

Evaluating Cognition and Movement Coordination of Adolescents with Intellectual Disabilities through Ball Games

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Abstract : Adolescents who have intellectual disabilities often demonstrate maladaptive behaviors in their daily activities due to either physical abnormalities or neurological disorders. These adolescents commonly struggle with their cognition and movement coordination when it comes to executing tasks such as throwing or catching objects smoothly, quickly, and gracefully, in contrast to their typically developing peers. Simply measuring movement time and distance doesn't provide a comprehensive view of their performance challenges. In this study, a ball-playing approach was proposed to assess the cognition and movement coordination of adolescents with intellectual disabilities using a smart ball equipped with an embedded inertial sensor. Four distinct ball games were specifically designed for this smart ball: two focusing on lower limb activities (dribbling along a straight line and navigating a zigzag path) and two centered around upper limb tasks (picking up and throwing and catching the ball). The cognition and movement coordination of 25 adolescents with intellectual disabilities (average age 18.36 ± 2.46 years) with that of 25 typically developing adolescents (average age 18.36 ± 0.49 years) were compared in these four tests. The results clearly revealed significant differences in the cognition and movement coordination between the adolescents with intellectual disabilities and the typically developing adolescents. These differences encompassed aspects such as movement speed, hand-eye coordination, and control over objects across all the tests conducted.

Keywords : cognition, intellectual disabilities, movement coordination, smart ball

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