges were gradually increased over the 8 weeks by adjusting team size, match duration, and scoring rules.

The control group participated in standard physical education sessions focused on technical drills and skill repetition without competitive mini-tournament formats.

### 2.4. Measurements

#### 2.4.1. Teamwork

Teamwork was assessed using a validated observational checklist adapted for youth sports, with trained observers rating communication with teammates, supportive behaviors such as encouragement and collaboration, and cooperative problem-solving during play; scores ranged from 0 to 20, with higher scores indicating greater teamwork

competence, and inter-rater reliability was confirmed with an intraclass correlation coefficient of 0.88.

#### 2.4.2. Motor Coordination

Motor coordination was measured using the Körperkoordinationstest für Kinder (KTK), which assesses balance through walking backward on a balance beam, hopping on one leg, lateral jumping, and moving sideways on platforms; a total motor coordination score was calculated according to standardized protocols, with higher scores reflecting better coordination (30).

#### 2.4.3. Motivation

Motivation was assessed using the Intrinsic Motivation Inventory (IMI)-Sports Version adapted for children, which evaluated interest and enjoyment, perceived competence, and effort or importance, with each item rated on a 5-point Likert scale and higher scores indicating greater intrinsic motivation (31).

#### 2.5. Procedure

The procedure consisted of a baseline assessment in which participants completed teamwork observations during practice games, the KTK motor coordination test, and the IMI motivation questionnaire, followed by an 8-week intervention during which mini-tournaments were implemented twice weekly under coach supervision with attendance and engagement monitored, and concluded with a post-intervention

assessment in which all outcome measures were repeated within one week after the intervention, with observers blinded to group assignment to reduce bias.

#### 2.6. Statistical Analysis

Data were analyzed using SPSS Version 29, with descriptive statistics (mean  $\pm$  SD) used to summarize participant demographics and baseline outcomes, independent-samples t-tests conducted to examine baseline equivalence between groups, paired-samples t-tests applied to evaluate within-group pre- to post-intervention changes, and analysis of covariance (ANCOVA) used to compare post-intervention outcomes between groups while controlling for baseline scores, age, and sex; effect sizes were reported using Cohen's  $d$  for t-tests and partial  $\eta^2$  for ANCOVA, and statistical significance was set at  $p < 0.05$ .

### 3. Results

#### 3.1. Participant Demographics

A total of 72 children participated in the study (36 in the mini-tournament group and 36 in the control group). The mean age was  $10.1 \pm 1.2$  years, with 38 boys (52.8%) and 34 girls (47.2%). Baseline characteristics, including age, sex distribution, teamwork, motor coordination, and motivation scores, were similar between groups (Table 1), indicating successful matching prior to the intervention.

**Table 1.** Baseline Participant Characteristics.

| Variable                                | Mini-Tournament (n = 36) | Control (n = 36) | p    |
|-----------------------------------------|--------------------------|------------------|------|
| Age (years), Mean $\pm$ SD              | 10.2 $\pm$ 1.1           | 10.0 $\pm$ 1.2   | 0.45 |
| Boys, n (%)                             | 19 (52.8)                | 19 (52.8)        | 1.00 |
| Teamwork Score, Mean $\pm$ SD           | 12.4 $\pm$ 2.3           | 12.1 $\pm$ 2.5   | 0.56 |
| Motor Coordination Score, Mean $\pm$ SD | 90.5 $\pm$ 8.7           | 91.2 $\pm$ 8.5   | 0.70 |
| Motivation Score, Mean $\pm$ SD         | 3.6 $\pm$ 0.5            | 3.5 $\pm$ 0.6    | 0.48 |

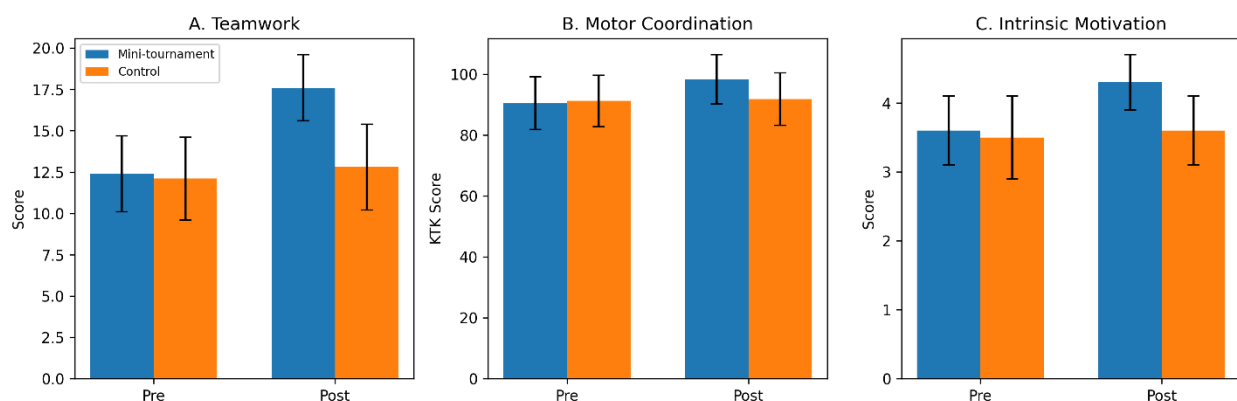
#### 3.2. Descriptive Statistics: Pre- and Post-Intervention Outcomes

Table 2 and Figure 1 summarize the pre- and post-intervention outcomes for teamwork, motor

coordination, and motivation. Children in the mini-tournament group showed marked improvements across all measures, whereas control children showed minimal changes.

