

Reference values of total and regional skeletal muscle mass in children and adolescents

Correas-Gómez L¹, Alvero-Cruz JR², Carnero EA¹.

¹Body Composition and Biodynamic Laboratory, Faculty of Education Sciences, University of Málaga, Spain. ²Sport Medicine School, University of Málaga, Spain.

Introduction: The acquisition of skeletal muscle mass (SMM) during childhood and adolescence must be a main concern to ensure healthy growth and improved motor development. Moreover, peak SMM increment must happen during youth, which would determine adulthood health and performance. Although some indicators of SMM have been using for assessment of nutrition status since the seventies like upper arm circumference or arm areas there is insufficient SMM data throughout childhood and adolescence to establish references norms. The first aim of this study, therefore, was to analyze trends of fat free mass (FFM) and regional and total SMM. The second objective was to compare trends between SMM and FFM by age and gender. **Method:** Cross-sectional data of 1103 healthy volunteers were analyzed (13.3±2.5 yrs, BMI=20.1±3.4 kg/m²; 323 girls and 780 boys). They were recruited from local primary schools, high-schools and local sport clubs. Anthropometry in accordance with ISAK guidelines was used to measure: triceps, thigh and calf skinfolds, and arm, thigh and calf circumferences were assessed by a caliper and tape respectively. Regional muscle areas were calculated from the corrected limb circumferences. FFM was estimated by anthropometric-derived equation. Validated age-specific models were applied to obtain SMM based on anthropometric variables (Poortmans' (<16 years) and Lee's models). Subjects were grouped annually from 8 until 18. A Kruskal-Wallis test was carried out to compare differences between age groups. A P value <0.05 for all tests was accepted. **Results:** All total and regional variables showed a significantly different rank within groups of age. Total SMM showed a chi-squared value of 641.6 (P>0.000) while FFM showed 688.7 (P>0.000). Sex interaction was found. **Conclusions:** Our findings show that there is a difference between boys and girls in the relationship between total SMM and age. Regional muscle areas from the upper limbs don't develop in linear fashion with age in contrast to development in the lower extremity areas. These results suggest that upper and lower muscle areas growth is different in terms of timing. Longitudinal studies are required to confirm these results. **Key words:** Skeletal muscle mass. Children. Adolescents. Reference values.