VPA ($U=576$, $=-4{\cdot}13$, $P=0{\cdot}000$, mean rank 35·20 *v.* 58·84, SA *v.* White, respecively). Weekend activity showed no ethnic difference in MPA or LPA ($U=961$, $=-0{\cdot}48$, $P=0{\cdot}319$, $U=908$, $=-0{\cdot}896$, $P=0{\cdot}187$, respectively). However, SA children spent less time in VPA at weekends than White EU ($U=767$, $=-2{\cdot}05$, $P=0{\cdot}020$, mean = 39·68 *v.* 50·96, SA *v.* White EU, respectively).

Conclusions: Our results suggest children from ethnic minorities exercise differently. Further work is needed to explore the reasons for these differences and how these may impact on metabolic health.

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38 – Ground reaction forces in overweight children

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Aim: To investigate the relationship between expected and recorded vertical (V), anterior-posterior (AP) and medial-lateral (ML) ground reaction forces (GRF) in overweight children.

Participants: Subjects were recruited from the paediatric weight management clinic at the Adelaide and Meath Hospital, Dublin. Subjects aged 7–17 years and with a BMI >25 kg/m^2 were included in the study. Subjects who presented with a leg length discrepancy >2 inches were excluded from the study.

Method: Subjects attended the gait laboratory at the Trinity Centre for Health Sciences. Anthropometry was conducted on arrival. Subjects fitted with surface markers walked between two Coda cameras (Charnwood Dynamics LtD, Rothley, UK) on a 10 m platform embedded with two AMTI force plates (Advanced Mechanical Technology, Inc., Watertown, MA, USA). Observed maximum GRF were collected manually from graphs. Expected maximum GRF were calculated using percentage body weight values reported by Cottalorda *et al.* (2003).

Analysis: Paired *t* tests were used to compare means between observed and expected V, AP and ML GRF. A *P*-value <0·05 was considered statistically significant.

Results: Eight males and fifteen females completed the study (age 12·04 (SD 2·8) years; weight 79·11 (SD 27·85) kg; height 157·87 (SD 14·05) cm; BMI 29·51 (SD 4·55) kg/m^2). Observed AP and ML GRF were found to be significantly greater than expected GRF, $P=0{\cdot}016$ and $P=0{\cdot}000$, respectively. No significant difference between observed and expected V GRF were noted $P=0{\cdot}615$.

Conclusions: From the present study, overweight children incur greater than anticipated AP and ML GRF than anticipated for their body weight. These forces may predispose this group to musculoskeletal disorders. This information should be noted when prescribing exercise to overweight children.

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Reference: Jerome Cottalorda, Abderrehmane Rahmani, Mountaga Diop, Vincent Gautheron, Eric Ebermeyer and Alain Belli (2003). Influence of school bag carrying on gait kinetics. *Journal of Pediatric Orthopaedics B*, **12** (6): 357–364.

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39 – Barriers to participation in physical education among obese pupils

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Introduction: Physical education's (PE) profile has recently been raised in the fight against childhood obesity. The present study determined overweight/obesity prevalence among pupils recruited from five secondary schools in the South of England and investigated their barriers to PE participation.

Methods: Body fat% of 380 pupils (202 boys and 178 girls) aged 11–15 years, were measured using bioelectric

impedance analysis (TANITA-BC-418MA). A validated physical activity questionnaire was used to ascertain their PE dislikes/barriers, and their answers were compiled into different categories, according to the core themes that were identified during thematic data analysis.

Results: 19·5% (*n* 74) of the subjects were classified as either obese/overweight. 14·2% of the subjects reported having no dislikes/barriers with regard to PE and among this population, only a small proportion (20·4%) of the subjects were among those classified as overweight/obese. This indicates that overweight/obese pupils are more likely to have PE dislikes/barriers. The most common barrier reported among the overweight/obese subjects, was a dislike of running/sprinting activities (23·2%). Other barriers reported include: unenjoyable/boring activities, tiring and physically unpleasant activities, lack of an adequate range of activities, too competitive PE environments, dislike of PE assessment and dressing out procedures, being dominated by skilled pupils or put into low-ability PE groups and fear of weight-related teasing/ridicule by peers.

Conclusions: Physical educators should find innovative ways to address the PE barriers/concerns of overweight/obese pupils, provide them a supportive PE environment to build their confidence and reduce the risk of embarrassment by designing creative activities that are appropriate to their ability.

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40 – Association between adiposity and physical activity levels of schoolchildren during physical education lessons

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Introduction: It is increasingly acknowledged that school physical education (PE) is some children's only experience of physical activity (PA) and therefore has an important role to play in the fight against childhood obesity. The present study explored the relationship between the PA variables (percentage of PE lesson time engaged in (i) moderate-to-vigorous physical activity (MVPA) and (ii) sedentary activity) and the body composition variables (i) BMI; (ii) waist circumference (WC) and (iii) waist-to-height ratio (WHtR)), in 158 pupils (82 boys and 76 girls), aged 11–13 years, from five secondary schools in the South of England.

Method: Anthropometry (height, body mass and BMI), and PA data (using Actigraph-GT1M accelerometers) of the pupils were measured using standardized methods.

Results: A significant negative correlation was observed between the percentage of PE lesson time engaged in MVPA and the body composition variables of WHtR ($r = -0{\cdot}32$) and WC ($r = -0{\cdot}30$ amongst boys ($P < 0{\cdot}01$) and WC among girls ($r = -0{\cdot}25$, $P < 0{\cdot}05$). There was a small but significant positive correlation ($r = 0{\cdot}25$) between the percentage of PE lesson time engaged in sedentary activities and WHtR ($P < 0{\cdot}05$) amongst boys. No significant associations were found between the BMI and any of the PA variables ($P > 0{\cdot}05$) for either gender. The study suggests that obese pupils are less active and more likely to be sedentary than non-obese pupils, during PE lessons.

Conclusions: Physical educators should find innovative ways to increase MVPA participation in overweight/obese pupils. WC and WHtR may be better proxy indices of the lack of PA than BMI.

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41 – The influence of a comprehensive programme for treatment of overweight and obesity on physical fitness of children and adolescents in health-resort conditions

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