スポーツ科学研究, 11, 69-130, 2014 年

Analysis of sprint ability in elementary school children

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The purpose of this study was to analyze sprint ability in elementary school children. We especially investigated the relationship between foot contact type and sprint abilities in school children from 6 to 12 years of age. 687 children (352 boys and 335 girls) who run 50m sprint during their school's fitness test were analyzed. Their mean foot contact time (T-c) and aerial time (T-a) during the interval 20-30m were calculated from video images captured by a high-speed video camera (300 frames/second). To control the effect of physical development, data were standardized with the mean value in each school year. In addition, their types of foot contact were classified into fore-foot, mid-foot and rear-foot types. As a result of statistical analysis, sprint time was significantly and positively correlated to T-c (boys; $r = 0.75$, $P<0.01$, girls; $r = 0.72$, $P<0.01$) but not to T-a. The sprint time was negatively correlated with ratio of aerial time to foot contact time (T-c/T-a, boys; $r = -0.61$, $P<0.01$ girls; $r = -0.54$, $P<0.01$). 70% of boys and 87% of girls belonged to rear-foot type. They also have tendency of longer T-c compared with other two types ($P<0.05$). From these results, T-c and T-a/T-c could be the key factors for sprint abilities of elementary school children, and also these factors could be influenced by their foot contact types.