

## Publication

## 3-year follow-up results of bone mineral content and density after a school-based physical activity randomized intervention trial

**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 2017582**Author(s)** Meyer, Ursina; Ernst, Dominique; Zahner, Lukas; Schindler, Christian; Puder, Jarden J.; Kraenzlin, Marius; Rizzoli, René; Kriemler, Susi**Author(s) at UniBasel** [Schindler, Christian](#) ; [Kriemler, Susi](#) ; [Meyer, Ursina](#) ; [Ernst, Dominique](#) ; [Zahner, Lukas](#) ;**Year** 2013**Title** 3-year follow-up results of bone mineral content and density after a school-based physical activity randomized intervention trial**Journal** Bone**Volume** 55**Number** 1**Pages / Article-Number** 16-22**Keywords** Exercise, Mechanical loading, Children, Growth and development, Physical activity

As an important modifiable lifestyle factor in osteoporosis prevention, physical activity has been shown to positively influence bone mass accrual during growth. We have previously shown that a nine month general school based physical activity intervention increased bone mineral content (BMC) and density (aBMD) in primary school children. From a public health perspective, a major key issue is whether these effects persist during adolescence. We therefore measured BMC and aBMD three years after cessation of the intervention to investigate whether the beneficial short-term effects persisted.; All children from 28 randomly selected first and fifth grade classes (intervention group (INT): 16 classes, n=297; control group (CON): 12 classes, n=205) who had participated in KISS (Kinder-und Jugendsportstudie) were contacted three years after cessation of the intervention program. The intervention included daily physical education with daily impact loading activities over nine months. Measurements included anthropometry, vigorous physical activity (VPA) by accelerometers, and BMC/aBMD for total body, femoral neck, total hip, and lumbar spine by dual-energy X-ray absorptiometry (DXA). Sex- and age-adjusted Z-scores of BMC or aBMD at follow-up were regressed on intervention (1 vs. 0), the respective Z-score at baseline, gender, follow-up height and weight, pubertal stage at follow-up, previous and current VPA, adjusting for clustering within schools.; 377 of 502 (75%) children participated in baseline DXA measurements and of those, 214 (57%) participated to follow-up. At follow-up INT showed significantly higher Z-scores of BMC at total body (adjusted group difference: 0.157 units (0.031-0.283); p=0.015), femoral neck (0.205 (0.007-0.402); p=0.042) and at total hip (0.195 (0.036 to 0.353); p=0.016) and higher Z-scores of aBMD for total body (0.167 (0.016 to 0.317); p=0.030) compared to CON, representing 6-8% higher values for children in the INT. No differences could be found for the remaining bone parameters. For the subpopulation with baseline VPA (n=163), effect sizes became stronger after baseline VPA adjustment. After adjustment for baseline and current VPA (n=101), intervention effects were no longer significant, while effect sizes remained the same as without adjustment for VPA.; Beneficial effects on BMC of a nine month general physical activity intervention appeared to persist over three years. Part of the maintained effects may be explained by current physical activity.

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