

Symmetry of gait in underweight, normal and overweight children and adolescents.

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Sensors 19, 2054, 2019.

Abnormal excess or lack of body mass can influence gait patterns, but in some cases such differences are subtle and not easy to detect, even with quantitative techniques for movement analysis. In these situations, the study of trunk accelerations may represent an effective way to detecting gait anomalies in terms of symmetry through the calculation of Harmonic Ratio (HR), a parameter obtained by processing trunk accelerations in the frequency domain. In the present study we used this technique to assess the existence of differences in HR during gait in a cohort of 75 healthy children and early adolescents (aged 7-14 years) stratified into 3 equally-sized age and gender-matched groups (Underweight: UW; Normal Weight: NW; Overweight: OW). The accelerometric signal, acquired using a single wearable inertial sensor, was processed to calculate stride length, speed, cadence and HR in antero-posterior, vertical and medio-lateral directions. No differences in spatio-temporal parameters were found among groups, while the HR in the medio-lateral direction was found significantly lower in UW children, while OW exhibited the highest values. On the basis of the results obtained, HR appears capable of discriminating gait symmetry in children with different body mass even when conventional gait parameters are unchanged.

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