

The interrelationships of three change of direction drills in elite female volleyball players



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Abstract

INTRODUCTION: Change of direction (COD) is a critical component of performance, particularly in the sport of volleyball. Despite its importance, various methods have been developed to assess COD ability, but limited research has examined the agreement between these tests. The purpose of this study was to evaluate the relationships between commonly used change of direction COD tests (T-test, L-drill, and 5-10-5 shuttle) in Division I female volleyball players. **METHODS:** Sixteen Division I female volleyball players (age = 19.4 ± 1.5 years, height = 176.2 ± 10.6 cm, weight = 71.5 ± 11.1 kg) participated in the study. In a randomized order, each participant performed three recorded trails for the T-test, L-drill, and 5-10-5 drill. The time to complete each test was measured with timing gates. The fastest time (seconds) from the three recorded attempts for each test was recorded and analyzed. Relationships between each test were determined with Pearson correlation procedures. In addition, a composite COD score was calculated for each participant by combining the scores for each test. A Spearman rank correlation was then utilized to determine the relationship between each COD drill and the composite score. **RESULTS:** Pearson correlations revealed significant coefficients between the T-Test and L-Drill ($r = 0.888$, $p < 0.001$), between the L-Drill and 5-10-5 Shuttle ($r = 0.914$, $p < 0.001$), and between the 5-10-5 Shuttle and T-Test ($r = 0.830$, $p < 0.001$). The Spearman rank correlation also revealed significant correlations between the composite COD score and all COD tests ($\rho = 0.92$ for L-Drill and 5-10-5, $\rho = 0.95$ for the T-Test). **CONCLUSION:** The findings demonstrated a strong agreement among the three COD drills, indicating that any of them could be used for COD testing. However, the T-Test showed the highest correlation with the composite COD score, suggesting it may be the best predictor of COD performance in elite female volleyball players. **PRACTICAL APPLICATION:** Based off the current results, it seems reasonable that coaches and trainers can utilize any of the three drills within this study to monitor COD performance in female volleyball players.

Introduction

- Change-of-direction (COD) ability is the capacity to quickly alter movement direction, speed, or mode, and an essential component of optimal performance in many sports (4).
- In volleyball, COD is particularly critical, as athletes must frequently execute explosive, multidirectional movements such as lateral shuffles for blocks, lunges for digs, and rapid transitions between offense and defense (1,2,3).
- These actions often involve complex movement patterns, including accelerations, decelerations, and cutting maneuvers.
- To assess COD performance, several tests are commonly used, including the T-test, L-drill, and 5-10-5 shuttle.
- Although each of these drills aims to evaluate COD ability, they differ in structure and impose varying neuromuscular and biomechanical demands and hence, their degree of overlap and interchangeability is poorly understood.
- Some evidence suggests that these tests may measure different components of COD ability, while other findings point to significant inter-test correlations (4).
- For sport-specific evaluation, especially in volleyball, it is important to identify whether athletes excel similarly across different COD tests or if certain drills better reflect the unique demands of the sport (2).
- The purpose of this study was to examine the interrelationships among the T-test, L-drill, and 5-10-5 shuttle in Division I female volleyball players.

Methods

- Sixteen Division I female volleyball players (age = 19.4 ± 1.5 years, height = 176.2 ± 10.6 cm, weight = 71.5 ± 11.1 kg) participated in this study.
- In a randomized order, each participant performed three recorded trails for the T-test, L-drill, and 5-10-5 drill. The time to complete each test was measured with timing gates.
- The fastest time (seconds) from the three recorded attempts for each test was recorded and analyzed.
- Relationships between each test were determined with Pearson correlation procedures.
- A Spearman rank correlation was utilized to determine the relationship between each COD drill and the composite score (i.e., the combined scores for all three tests).

Results

Table 1. Mean ± SD for COD drills.

