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» **Journal Abstract**

High intensity cycle performances of adolescent boys and girls expressed in relation to lower limb muscle mass

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The study investigated the muscle power of the lower limbs in a group of 13 and 14 year old boys and girls. Participants were 45 boys (stature: 1.69 ± 0.05 m; body mass: 57.9 ± 11.8 kg; lower limb muscle mass: 16.4 ± 2.5 kg) and 36 girls (stature: 1.59 ± 0.06 m; body mass: 57.7 ± 7.6 kg; lower limb muscle mass: 12.5 ± 1.2 kg). Lower limb muscle mass (LLMM) was determined using a dual energy X-ray absorptiometric (DEXA) procedure. Participants completed a 30 s Wingate Anaerobic Test (WAnT) where peak power (PP) and mean power (MP) were expressed in relation to LLMM using ratio-scaling and log-linear adjustment procedures. Boys and girls had similar body mass-accounted PP (37.7 vs. 37.6 W/kg, $P > 0.05$) and MP (28.0 vs. 33.7 W/kg, $P > 0.05$) when ratio-scaled to LLMM, or when the same data were log-linearly adjusted for PP (495 W vs. 488 W, $P > 0.05$) and for MP (423 W vs. 422 W, $P > 0.05$) in relation to LLMM. However, common b exponents that defined the allometric relationship between PP and MP, and LLMM in both boys and girls were 1.26 (SE 0.15), and 1.21 (SE 0.15), respectively. These were markedly different from the b exponent of 1.0 used in the ratio standard, or the 0.67 value predicted from geometric similarity theory. Despite a similar interpretation of data (i.e. no sex difference in lower limb muscle power in boys and girls) using either allometric modeling or ratio-scaling, expressed in relation to LLMM, allometric modeling of sample-specific exercise data is recommended to produce an appropriate size-independent variable, to allow appropriate comparisons in performance between boys and girls. Data in the study showed no sex difference in WAnT power expressed in relation to LLMM in adolescent boys and girls.

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