The impact of the Badminton World Federation Shuttle Time intervention on body mass index and motor competence in British children

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Introduction

Prior research, has reported that children with higher BMI have poorer motor competence (MC) (Cliff et al., 2009; Lopes, et al., 2011). MC is an important predictor of children's physical activity and weight status and, in the context of MC based interventions, the development of object control skills has been posited as more important than locomotor skills for overall motor development (Morgan et al., 2013). However, few studies have trialled object control skill based interventions in children. Fewer still have examined if there are differential effects of such interventions on children in different ages of primary education.

This study addresses this issue by the impact of the Badminton World Federation's 'Shuttle Time' programme, a school and badminton based FMS intervention, on body mass index (BMI) and motor competence (MC) in British children.

Methods

Participants and Design

Using a quasi-randomised design, 124 children aged either 6-7 years (n=66) or 10-11 years (n=58) undertook either a, once weekly object control skill intervention over 6 weeks in lieu of statutory PE (INT, n = 63) or acted as controls (CON, n = 61) undertaking statutory PE only. The intervention focused on development of movement skills through badminton. The intervention comprised the Badminton World Federation (BWF) 'Shuttle Time' programme focusing on development of object control skills (See Figure 1 for example activities). Pre, post and 10 weeks post, children underwent assessment of MC and weight status.

Motor Competence Assessment

MC was assessed using video analysis and the Test of Gross Motor Development-2 (TGMD-2) (Ulrich, 2000). The following skills were assessed: run, jump, catch, throw, strike. These were particularly selected as they are the key skills identified as targets for development by the UK National Curriculum for Physical Education for children of the age participating (Department for Education 2013). A total MC score (0-40) was derived from the summed components of all the skills.

Weight Status Assessment

Body mass, measured to the nearest 0.1kg and height, to the nearest 1mm were assessed barefoot with participants wearing light clothing using a Seca Stadiometre and Weighing scales (Seca Instruments, Germany, Ltd). Body Mass Index (kg/m^2) was calculated and employed as a measure of weight status.

Statistical Analysis

Data were analysed using repeated measures ANOVAs with time (pre, post and 10week post) scores for BMI and MC as dependant variables and sex, group (INT vs CON) and age stage (6-7 vs 10-11 years) as between-subjects variables The Statistical Package for Social Sciences (SPSS, Version 22, Chicago, Il, USA) was used for all analysis and statistical significance was set, a priori, at p <.05.

Figure 1. Children undertaking activities within the BWF Shuttle Time Programme

Results

For MC there was a significant time X group X age stage interaction (P = .0001, See Figure 2). Bonferroni post-hoc analysis indicated that MC was not significantly different over time or between INT and CON groups for 10-11year olds (all P>0.05). For 6-7year olds there was a significant increase in MC for the INT group post and 10 weeks post intervention (both P = 0.01) compared to the CON group. Boys also had significantly better MC than girls (P = 0.001). For BMI there was a time X group interaction (P = 0.04, See Figure 3) where BMI decreased pre to post for children in the INT group (P = 0.04) but not the CON group.

