

CHILD-CENTRED PHYSICAL ACTIVITY: EFFECT ON MOTOR SKILL DEVELOPMENT IN TODDLERS: ABSTRACT

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Background: Over the last 20-30 years, children's physical activity levels have decreased significantly resulting in obesity rates reaching epidemic levels. To date there has been very little research regarding physical activity in toddlers, with the majority of research focussing on young children (3-5 year-olds) or on children at risk of motor or neurological deficiencies. Purpose: To investigate the effects of a nine-week, child-centred physical activity programme on cognitive and motor skill development, safety skills, balance and parent supervision in typically developing 12-24 month-old children.

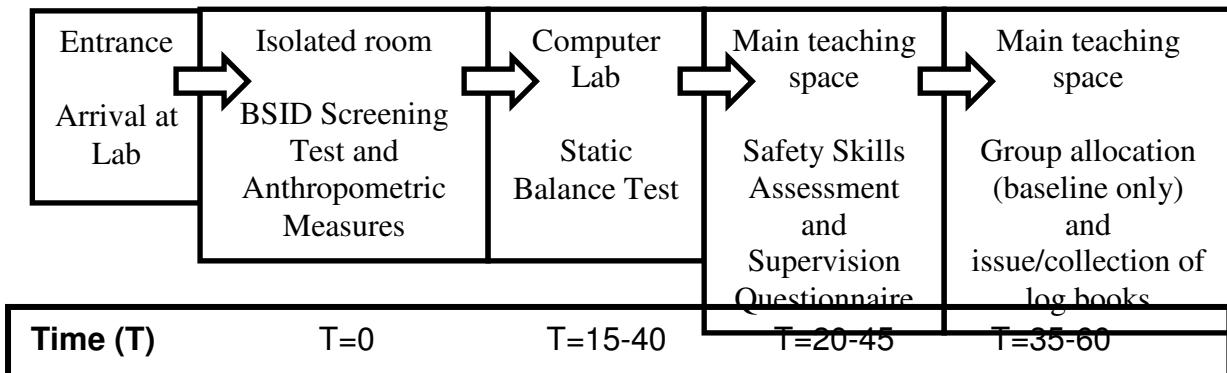
Methods: In a randomised, controlled design, 90 toddlers (age 17.0 ± 2.6 months; 52.2% male) and their parents were split into two treatment groups stratified by age and gender at baseline. The intervention completed was either nine weeks (one school term) of one-hour child-centred physical activity classes or normal physical activity for nine weeks. In the school holiday periods prior to, and following the intervention period anthropometric measures (mass and height), overall development (Bayley Scales of Infant Development – Screening Test), safety skills (nine-skill test battery), balance measures (centre of pressure) and parent-child supervision were assessed.

Results: The nine-week physical activity intervention was successful in improving the overall safety skills score ($p < 0.05$). In addition, the ability to climb over a small-runged A-frame while using a cylinder grip and safe face-the-slope dismount and the execution of a safety roll down a foam wedge were improved as the result of the intervention ($p < 0.05$). There was no effect of the exercise intervention on overall development, measures of balance or supervision aspects. A main effect of Age Group on the mean change score in all subscales was reported with younger children (12-18 months) tending to show greater improvements as compared to older children (18-24 months). Regression analysis showed that 27.8% of the change in overall development could be predicted by knowing the age of the child and whether their day-to-day environment was mostly home care with their parent or other adult, or not.

Conclusions: This was the first randomised, controlled trial that examined the effects of a child-centred physical activity programme on overall development, safety skills, balance and supervision in 12-24 month-old children in New Zealand. There is a need for more randomised, controlled trials that incorporate a multitude of external factors that may influence development, namely cognitive and motor skill development.

Keywords: motor skill development, cognitive development, toddlers, physical activity, balance

Methods



Flow chart detailing the study procedures and average time taken to complete each stage of the overall assessment.

Anthropometric and demographic assessments

- Online questionnaire used to obtain demographic information about the child and parents and anthropometric information of the child at birth.
- The child's body mass and height was measured in the laboratory

Bayley Scales of Infant Development (BSID)

- Comprehensive scale of development that provides information regarding motor, cognitive and language development
- Five subscales: Cognition, Receptive Communication, Expressive Communication, Fine Motor Skill and Gross Motor Skill.
- Administration of test took between 15 and 40 minutes depending on the age and ability of the child, with older, more developed children requiring a longer testing period due to their further progression through the scales.

Static balance test (force plate)



Safety skill assessment

The safety skills test battery consisted of the following:

- a) Safe climbing down foam stairs facing the slope, from placement at the top of the stairs facing forwards.
- b) Safe face-the-slope drop from foam block, from placement at the top of the stairs facing forwards or from climbing up and over stairs.
- c) Jump to land on two feet.
- d) Walking on stepping stones (depth perception board).
- e) Climbing down a small-runged A-frame, from placement at the top of the A-frame or from climbing up and over.
- f) Climbing over a small-runged A-frame, sitting at top and using cylinder grip and safe face-the-slope, leg-over dismounting techniques.
- g) Execution of safety roll (Aikido roll) down a foam wedge.
- h) Locomotion across a wide beam.
- i) Hanging from a horizontal bar or trapeze, supporting body weight using a whole-hand grip.



The level of competency in each skill ranged from 0 to 5:

- 0. Not attempted
- 1. Fully assisted
- 2. Partially assisted
- 3. Supported
- 4. Independent
- 5. Mastery