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# Change of direction skills in elite football players in relation to speed qualities and competitive level

Thomas Rostgaard<sup>1</sup>, Lars Raundahl Rasmussen<sup>1,2</sup>, Peder Siggard<sup>1,3</sup>, Thomas P. Gunnarsson<sup>1</sup>, and Jens Bangsbo<sup>1</sup>

**Affiliations:**

<sup>1</sup> Department of Exercise and Sport Sciences, University of Copenhagen, Copenhagen, Denmark <sup>2</sup> Aarhus GF, Aarhus, Denmark <sup>3</sup> Brøndby IF, Copenhagen, Denmark

**INTRODUCTION:**

It is well-established that football players during the course of a game perform intermittent exercise with changes in activity every 3–5 seconds.

Due to multiple brief intense actions involving jumps, turns, tackles, high speed runs, and sprints the game of football is physically demanding (Bangsbo, 1994), and requires a highly complex hybrid of physical fitness abilities, including speed, agility, and quickness. As such, change of direction (COD) skills of the individual player can be considered an important sub-component of over-all physical performance capacity.

The ability to change direction multiple times at high speed is believed to be an independent measure of performance, and improvement in straight line sprinting speed does not appear to transfer to COD performance (Young et al., 2001).

With some few exceptions (e.g. the T-test), the vast majority of COD tests are comprised of a forward directed movement pattern. Therefore, there is a need for a multi-directional COD-test which makes it possible to evaluate COD skills including the discrete movement pattern transition from fast forward to fast backwards running.

**PURPOSE:**

To develop and evaluate a COD-test involving multiple transitions from forward to backward high-speed movements in elite football players. Furthermore, to examine whether the COD-test can differentiate players competing at different performance levels.



**Fig. 1:** Set-up and administration of the COD test can be followed as a video sequence. Scan the Quick Response Code (QRC) or log on to <http://www.youtube.com/watch?v=ZVQqPPhatUI>

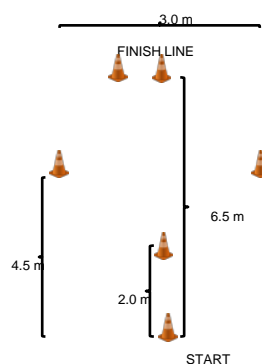
**METHODS:**

Fifteen youth elite (YE) football players (age: 18.2±0.2 yrs) and 16 adult elite (AE) football players (24.0±1.3 yrs) completed three attempts on a COD-test consisting of multiple stopping maneuvers, transitions from forwards to backward running, and acceleration over short distances (< 5 m). This test replicates a series of movements often to be found during match play, and can be considered a football specific COD test.

Also, the players carried out three straight 30-m sprints separated by 2 min of passive rest. Infrared light sensors were used to determine COD-performance, and running time after 5, 10, and 30 m.

On a separate occasion the reproducibility of the COD-test was evaluated in the YE group (N=10). Coefficient of Variation (CV) was calculated as the standard deviation of repeated measures divided by the mean times 100.

**TEST SET-UP:**



**Fig. 2:** Set-up of the COD test used in the present study (Raundahl's Agility Test) (please consult fig. 2 for administration of the test).

**RESULTS:**

Adult elite players showed superior COD test performance (+4.2%) compared to youth elite players (p<0.05) (fig.3). Test results in the 5, 10, and 30 m sprint test showed no differences when the two level of players were compared (AE vs. YE players, p>0.05) (tab.1). COD test performance was not related to the sprinting performance measures in either group of players (p>0.05) (tab. 1). COD test-retest performance in the YE group was not different and the CV was 1.1% (fig.4).

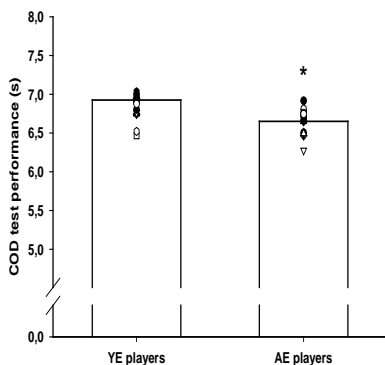
**CONCLUSION/DISCUSSION:**

The lack of relationship between COD and straight line sprinting performance suggest that COD ability is an independent measure of performance, and that it should be tested accordingly. The COD test can reveal a difference between two levels of elite football players, and due to its high level of reproducibility, the COD test may serve as a valuable tool in the selection process of talented football players in the transition from youth to adult level elite football.

**REFERENCES:**

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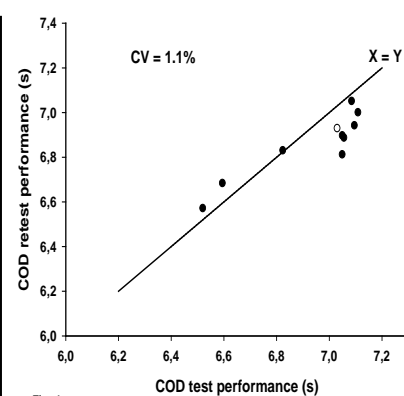
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**Fig. 3:** COD performance in youth elite (YE) and adult elite (AE) football players. \* denotes significant difference between players competing at the two levels(p < 0.05).

	5 m	10 m	30 m
<b>Adult Elite (AE) players</b>	0.88 ± 0.01	1.58 ± 0.02	3.97 ± 0.03
<b>Youth Elite (YE) players</b>	0.89 ± 0.02	1.60 ± 0.02	3.95 ± 0.03
<b>Significance</b>	NS	NS	NS
<b>AE COD Performance</b>	-0.04 (0.90)	-0.08 (0.77)	0.11 (0.69)
<b>YE COD Performance</b>	-0.22 (0.45)	0.06 (0.84)	0.30 (0.32)

**Tab. 1:** Comparison of sprint performance (s) in different levels of elite football players (upper panel). Numbers are mean ± SEM ; Correlation matrix (lower panel) between sprint performance and COD ability(s). Numbers are Pearson's r (p value). Level of significance; p < 0.05.



**Fig. 4:** Test-retest reproducibility of the COD test. The correlation coefficient was 0.91 (N = 10, P < 0.05). Full line is the identity line (x = y).