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**Citation for published version:**

Phillips, S & Donaldson, E 2018, 'Change of direction ability: Investigating its relationship with sprint performance and maturation in youth soccer players', NSCA National Conference, Indianapolis, United States, 11/07/18 - 14/07/18.

**Link:**

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**Document Version:**

Publisher's PDF, also known as Version of record

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# Change of Direction Ability: Investigating its relationship with sprint performance and maturation in youth soccer players



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## INTRODUCTION & AIM

- The 5-0-5 agility test is a common test of change of direction (COD) ability in soccer players (1). However, the 5-0-5 test may be heavily influenced by linear sprint speed, which is independent of COD ability (2).
- One-metre directional changes are not as influenced by linear sprint speed, suggesting that a '1-0-1' test may be a more valid measure of COD ability (3).
- In youth, biological maturity influences the development of linear speed through a variety of morphological and neuromuscular mechanisms (4). Examining the relationship between tests of COD ability, linear speed, and maturation will allow further quantification of the validity of such tests in youth populations.
- The aims of this study were to 1) Examine the relationship between 5-0-5 and 1-0-1 agility test performance and linear sprint performance in youth soccer players, and 2) Investigate the influence of maturation on agility and sprint performance.

## METHODS

- Twenty-eight elite academy soccer players (age  $12.9 \pm 2.0$  years, height  $1.62 \pm 0.14$  m, body mass  $49.9 \pm 14.7$  kg).
- Maturity offset calculated using the equation of Mirwald et al. (5).
- Linear sprint performance was assessed over 5m and 20 m.
- Participants completed the 5-0-5 and 1-0-1 agility tests:

