

but also improved as children got older ($F(1, 226) = 4.43$, $P = 0.03$, $f = -1.847$).

Conclusions: The present study adds novel data in that multiple domains of balance performance (balance

stability, sensorimotor balance) were examined, suggesting that children within the 'normal weight' category exhibit superior balance scores compared with overweight/obese children.

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36 – Patterns of physical activity in primary-school children: the effect of ethnicity

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Introduction: Ethnicity is an important predictor of metabolic health and the reasons for this are likely to be multifactorial. Differences in physical activity (PA) may contribute to this risk but few data exists in childhood.

Method: 122 (57 White EU, 36 South Asian, 29 other ethnic) children (mean age 8.5 (SD 0.5) years) wore a combined physical activity/heart rate (Actiheart, UK) monitor for 7 d.

Median daily activity counts per minute (CPM) were compared between ethnic groups using Wilcoxon signed-rank test.

Results: Examining the group as whole, PA is greater on weekdays than weekends (109 *v.* 99 cpm, =3.92, $P = 0.000$) and during school than after school (117 *v.* 99 cpm, =-3.22, $P = 0.001$). Compared with children from all ethnic backgrounds, White EU were more active

on weekdays ($u = 1376$, =-2.45, $P = 0.014$; mean rank = 70 *v.* 54, white EU *v.* all other ethnic groups, respectively) and after school ($u = 1237$, =-3.16, $P = 0.002$, mean rank = 72 *v.* 52). Subgroup analysis showed that South Asian children had no differences between weekday and weekend PA (103 *v.* 92 cpm, =1.654, $P = 0.098$) but were more active at school than after school (122 *v.* 91, =3.174, $P = 0.002$). White EU children were more active on weekdays than weekends (116 *v.* 90 cpm, =-2.24, $P = 0.025$) but did similar activity after school and during school (118 *v.* 112 cpm, =4.65, $P = 0.642$).

Conclusions: Ethnic groups exercise differently but all children engage in highest activity at school. The contribution of PA on metabolic well-being needs further investigation in vulnerable groups of children.

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37 – South Asian children spend more time in light activities and less time in moderate and vigorous PA on weekdays

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Introduction: South Asian (SA) children are at increased metabolic risk compared with White children. The role of physical activity in this risk is unknown. The present study compares metabolic equivalent (MET) levels in SA and White EU children.

Method: Ninety-five (54 White EU, 41 SA) children (mean age 8.4 (SD 0.5) years) wore a combined activity and heart rate monitor (Actiheart, Cambridge, UK) for 7 d. Time spent in MET levels were categorized into light (LPA),

moderate (MPA) and vigorous physical activity (VPA). Results were analysed using the Mann-Whitney test.

Results: SA children spent fewer minutes (average 7 d) in VPA ($U = 589$, =-4.12, $P = 0.000$, SA mean rank = 34.62 *v.* White EU mean rank = 39.68) and more minutes in LPA than White EU ($U = 889$, -1.82, $P = 0.034$, SA mean rank = 54.37 *v.* White EU 43.94). SA children spent fewer weekday minutes in MPA ($U = 875$, =-1.75, $P = 0.040$, mean rank 42.33 *v.* 52.31 SA *v.* White EU, respectively) and

VPA ($U=576$, $=-4.13$, $P=0.000$, mean rank 35.20 *v.* 58.84, SA *v.* White, respectively). Weekend activity showed no ethnic difference in MPA or LPA ($U=961$, $=-0.48$, $P=0.319$, $U=908$, $=-0.896$, $P=0.187$, respectively). However, SA children spent less time in VPA at weekends than White EU ($U=767$, $=-2.05$, $P=0.020$, 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/m² 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/m²). Observed AP and ML GRF were found to be significantly greater than expected GRF, $P=0.016$ and $P=0.000$, respectively. No significant difference between observed and expected V GRF were noted $P=0.615$.

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