

## Application of the Motion Analysis System to Formulate Parameters Defining the Movement of the Upper Limbs during Various Types of Gait

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**Abstract :** The movement of the upper limbs contributes significantly to balance control while walking in humans. However, the impact of different arm swing modes on gait stability is yet to be determined. This work intends to establish numerical parameters for assessing the arm swing. Nineteen people, comprising fifteen young, healthy individuals, two middle-aged individuals, and two individuals with dysfunctions, were analyzed using the movement analysis system. Proposed parameters such as  $AS_{ia}$  (reflecting the arm swing amplitude) and Pearson's correlation coefficient between the right and left upper limbs can be used to classify the type of movement task each participant performs. The results indicate that the  $AS_{ia}$  parameter could potentially detect any abnormalities in upper limb functions, which may be due to musculoskeletal disorders or other malfunctions.

**Keywords :** arm swing, human balance, interlimb coordination, motion analysis system

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