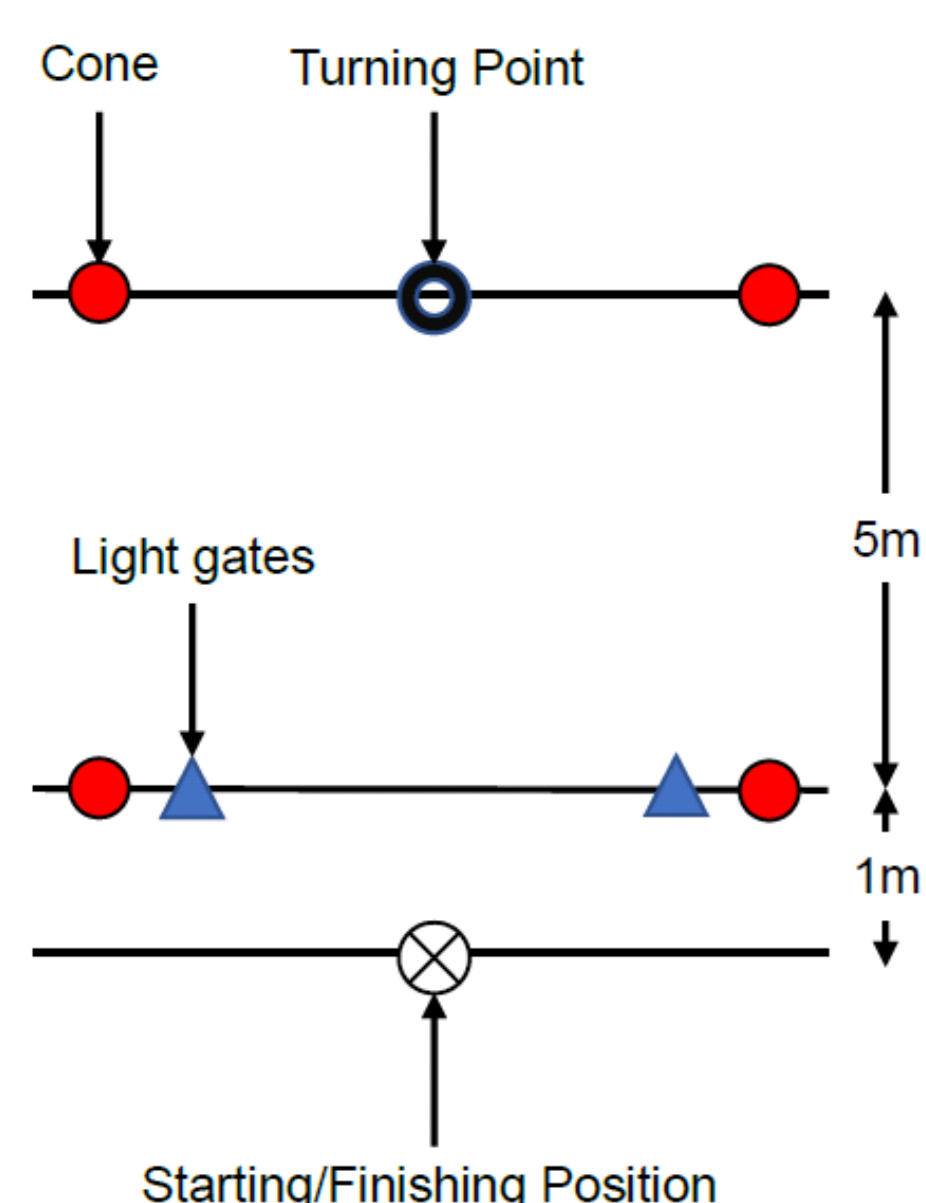


Fig. 1: 5-0-5 Agility Test

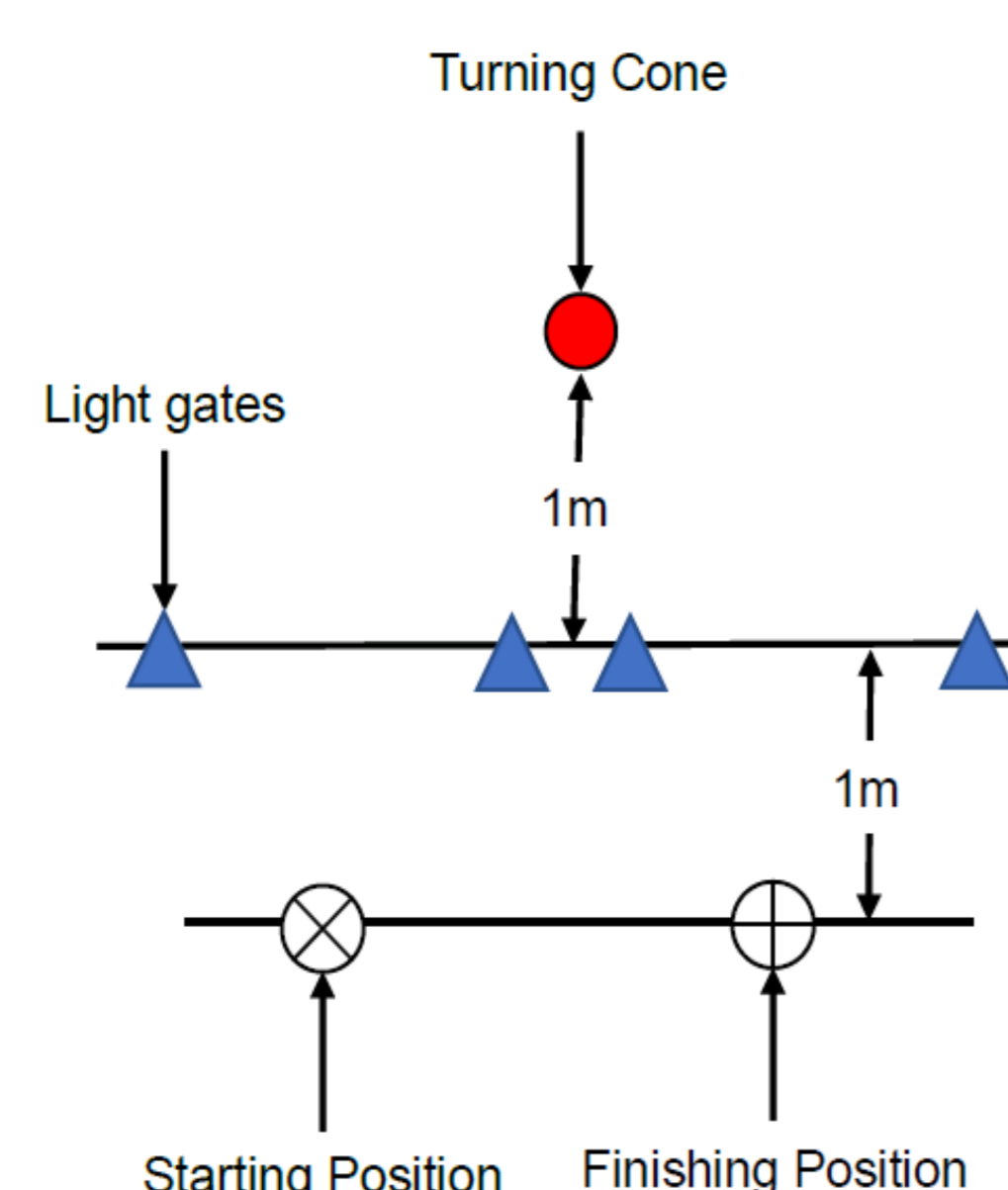


Fig. 2: 1-0-1 Agility Test

## RESULTS

Table 1: Descriptive statistics

Test	Mean $\pm$ SD	95% CI
5 m (s)	1.05 $\pm$ 0.06	1.03 – 1.07
20 m (s)	3.23 $\pm$ 0.35	3.09 – 3.36
505L (s)	2.67 $\pm$ 0.19	2.59 – 2.74
505R (s)	2.65 $\pm$ 0.21	2.57 – 2.73
101L (s)	0.88 $\pm$ 0.09	0.85 – 0.92
101R (s)	0.90 $\pm$ 0.08	0.87 – 0.93
Age @ PHV (years)	13.83 $\pm$ 0.69	13.57 – 14.10
Maturity offset (years)	-0.54 $\pm$ 1.88	-1.27 – 0.19

Table 2: Correlations between agility performance and sprint times

	505R v. 101R	505R v. 5m	505R v. 20m	101R v. 5m	101R v. 20m	505L v. 101L	505L v. 5m	505L v. 20m	101L v. 5m	101L v. 20m
<i>r</i>	0.03	0.68	0.54	0.10	-0.31	0.23	0.81	0.56	0.11	-0.31
<i>r</i> <sup>2</sup>	0.00	0.47	0.23	0.01	0.09	0.05	0.66	0.32	0.01	0.10
<i>P</i>	0.87	<0.001	0.003	0.60	0.11	0.23	<0.001	0.002	0.59	0.11

505R = 5-0-5 agility test turning on right foot; 505L = 5-0-5 agility test turning on left foot; 101R = 1-0-1 agility test turning on right foot; 101L = 1-0-1 agility test turning on left foot.

- Performance in the 5-0-5 agility test was significantly correlated with 5 m and 20 m sprint performance.
- However, performance in the 1-0-1 agility test was not significantly correlated with 5 m or 20 m sprint performance.

Table 4: Correlations between maturity offset and physical test performance

	5 m	20 m	505L	505R	101L	101R
$\rho$	-0.43	-0.63	-0.61	-0.71	-0.14	0.15
$\rho^2$	0.18	0.39	0.37	0.50	0.02	0.02
