Editorial

Improving and Monitoring Reactive Agility is Essential Strategy in Young Soccer Training

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Pre-planned Change of Direction Speed (CODS) and Reactive Agility (RA) are essential pre-requisites for effective performance in soccer. The CODS can be defined as the ability to decelerate, reverse or change movement direction and accelerate again, and was influenced by a number of physical and technical attributes such as strength, sprinting, speed/acceleration, eccentric and concentric strength, power and reactive strength [1]. RA is classified as sprints with directional changes in response to a stimulus and depends on several motor abilities such as power, speed, and balance, as well as cognitive skills such as anticipatory skill and reactivity [2]. In fact, a comprehensive definition of agility would recognize the physical demands (strength and conditioning), cognitive processes (motor learning) and technical skills (biomechanics) involved in agility performance [3]. Previous study results clearly indicate that RA has more relationship to performance in invasion sports than CODS does [4], taking into account that cognitive skills are an integral part of the abilities required in soccer especially in reaction to the opponents' actions (i.e., stimuli). Players differ in their ability to 'read and react' to stimuli, which is the definition of Reactive Agility (RA), nevertheless the soccer experience influences this ability, which consequently may and must be train and improved.

RA and CODS are independent skills within adult soccer players [3], due to the different contribution of perceptual skills for RA and physical skills required in pre-planned CODS. In young soccer instead, in which the physical skills have not reach maturation, RA and CODS resulted significantly and positively correlated and the training of these abilities could be simultaneous [5].

The RA training in youth, beyond improving the soccer specific physical fitness, allows the young soccer players to cover different field positions. This condition trains them to be adaptable in the different technical and tactical tasks, and when they become adult soccer players, they will be prepared to cover different specialized roles. The RA skill is effective for both attackers to evade their opponents' pressures, and for defenders to reduce space on the field or court, to limit attacking movements or potentially achieve a turnover. For this reason, a previous study does not recommend to use RA as indicators to assign the players roles in youth soccer [5].

Given these premises, it is essential in young soccer to train CODS and RA, both with pre-structured courses, and small side games or other tactical or technical practices (one vs. one, two vs. one and so on). To monitor RA and CODS improvements, two tests, the Y-Agility Test [6], and Modified Illinois Change of Direction modified Test (MICODT) [7], can be used. These tests provided objective and comparable scores that allow relevant information to be obtained for selecting and training young players. The simplicity and shortness of these tests may allow periodic and frequent repetitions of the tests, with ease of comparison of the results, which may improve the training of the players. The pre-planned Y-test (Y-PLAN test) assessed CODS ability, and the reactive Y-test (Y-REAC test). In the agility tasks, the athletes chose the appropriate direction in response to a stimulus. The MICODT assesses the speed in change of direction, taking into account ball control skill and management. In fact, the assessment to measure these skills could be done with and without the ball.

Y-pre-planned Agility Test

The Y-pre-planned agility test is used to evaluate CODS. Participants are asked to sprint as fast as possible for 5m through a triggered timing gate (start gate), make a 45° cut and sprint 5m to the left or right through a target gate. In this test, participants know the cut direction. The time to complete the 10m of the test is recorded by software that measures the time spent between the photocells at the start and finish gates. The best time of eight attempts is considered the Planned Trial score (Y-PLAN).

Y-reactive Agility Test

Participants perform the same sprint described in the previous test, but they did not know the cut direction in advance and had to visually find the illuminated gate that indicated the change of direction. Illumination of the target gate is activated by photocells positioned 2.5m away from the start gate. The time to complete the 10m of the test is recorded by software and photocells, and the best time of eight attempts is considered the Reactive Trial score (Y-REAC).

The difference between the two scores (Y-REAC minus Y-PLAN) represent the time required for reactive processes to occur and is the third score of the Y-test, named REAC-INDEX.