**Table 2.** Pre- and Post-Intervention Outcomes.

| Outcome            | Mini-Tournament Pre | Mini-Tournament Post | Control-Pre    | Control-Post   |
|--------------------|---------------------|----------------------|----------------|----------------|
| Teamwork Score     | 12.4 $\pm$ 2.3      | 17.6 $\pm$ 2.0       | 12.1 $\pm$ 2.5 | 12.8 $\pm$ 2.6 |
| Motor Coordination | 90.5 $\pm$ 8.7      | 98.3 $\pm$ 8.1       | 91.2 $\pm$ 8.5 | 91.8 $\pm$ 8.6 |
| Motivation Score   | 3.6 $\pm$ 0.5       | 4.3 $\pm$ 0.4        | 3.5 $\pm$ 0.6  | 3.6 $\pm$ 0.5  |



**Figure 1.** Changes in teamwork, motor coordination, and intrinsic motivation before and after the 8-week intervention. Panel A shows teamwork scores, Panel B motor coordination scores, and Panel C intrinsic motivation scores for the mini-tournament and control groups.

### 3.3. Pre-Intervention Equivalence

Independent-samples *t*-tests confirmed no significant baseline differences between groups for teamwork ( $t(70) = 0.58$ ,  $p = 0.56$ ), motor coordination ( $t(70) = -0.38$ ,  $p = 0.70$ ), or motivation ( $t(70) = 0.71$ ,  $p = 0.48$ ).

### 3.4. Effects of Volleyball Mini-Tournaments

Paired-samples *t*-tests indicated significant improvements in the mini-tournament group across all outcomes, with teamwork scores increasing from 12.4 to 17.6 ( $t(35) = -12.1$ ,  $p < 0.001$ , Cohen's  $d = 2.02$ ), motor coordination (KTK) scores rising from 90.5 to 98.3 ( $t(35) = -9.3$ ,  $p < 0.001$ , Cohen's  $d = 1.55$ ), and intrinsic motivation scores improving from 3.6 to 4.3 ( $t(35) = -8.7$ ,  $p < 0.001$ , Cohen's  $d = 1.45$ ), whereas the control group demonstrated minimal and non-

significant changes in teamwork (12.1  $\rightarrow$  12.8,  $p = 0.18$ ), motor coordination (91.2  $\rightarrow$  91.8,  $p = 0.42$ ), and motivation (3.5  $\rightarrow$  3.6,  $p = 0.31$ ).

### 3.5. Between-Group Comparisons

ANCOVA analyses controlling for baseline scores, age, and sex revealed significant post-intervention differences between groups across all outcomes, with the mini-tournament group demonstrating higher adjusted mean teamwork scores ( $F = 101.2$ ,  $p < 0.001$ , partial  $\eta^2 = 0.59$ ;  $17.6 \pm 2.1$ ) compared with the control group ( $12.9 \pm 2.5$ ), greater motor coordination scores ( $F = 85.4$ ,  $p < 0.001$ , partial  $\eta^2 = 0.54$ ;  $98.2 \pm 8.0$  vs.  $91.9 \pm 8.5$ ), and higher motivation scores ( $F = 72.8$ ,  $p < 0.001$ , partial  $\eta^2 = 0.50$ ;  $4.3 \pm 0.4$  vs.  $3.6 \pm 0.5$ ), indicating large effect sizes favoring the mini-tournament intervention (Table 3).

**Table 3.** Post-Intervention ANCOVA Results.

| Outcome            | F     | p      | Partial $\eta^2$ | Adjusted Group Means $\pm$ SD                              |
|--------------------|-------|--------|------------------|------------------------------------------------------------|
| Teamwork Score     | 101.2 | <0.001 | 0.59             | Mini-Tournament: $17.6 \pm 2.1$<br>Control: $12.9 \pm 2.5$ |
| Motor Coordination | 85.4  | <0.001 | 0.54             | Mini-Tournament: $98.2 \pm 8.0$<br>Control: $91.9 \pm 8.5$ |
| Motivation Score   | 72.8  | <0.001 | 0.50             | Mini-Tournament: $4.3 \pm 0.4$<br>Control: $3.6 \pm 0.5$   |

## 4. Discussion

The present study investigated the effects of volleyball mini-tournaments on teamwork, motor coordination, and motivation in children aged 8–12 years. The findings indicate that incorporating structured mini-tournament formats into youth volleyball training can positively influence both motor and psychosocial outcomes. These results support the growing body of literature suggesting that game-based learning environments provide meaningful opportunities for children to develop physical skills while simultaneously fostering social interaction and motivational engagement.

