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KEYNOTE SPEECH

AGILITY EVALUATION IN PERFORMANCE ENVIRONMENT WITH INERTIAL MEASUREMENT UNITS: GUIDING PRACTICE AND TEST TASKS IN YOUTH SOCCER

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Agility has been defined as a rapid movement of body, including a change of velocity or direction in response to a stimulus. Change of direction (COD) and maneuverability can be seen as subcomponents of agility and differentiated by the type of turn performed (hard vs soft). To test agility or its subcomponents, a vast array of tests are being used, which indicates that there is little consensus of how to measure these abilities. Different COD tests do not correlate well with each other, which suggests that it is difficult to ascertain what is actually measured – agility, COD, maneuverability or perhaps physical capacities.

However, COD tests are commonly used in sports and the ability to perform this complex movement efficiently has been connected to athlete's performance. Soccer is an invasion sport that requires several abilities related to physical performance and soccer-specific skill characteristic. In invasion sports, it is crucial to be able to percept and react to the opponent movements when attacking or defending, which results to multiple fast direction changes during games. It is not surprising that change of direction (COD) ability has been reported to be an important characteristic in discriminating between elite and sub-elite players in soccer and on the other hand linked with lower extremity injuries.
Common COD test set-ups lack the context of the game and the need for perception-reaction. Individual performing the test knows what will happen and when, which makes the task different from games where rhythm and speed of the movement are complex and unpredictable.

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In addition, playing position sets specific demands for technical, tactical and physical abilities for soccer players. Agility has been connected to decisions made about playing position and on the other hand the physical demands of the playing positions can vary very much, for example physical loading in general.

COD tests are usually evaluated based on time to complete a specific running drill. More interesting aspect could be the quality of specific CODs and if they differ based on situations during the games. Wearable devices have been used to evaluate aspects of change of direction movement, but so far there are no clear recommendations on specific metrics to be used. However, wearable technology and specifically inertial measurement units (IMU) could provide an easy to use, low-cost option for measuring and evaluating agility in soccer.

Our pilot study aimed to provide guidance to how IMU technology could be used when testing COD ability and to provide answers if agility in game situations could be measured in a meaningful way. The results of this study can guide practitioners and stakeholders to implement new methods for testing as well as training. The study population included eight U15-U17 soccer teams from Calgary, Alberta and the data collection was done from Summer 2019 to Spring 2022.