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**Background and purpose:** Previous reviews have identified high birth weight as an important risk factor for childhood obesity. However, studies by using gold-standard methods of measuring total body fat mass (FM) such as DXA (dual energy X-ray absorptiometry) have shown lower birth weight individuals do not have an increased FM or percentage body fat (%Fat). The aim of this study was to examine the associations of birth weight with later body composition measures, while controlling for objectively measured physical activity (PA) in children.

**Methods:** DXA was performed in 224 children aged 6-7 years, who were singletons and born with birth weight  $\geq 1.5$ kg. Birth weight and gestational age were reported according to Maternal and Child Health Handbook records. PA was objectively measured using accelerometry for 14 days and evaluated as the time spent in MVPA (moderate to vigorous PA:  $\geq 3.0$  METs) and VPA (vigorous PA:  $\geq 6.0$  METs).

**Results:** Positive correlations were obtained between birth weight and current height ( $r=0.28$ ), weight ( $r=0.26$ ), lean soft tissue (LST) ( $r=0.30$ ), or FM ( $r=0.13$ ) when controlling for gender. The multiple linear regression analysis revealed that lower birth weight was significantly associated with decreased LST ( $\beta=0.07$ ) and increased FM ( $\beta=-0.08$ ) or %Fat ( $\beta=-0.12$ ) after adjustment for gender, gestational age, and current weight. Further adjustments for MVPA or VPA did not moderate in the relationship between birth weight and LST, FM, or %Fat, while VPA was a relatively stronger predictor of LST ( $\beta=0.17$ ), FM ( $\beta=-0.22$ ), or %Fat ( $\beta=-0.32$ ) than birth weight (LST: $\beta=0.09$ , FM: $\beta=-0.11$ , or %Fat: $\beta=-0.16$ ).

**Conclusion:** The present study suggests that lower birth weight may be a risk factor for later excess body fat and lesser LST independent of current weight in Japanese children. However, physically active lifestyle which focuses on vigorous intensity activity may exerts more important role for determining body composition than low birth weight.