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Change of Direction Tasks: Does the Eccentric Muscle Contraction Really Matter?

Helmi Chaabene*[1,2]

[1]*Tunisian Research Laboratory Sports Performance Optimization, National Center of Medicine and Science in Sports (CNMSS), Tunisia*

[2]*High Institute of Sports and Physical Education, University of Jendouba, Tunisia*

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Editorial

The capacity to quickly change direction while sprinting, known also under the term cutting or else change of direction ability (COD), is paramount for many sporting disciplines and particularly for team sports (e.g., soccer, handball, basketball, etc…). In fact, COD is one of the main agility components that defines movement where no immediate response to a stimulus is needed [1]. To say it another world, the direction change is quite anticipated. Numerous studies indicated that COD is featured by several physical factors. For instance, it has been demonstrated that straight running speed correlates moderately with COD performance with a low shared variance [2]. According to the same authors, such a low common variance level point out that COD and straight running speed seem to be distinct physical qualities. With respect to the association between COD and strength and power measures, studies' outcomes are somehow conflicting. For instance, numerous studies (for in-depth details see the review of Sheppard and Young, 2006) [1] revealed trivial to small, non-significant in many cases, relationship between COD and various measures of strength and power (e.g., counter-movement jump, standing broad jump, isokinetic strength) [1]. In contrast, others demonstrated a moderate and significant correlation between the bilateral drop jump and COD [3] and single leg isokinetic squat strength and COD [4]. It is worth noting that the common factor between almost all the strength and power tests used is the fact that they mainly use concentric muscle contraction regime. Such strength and power measures concentric-based regimes appear to be poor predictors of COD performance [1]. Brughelli et al. [2] claimed that jumps that combine both horizontal and vertical ground reaction force appear to predict better COD performance. However, conventional resistance training programs including exercises performed bilaterally in the vertical direction, e.g., Olympic-style lifts, squats, deadlifts, plyometrics, vertical jumping, have failed to induce significant COD performance gain [2].

All things considered, the question "how to make an athlete faster while changing direction?" remain not fully answered as the main determinant factors fostering COD performance still not yet clearly elucidated. The only certainty that deserves the reader's attention is the fact that the major COD determinants are, notwithstanding, yet uncertain. Sheppard and Young [1] recommended future studies examining the relationship between COD and the eccentric-based muscle contraction testing [1]. Such a contraction regime presents a strong association with deceleration which governs with acceleration the whole COD outcome. Brughelli et al.[2] acknowledged that eccentric strength represents relevant stimulus

***Corresponding author:** Dr. Helmi Chaabene, Tunisian Research Laboratory Sports Performance Optimization, National Center of Medicine and Science in Sports (CNMSS); High Institute of Sports and Physical Education, University of Jendouba, Tunisia, Tel: +21652217114, E-mail: chaabanehelmi@hotmail.fr

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toward arousing COD gains. In a preliminary study, Green, et al. [5] compared the biomechanics of a 45° cutting maneuver between starters (i.e., first team player) and non-starters (i.e., reserve team player) rugby players. They demonstrated that starters were able to accomplish the cutting task in a shorter time compared with non-starters ones. This result is mainly attributed to the faster deceleration (i.e., the time before the knee starts extending) of starters compared with their non-starter counterpart [5]. Consequently, starters were able to accelerate into the new direction earlier than their non-starters ones. From a practical point of view, this particular observation suggests that coaches, sports scientists, and strength and conditioning specialists should consider implementing eccentric strengthening, which is the main muscle contraction regime activated during deceleration, in their training programs directed at promoting COD outcome.

The main purpose of the present editorial is to catch and/or guide the attention of readers with respect to the paramount role of eccentric strength training on COD performance improvement. What is more, the author of this editorial wants to strikingly recommend future longitudinal studies examining the effect of eccentric training on COD outcome. In fact, my great belief is that promising results in this way will be obtained. In the meantime, concentric muscle actions should not be ignored.

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