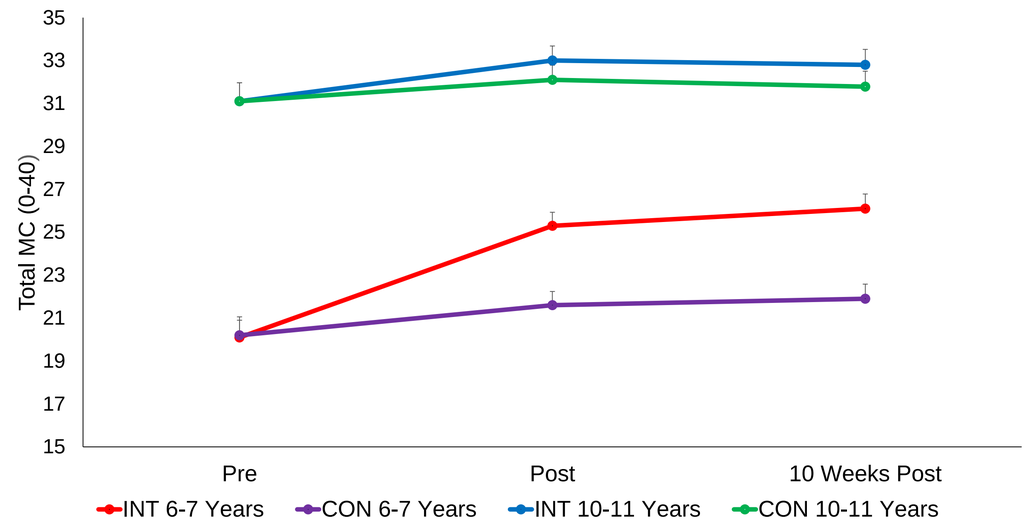

Figure 2. Mean ± SE of total MC (0-40) pre, post and 10 weeks post the BWF Shuttle Time intervention for children aged 6-7 years and 10-11 years in INT and CON groups.

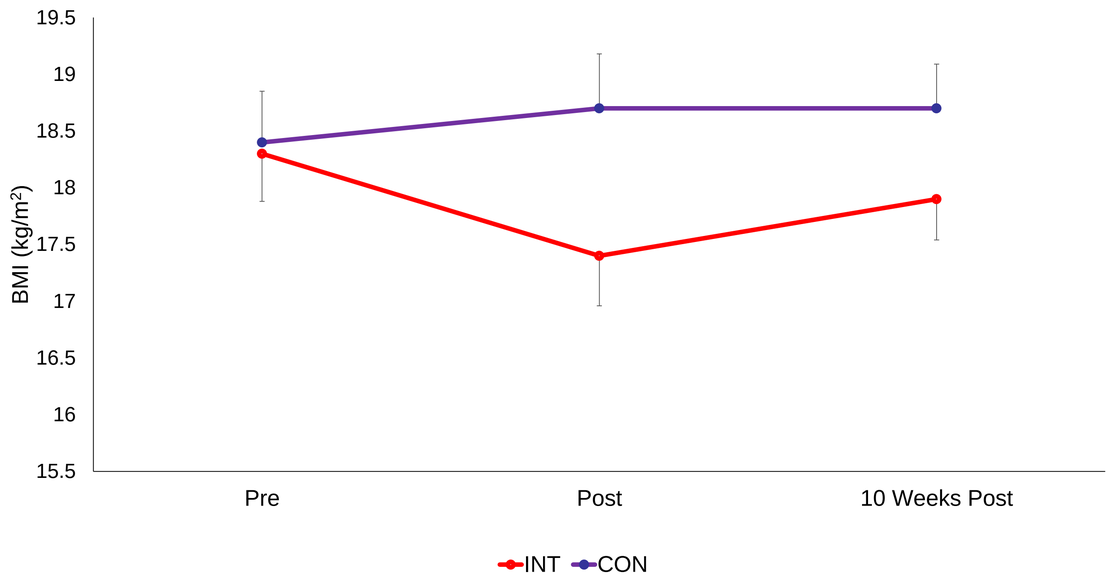

Figure 3. Mean ± SE of BMI (kg/m^2) pre, post and 10 weeks post the BWF Shuttle Time intervention for intervention and control groups

Discussion

•This study demonstrates that the BWF Shuttle Time Intervention has positive short term effects on BMI in children aged 6-7 and 10-11 years but positive sustained effects on MC only in children aged 6-7 years.

•Importantly, the current study differentiated the efficacy of the programme according to age stage, a variable often overlooked in the evaluation of MC based interventions.

•Irrespective of age stage, BMI decreased for children who undertook the Shuttle Time intervention in lieu of one of their statutory PE lessons per week, from pre-post, compared to the control group. Such a change is positive and suggests participation in Shuttle Time may help to maintain healthy weight in children

References

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