Measuring physical fitness in adolescents with DCD: do we use the right measures?

Beth P. Hands  
*University of Notre Dame Australia, beth.hands@nd.edu.au*

Fleur McIntyre  
*University of Notre Dame Australia, fleur.mcintyre@nd.edu.au*

Dawne Larkin

Elizabeth Rose  
*University of Notre Dame Australia, elizabeth.rose@nd.edu.au*

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Introduction: Measuring physical fitness in adolescents with DCD using standard tests is problematic as their poor coordination and inconsistent motor performance may confound the outcome. Consequently, identifying change in fitness associated with an exercise intervention is challenging.

Methods: A sample of 33 adolescents with movement difficulties ranging in age from 13 to 17 years participated in a twice weekly 13-week exercise intervention study (AMPitup) based on strength training and aerobic conditioning. To be eligible, participants needed a score below 1 SD of the mean Neuromuscular Developmental Index derived from the MAND (McCarron, 1997) and/or a history of movement difficulties. We examined the results from several perspectives. Data for standard fitness measures including aerobic fitness (PWC\textsubscript{170}, MSFT), muscle strength (vertical and broad jump), flexibility and balance were taken pre and post the intervention. Linear mixed models compared the measures across time adjusting for sex, age and sessions. Correlations were used to compare data for tests designed to measure the same fitness component. Finally, the individual session records for several cases were examined for performance changes and consistency in a range of aerobic and strength exercises.

Results: When we compared the data for the standard fitness tests a significant difference for time was only found for the number of curl ups ($p = .015$), although a positive trend was apparent for the MSFT ($p = .10$). The correlations between tests measuring similar fitness components were weak for the aerobic tests (PWC\textsubscript{170} and MSFT; $r = .21$) and moderate for the strength tests (e.g. vertical and broad jump; $r = .53$). Although the records showed overall improvements in aerobic and strength outcomes, inconsistency was present from week to week.

Conclusion: Although the sessional reports and personal feedback indicated fitness improvements, these were not reflected in most of the standard tests used. The low correlation between the aerobic tests reflects differing coordinative demands, whereas the strength tests were similar. Task demands may confound the measurement of fitness elements. The only standard test (curl up) able to detect performance changes in these adolescents had simple task demands, provided both intrinsic and extrinsic motivation to improve, and was closely aligned to the exercise program. The participants were unable to generalise fitness improvements in the gymnasium to unfamiliar standard tests.