COD Test	Mean ± SD
T-Test (s)	10.9 ± 0.7
L-Drill (s)	8.6 ± 0.3
5-10-5 (s)	4.9 ± 0.2

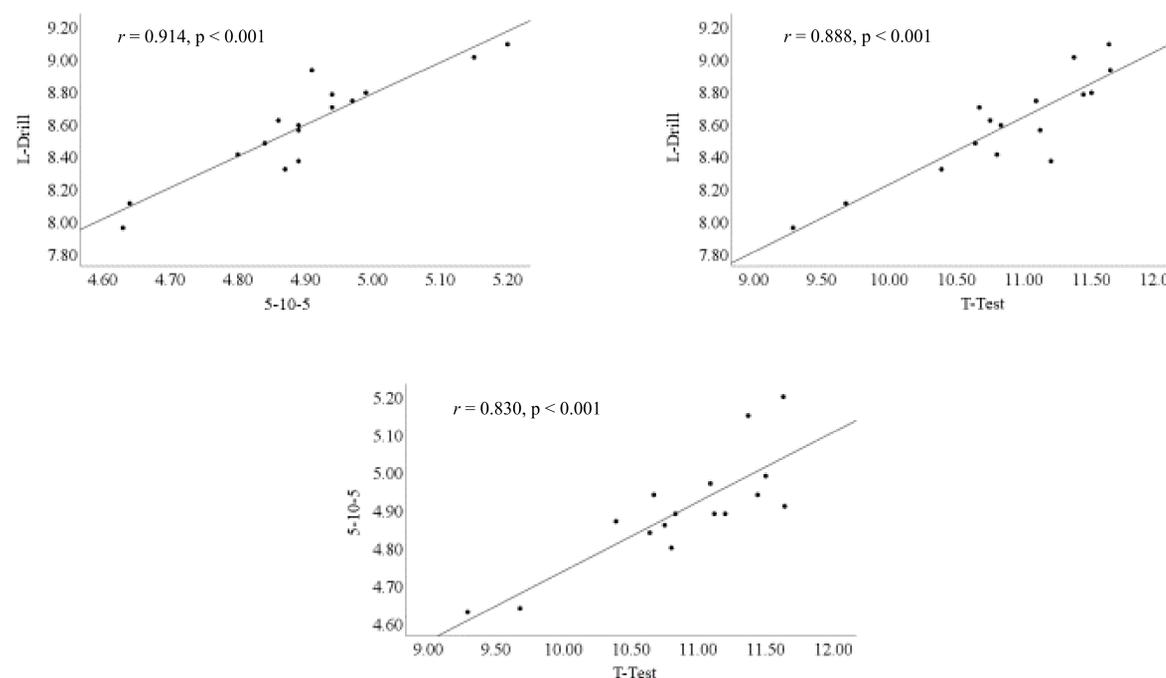


Figure 1. Scatterplots displaying the correlations between each of the change of direction drills.

- Additionally, the Spearman rank correlation revealed significant correlations between the composite COD score and all COD tests ($\rho = 0.92$ for L-Drill and 5-10-5, $\rho = 0.95$ for the T-Test).

Conclusions

- The current findings indicate a strong and statistically significant relationship among the T-test, L-drill, and 5-10-5 shuttle, supporting their collective utility in assessing COD performance in elite female volleyball players.
- All three tests demonstrated high inter-test correlations, suggesting that each captures similar underlying components of COD ability.
- The results also demonstrate the utility of a composite COD score as a broader measure of multidirectional agility, capturing the variability and nuance of COD performance across different test formats.
- These findings contribute to a growing body of knowledge aimed at refining performance assessments in sport-specific populations.

Practical Applications

- For practitioners working with elite female volleyball players, these results provide valuable insights into the assessment of COD ability.
- The high correlation between the T-test, L-drill, and 5-10-5 shuttle suggests that any of the three tests can be effectively used to evaluate COD performance in this population.
- This flexibility allows practitioners to select the test that best aligns with their logistical constraints, facility space, equipment availability, or specific performance goals.

References

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