One important finding of this study was the improvement in teamwork among children who participated in the mini-tournament intervention. Rather than merely practicing isolated technical skills, participants were required to interact continuously with teammates, coordinate actions, and make collective decisions during gameplay. Such interactive environments are known to promote collaborative behaviors and communication in youth team sports (12,14,15,28). From a theoretical perspective, these outcomes can be interpreted through social learning theory (32), which suggests that cooperative behaviors develop through observation, imitation, and reinforcement within social contexts. The mini-tournament structure created repeated opportunities for peer interaction and shared problem-solving, allowing children to observe effective teamwork behaviors and apply them during play. In addition, ecological dynamics theory (16,17) emphasizes that behavior emerges from interactions between the performer, task, and environment. The dynamic and unpredictable nature of mini-tournament play likely encouraged children to adapt to teammates' movements and game situations, thereby strengthening cooperative coordination.

Another significant outcome was the improvement in motor coordination among children exposed to the mini-tournament format. Game-based activities

require continuous adjustment of movement patterns in response to changing environmental conditions, which may stimulate neuromotor development more effectively than repetitive drill-based practice. Consistent with previous research, studies have shown that play-based and small-sided sport activities can enhance children's balance, agility, and overall coordination (33,34). From a motor learning perspective, the variability inherent in mini-tournament play may facilitate the development of adaptable movement patterns. Motor learning theory emphasizes that variable and context-specific practice improves the transfer of skills to real-game situations (18,19). During mini-tournament matches, children repeatedly adjusted their movements according to ball trajectory, teammates' positioning, and opponent actions, which likely contributed to improvements in coordination and motor control.

The results also demonstrated an increase in intrinsic motivation among participants in the intervention group. Motivational improvements are particularly relevant in youth sport contexts, as enjoyment and engagement are key predictors of long-term participation in physical activity. Previous research has suggested that game-based formats create more engaging and enjoyable learning environments compared with traditional drill-based practice (21,22). Self-determination theory provides a useful framework for interpreting these findings. According to this theory, intrinsic motivation is strengthened when individuals experience autonomy, competence, and relatedness (20). Mini-tournaments may support these psychological needs by allowing children to make decisions during play, experience success through skill application, and interact closely with teammates in a shared competitive environment. The combination of challenge, enjoyment, and social interaction likely contributed to the higher levels of motivation observed in the intervention group.

Taken together, these findings highlight the potential of mini-tournament-based training as an

effective strategy for promoting multiple developmental outcomes simultaneously. By integrating technical skill execution, tactical decision-making, and social interaction within authentic gameplay situations, mini-tournaments provide a comprehensive learning environment that supports both motor and psychosocial development. This integrated approach may be particularly valuable in youth sport and school settings where limited training time requires efficient methods that address multiple developmental goals.

Several limitations should be acknowledged. First, the quasi-experimental design limits causal inference because participants were assigned by class rather than randomized individually. Second, the intervention period was relatively short (eight weeks), and therefore the long-term sustainability of the observed improvements remains unclear. Third, the sample consisted of children from a limited number of schools, which may restrict the generalizability of the findings. Additionally, teamwork was assessed through observational ratings which, despite demonstrating high inter-rater reliability, may still be subject to observer bias. Future research should consider longer intervention periods, larger and more diverse samples, and follow-up assessments to determine whether the observed benefits are maintained over time.

Despite these limitations, the present study provides evidence that mini-tournament formats can serve as a practical and engaging pedagogical approach in youth volleyball training. Integrating structured mini-tournaments within physical education or youth sport programs may help coaches and educators simultaneously enhance motor skill development, cooperative behavior, and motivation among children.

#### 4.1. Conclusion

The findings of this study demonstrate that volleyball mini-tournaments represent an effective game-based strategy for enhancing teamwork, motor coordination, and intrinsic motivation in children aged 8–12 years. By providing dynamic and socially interactive gameplay environments, mini-tournaments encourage cooperative interaction, adaptive motor responses, and meaningful engagement in sport activities. These results suggest that incorporating mini-tournament formats into youth sport and physical education programs may contribute to more holistic developmental outcomes, supporting not only skill acquisition but also positive social experiences and sustained motivation for physical activity. Future research should further explore long-term effects and examine the applicability of this approach across different sports and educational contexts.

**Authors' Contribution:** The author undertook the study from its initial conception and design through intervention implementation, participant assessment, data analysis, interpretation of the results, and manuscript writing.

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**Ethical Considerations:** All research procedures were carried out with attention to established ethical principles and in accordance with the Declaration of Helsinki. Written informed consent was obtained from the parents or legal guardians before the children took part in the study. The children were informed about the study procedures in an age-appropriate manner, and participation was voluntary.

**Data Availability:** The data generated and examined in this research are available from the corresponding author upon reasonable request and subject to applicable ethical and confidentiality requirements.

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**Conflicts of Interest:** The author confirms that no financial, personal, or professional conflict of interest influenced the conduct or reporting of this research.

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