

THE RELATIONSHIP OF V-PATTERN SPORT-SPECIFIC TEST TO LOWER-BODY PERFORMANCES.

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INTRODUCTION: American football uses the 5-10-5 agility test (AT), also called the pro-agility test, as an assessment of a player's ability to change direction (COD). Serpell et al., (2010) examined the reliability and validity of a rugby specific reactive agility test (RSRT) and change of direction (RSCOD) test. The RSRT demonstrated reliability and validity (ICC = 0.82, $p < 0.05$) while the RSCOD was only reliable (ICC = 0.87); suggesting the first test may provide a more effective method of identifying rugby talent. Furthermore, Sekulic, et al., (2017) evaluated sport specific agility tests that mimicked offensive (pre-planned) and defensive (non-planned) abilities in basketball players. The basketball specific agility and COD tests developed complimented the already utilized T-test that demonstrates forwards to be more successful than other positions when performing a basketball specific agility test (Sekulic, et al., 2017). Sekulic, et al., (2017) suggest forwards' body dimensions (step length) may predispose them to a more efficient execution of agility tests. Sport specific agility tests are important indicators of sport performance, but specific field/court positions may benefit from position specific agility testing.

Determining what test may measure performance and ability to play American football was conducted by Sawyer et al., (2002). Running backs, line backers and tight ends' playing ability demonstrated a strong relationship to the AT suggesting the greater lateral movement in these positions should be reflected in position specific testing. However, the short distances both offensive and defensive linemen travel, along with the reality that their movement are not predominately lateral limits the effectiveness of the AT in assessing linemen talent. Offensive and defensive line have similar position specific requirements which are performed in a smaller confined area of movement thus having less occurrences of reaching maximal acceleration (Wellman, et al., 2016). A more applicable agility test should have the combination of forward and backward movements with a change of direction. Sekulic, et al., (2017) evaluated the reliability and validity of a sport-specific agility test for basketball, which was a similar V-pattern as the current study. The purpose of this study is to determine if a relationship exists between a V-pattern agility test and the AT, T-test, countermovement vertical jump (CMJv), and 50m sprint performances that may have other specific sports application.

METHODS: Subjects were a convenience sample of male collegiate athletes free of musculoskeletal injuries. The study was approved by the institutional review board prior to subject recruitment and data collection. Six subjects participated in this study (age = $19.67 \pm .75$ yrs, height = 175.69 ± 3.99 cm, bodyweight = 76.74 ± 8.09 kgs).

Tests: A familiarization session occurred one week prior to testing which included a verbal explanation of all tests followed by a physical execution of the tests at submaximal efforts. Two testing sessions were complete during a single week, separated by 48 hours; this was repeated two consecutive weeks. The AT, T-test, CMJv without arm swing and 50 m sprint followed the protocols as outlined by McGuigan (2016). Subjects performed the AT with initiation of movements to their left and right with the times being recorded for both directions. The V-test consisted of three cones with 4.54 m between cones with a 45° angle at the apex of the V (Figure 1). Subjects started at one of the end cones then back pedaled to the middle cone

where a COD occurred and the subject sprinted forward to the opposite corner cone, then immediately repeated the process back to the starting cone. A Brower Timing TC-System (Brower Timing Systems, Draper, UT) was used to measure all agility test times. CMJv vertical displacement was obtained by the Just Jump Mat (Probotics, Inc. Huntsville, AL). CMJv and AT were performed on the first day of testing each week while the V-test, T-test and 50m sprint were performed on the second day of testing each week. Tests were completed in a random order each day. There was a 5-minute rest between all tests to allow subjects to recover and minimize the fatiguing effects that may occur from the preceding test. Since the longest duration of activity was just under 11 s, fatigue was likely not a concern. Statistical Analysis: A Pearson product moment correlational (PPM) was completed using the peak values for both week 1 and 2 test days. Additionally, an ICC and Cronbach's alpha (α) was used to test the test-retest reliability and internal consistency respectively between testing days. Descriptive statistics were also analyzed using SPSS v23 (IBM).

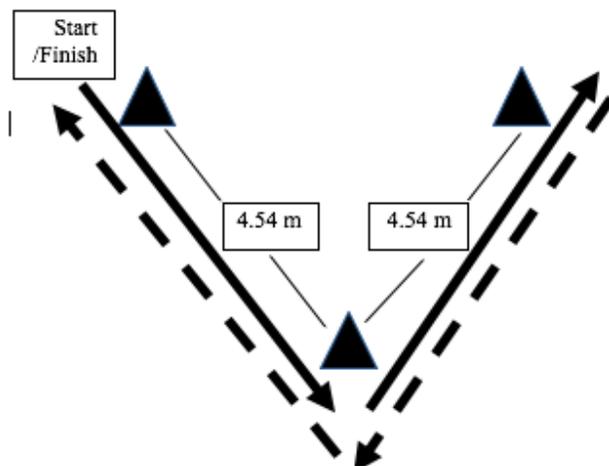


Figure 1. V-pattern agility test

RESULTS: The tests' descriptive statistics can be seen in Table 1. The test-retest reliability and internal consistency showed the V-test had the lowest values, $\alpha = .45$ and ICC = .29 (Table 2). The V-test demonstrated a significant correlation ($r = .64$) with the 50 m sprint.

Table 1. Test peak descriptive statistics

Test	Week 1 (Mean \pm SD)	Week 2 (Mean \pm SD)	Combined (Mean \pm SD)
CMJv (cm)	54.56 \pm 4.80	52.78 \pm 4.80	53.67 \pm 4.78
AT (s)	4.55 \pm .21	4.75 \pm .18	4.65 \pm .22
V-test (s)	5.89 \pm .17	5.68 \pm .20	5.79 \pm .21
T-test (s)	10.01 \pm .42	9.92 \pm .55	9.96 \pm .47
50 m sprint (s)	6.57 \pm .36	6.54 \pm .29	6.56 \pm .31

Table 2 Reliability of tests

Test	α	ICC
CMJv	.96	.92
AT	.97	.93
V-test	.45	.29
T-test	.96	.93
50 m sprint	.97	.95

DISCUSSION: The relationship between the V-test and the 50 m sprint in the present study suggest poor reliability and may not be useful in evaluating COD. This study was used to assess if further examination would be warranted in the V-test's reliability and validity. Moderate correlations were observed in the current testing data but a larger sample size is needed to determine if reliability and validity exists in the V-test. Future studies need to test specifically the line position of American football for the V-test use in evaluating these athletes' ability to COD for their sport's skills.

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