Development, inter-rater and intra-rater reliability of the modified resistance training skills battery

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The purpose of this study was to develop and assess the inter-rater and intra-rater reliability of a modified version (mRTSB) of the Resistance Training Skills Battery (RTSB) for children with varying levels of motor proficiency.

Adequate muscular strength is required to perform fundamental movement skills (FMS) proficiently. The ‘mastery’ of FMS is described as contributing to the physical and social development of children. Therefore, those who do not increase their strength and movement skill proficiency in the early years may not develop the motor skills needed to successfully participate in physical activities with confidence and enjoyment in the later years – a key aspect of developing and maintaining optimal health.

Children are more frequently being prescribed resistance training (RT) to improve fitness and health. Whilst research is indicating the role of RT in enhancing motor function in those with movement difficulties, it is important to assess whether they are competent in basic RT skills before appropriate prescription can occur.

On two occasions children aged 6-12 years performed the mRTSB. In order to determine inter-rater and intra-rater reliability three raters independently evaluated the 6 RT skills. The test administrator assessed movement live, whilst additional raters scored performance based on video footage from frontal and sagittal plane. Before analysis, raters were given test instructions and video samples to establish what is considered ‘acceptable’ for each performance criteria for the 6 RT skills.

Participants performed 2 sets of 4 repetitions for 6 RT skills (step-up, front support with chest touches, squat, push-up, suspended row and overhead press). The best repetition performance score in each set was summed for a total RT skill score. RT skill scores were then summed for the modified resistance training skills quotient (mRTSQ).

Data analysis was performed using SPSS, with descriptive statistics calculated as mean values with standard deviation. Inter-class Correlation Coefficients (ICCs) were computed to determine the inter-rater and intra-rater reliability of the mRTSB and individual RT skills of the mRTSB. Clinical significance was defined as good for an ICC 0.75 or above, moderate for 0.50-0.75, and poor for below 0.50.

RESULTS

Twenty children between 6-12 years (mean age = 8.15, SD ± 1.79) were recruited across a range of motor proficiency levels (MABC-2 range = 1-91).

Inter-rater reliability for the 3 raters (session 1) was very good for the mRTSQ (ICC = 0.97), step-up (ICC = 0.91), front support with chest touches (ICC = 0.93), squat (ICC = 0.92), push-up (ICC = 0.86), suspended row (ICC = 0.89) and overhead press (ICC = 0.87).

Intra-rater reliability of the live rater (session 1 & 2) was very good for the mRTSQ (ICC = 0.99), step-up (ICC = 0.97), front support with chest touches (ICC = 0.98), squat (ICC = 0.97), push-up (ICC = 0.93), suspended row (ICC = 0.96) and overhead press (ICC = 0.97).

DISCUSSION

The mRTSB has demonstrated very good inter-rater and intra-rater reliability, indicating it is a reliable tool to assess movement competency in selected RT skills in 6-12 year old children. Furthermore, reliability and feasibility was demonstrated in children with varied levels of motor proficiency, therefore increasing the ease of application across both clinical and community based paediatric populations.

Reliable measures for assessing RT skill competency and evaluating intervention effects have now been established for both adolescents (12-16 years) and children with varying levels of motor proficiency. In consultation with the original authors, cut-offs were also developed to determine competency in individual RT skills and overall readiness to begin a structured RT program. Competency in individual RT skills is achieved if 3/4 or 4/5 performance criteria are satisfied and competency across all 6 RT skills is required to be considered ‘ready’ to begin RT.

Therefore, the mRTSB has the potential to (a) evaluate the efficacy of school and community based RT programs, (b) assess individual progress and provide feedback in RT programs, (c) be used as a measurement tool in research focusing on movement skill competency, and (d) determine readiness for RT.

Further research is currently investigating the association between muscular fitness and RT skill competency in order to assess the construct validity of the mRTSB.

REFERENCES...