The Illinois Change of Direction Modified Test

The MICODT with and without the ball is set up with four markers forming a square area of 9.3 x 7.2 meters. The start and finish gates are positioned at two consecutive angles of a square area, and two markers are positioned on the opposite side to indicate the two turning points. Four other markers are in the centre, an equal distance apart (3.1 m). Each participant has to run as quickly as possible from
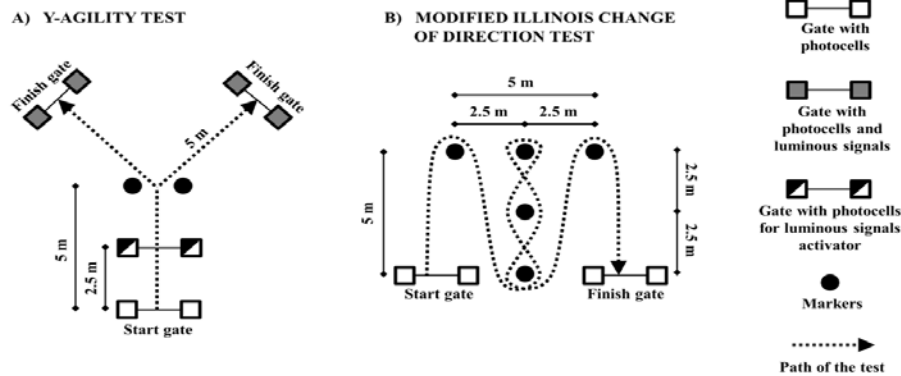
Figure 1: Graphical description of Y-Agility Test and Modified Illinois Change of Direction Test (ICODT): A) Y-Agility Test is performed into two phases: In the first phase (Y- PLAN) the participant is asked to sprint as fast as possible to follow the path on a determinate direction(left or right) as indicated in figure. In the second phase (Y-REAC), the participant performs the same sprint, but they do not know the direction to follow, and they have to visually find the illuminated gate that is activated by the photocells positioned at 2.5 meters after the start gate. Y-REAC–Y-PLAN = REAC INDEX; B) In the Modified Illinois Change of Direction Test (ICODT) the participant has to run as quickly as possible performing a slalom through the markers and following the planned direction indicated in the figure.

the start gate, follow a planned route and slalom through the markers without knocking them down or cutting over them. From a standing position, each athlete sprinted 9.3m on command and returned back to the starting line, then had to swerve in and out of the markers, perform another sprint of 9.3m, and complete the test by running to the finish gate. When the participant went through the finish gate and the software had recorded the time between the photocells at the start and finish gates, the test was completed. If a subject failed to do this, the trial was stopped and reattempted after the required recovery period. The best time of three attempts was considered the MICODT score. The test reliability is 0.96 (ICC) [7]. The test must to be repeated in the same manner with the ball, keeping possession of the ball near the foot throughout the testing phase. A previous study has shown that this test had an approximately 3% coefficient of variation. The difference between the two scores, MICODT with the ball minus MICODT without the ball, represents the time required for ball control techniques and is the third score obtained from the MICODT, named TECHN-INDEX [7]. A graphic representation of the test is shown in (Figure 1).

Conclusion

An efficient age-related planned training may improve not only the current skill training of CODS and RA, but will lay the foundation for future learning in more-complex movements, especially in young athletes. RA is a key skill required for soccer success and it is based on greater levels of motor control, when compared to pre-planned CODS. The better performance through age of Y-PLAN and MICODT depends on physical skill improvement, and the better RA results highlighted that technique and experience help the players to use anticipatory skill. The high correlation between CODS and RA performances suggests that an effective work program for young players may include RA and CODS training at the same time. Successively the athlete maturation explains a great variation both in RA and CODS performances, reflecting the different levels of physical fitness and the increased expertise in decision making and game solutions. This consideration differentiates the two types of training. RA and CODS are key skills required for soccer success, based on greater levels of motor control, however RA and CODS are not recommend as indicators to assign the players roles in youth soccer [7].

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