<i>P</i>	0.02	<0.001	0.001	<0.001	0.49	0.46

- Maturity offset was significantly correlated with sprint and 5-0-5 agility performance, but not 1-0-1 agility performance.

## CONCLUSION

- In elite youth soccer players, the 5-0-5 agility test was significantly correlated with linear sprint performance and maturity offset.
- However, the 1-0-1 agility test was not significantly correlated with either linear sprint performance or maturity offset.
- Therefore, the 1-0-1 agility test may offer a more valid assessment of COD ability by isolating COD ability from linear sprint speed.
- The 1-0-1 agility test also appears to be a measure of COD ability that is less influenced by maturation than the 5-0-5 agility test. This again reinforces the objectivity and validity of the 1-0-1 test.

## PRACTICAL APPLICATIONS

- The findings of the current study suggest that the 1-0-1 agility test is not significantly related to either linear sprint speed or maturity offset. Therefore, practitioners should consider using the 1-0-1 agility test instead of the 5-0-5 agility test when assessing COD ability in young soccer players.
- The lack of correlation between 1-0-1 agility test performance and maturity offset also suggests that the 1-0-1 test may be a more objective tool than the 5-0-5 test for evaluating and monitoring COD ability during the selection process of soccer academies. In particular, maturation assessment may not be necessary in order to interpret test results using the 1-0-1 test.

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