

## Physical Activity at Growth Induce Bone Mass Benefits Into Adulthood: A 15-Year Prospective Controlled Study

Björn E. Rosengren<sup>1</sup>, Jakob Rempe<sup>1,2</sup>, Lars Jehpsson<sup>1</sup>, Magnus Dencker<sup>3</sup>, Magnus K. Karlsson<sup>1</sup>

<sup>1</sup> Clinical and Molecular Osteoporosis Research Unit, Skåne University Hospital

<sup>2</sup> Department of Orthopedics, Helsingborg Hospital

<sup>3</sup> Department of Physiology and Clinical Sciences, Skåne University Hospital

**Introduction:** Daily school physical activity (PA) is associated with beneficial gain in musculoskeletal traits, but it is unclear if the benefits remain in adulthood.

**Method:** We followed in a PA intervention study 209 children from baseline [age  $8\pm 1$  (mean $\pm$ SD)], to end of intervention (age  $15\pm 1$ ), and mean  $7\pm 2$  years after the intervention (age  $23\pm 2$ ). The intervention group ( $n=131$ ) received 40 minutes of daily school PA (200 minutes/week) during the nine compulsory school years, while controls ( $n=78$ ) received national standard of PA 1-2 times/week (60 minutes/week). Bone mineral content (BMC), bone mineral density (BMD) and bone size were followed by dual-energy X-ray absorptiometry (DEXA) and knee muscle strength (knee peak torque) by a computerized dynamometer. Analyses of covariance (adjusted for sex and follow-up time) estimated group differences.

**Results:** Gains in musculoskeletal traits, from study start to seven years after the intervention, were higher in intervention group [total body less head BMC  $+182.5$  g ( $55.1, 309.9$ ) (mean (95%CI)), BMD  $+0.03$  g/cm<sup>2</sup> ( $0.003, 0.05$ ), femoral neck area  $+0.2$  cm<sup>2</sup> ( $0.1, 0.4$ ) and knee flexion peak torque (60 degrees per second)  $+9.2$  Nm ( $2.9, 15.5$ )]. There was no attenuation of the benefits after termination of the intervention (all group comparisons between changes from end of intervention to mean seven years after  $p>0.05$ ).

**Conclusions:** Daily school PA is associated with beneficial gain in musculoskeletal traits that remains into adulthood, with no sign of attenuation when the intervention are terminated. Daily school PA may thus possibly reduce fracture risk in adulthood.