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Some do and some don't, but who will and who won't: can patterns of physical activity maintenance be predicted in children and young people with cystic fibrosis?

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Objectives: Maintaining adequate levels of physical activity (PA) is important for the health and well-being of children and young people with cystic fibrosis (CYPwCF). Identifying who maintains adequate levels and who needs targeted support is difficult in the clinical setting. This study aimed to identify whether PA maintenance could be predicted by exercise capacity, self-efficacy for PA and self-reported PA in 78 CYPwCF aged 6–16years.
Methods: All participants wore activity trackers (Fitbit Alta HR™) for at least 2months (mean ± SD 154 ± 51days) to enable daily capture of time spent in moderate-to-vigorous PA (MVPA). Exercise capacity (from 25-level 10 m Modified Shuttle Walk Test) was measured at baseline and questionnaires were used to measure 1) self-efficacy for PA (Children's Self-Perception of Adequacy in and Predilection for Physical Activity) and 2) self-reported PA (Habitual Activity Estimation Scale) after at least 2 months of PA tracking. Linear Discriminant Analysis was conducted to investigate if pattern of PA maintenance (from Latent Class Growth Analysis (LCGA)) could be predicted by exercise capacity, self-efficacy for PA or self-reported PA.
Results: The LCGA model identified 5 different patterns of PA maintenance, including 7 (9%) CYPwCF who maintained regular high PA levels, 18 (23%) who maintained very little activity, and 53 (68%) who were active sometimes but not routinely. Using 3 simple and routine clinical measurement tools could only predict maintenance of PA pattern (represented by the 5 LCGA classes) in 45% of cases.
Conclusion: Patterns of PA must be directly and objectively measured to gain a true insight into the maintenance of PA in CYPwCF. These findings are significant for CF clinical teams. Accurately identifying patterns of, and factors affecting, PA maintenance, could enable clinical teams to facilitate the right type and level of support for individual CYPwCF to optimise outcomes.

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Clinimetric properties of field exercise tests in cystic fibrosis: a systematic review

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Objectives: Accurate measurement of exercise capacity is an important prognostic indicator for people with cystic fibrosis (CF), however gold-standard, laboratory, cardiopulmonary exercise tests are commonly unavailable. This review systematically describes the clinimetric properties of field exercise tests for pwCF across all ages.
Methods: A systematic review was undertaken for studies reporting field exercise tests in CF. Four electronic databases were searched for studies published from 1990 to January 2022. The Consensus-based standards for the selection of health status measurement instruments (COSMIN) checklist was used to assess study quality. Where available, clinimetric properties reported included reliability, validity and responsiveness.
Results: 3614 studies were identified with 130 eligible for inclusion. Nine different field exercise tests were described including six walk/run tests (incremental shuttle walk test (ISWT); modified shuttle test 15-levels (MST-15) and 25-levels (MST-25); 20-meter shuttle; the 6-minute walk test (6MWT); the twelve 12-minute walk test (12MWT)); two step tests (3-minute step test (3MST); incremental step test); and the 1-minute sit to stand test (1STS). The overall methodological quality of the included studies was adequate as assessed by the COSMIN checklist. Reliability was found for ISWT, MST-15, 6MWT, 1STS and 3MST (ICC >0.80). The ISWT, MST-15, and 6MWT were found to be valid (concurrent and discriminate). Responsiveness was supported for the 6MWT but more data is required for other tests. Four tests (MST-15, 6MWT, 3MST and 1STS) have all demonstrated ceiling effects.
Conclusion: This review supports the reliability and validity of the ISWT, MST-15, and 6MWT in pwCF. Responsiveness was supported for the 6MWT. The 3MST and 1STS are reliable and feasible, but utility is limited by ceiling effects. The MST-25, 20-metre shuttle, incremental step test and 12MWT require further investigation of their clinimetric properties.

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Feasibility of performing the three-minute step test with remote supervision in children and adolescents with cystic fibrosis

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Objective: The three-minute step test (3MST) is a simple and easy-to-apply option to monitor submaximal exercise capacity, although its use via remote video monitoring has not been investigated in children with cystic fibrosis (CF). This study aimed to assess the feasibility and reproducibility of performing the 3MST with remote supervision in CF children and adolescents.
Methods: A cross-sectional study including CF patients between 6 and 18 years from two CF services was performed. Demographic, anthropometric, clinical and lung function data were collected and two 3MST were performed: (i) personally supervised (T1), and (ii) remotely supervised by video-monitoring (T2). Before and after the tests, heart rate (HR), oxygen saturation (SpO_2), and the BORG score for dyspnea and lower limb fatigue were monitored. HR and SpO_2 were also collected at 3-min recovery. Ethical approval was obtained. Data were analyzed using a paired *t*-test, intraclass correlation coefficient (ICC), Pearson correlation and the Bland-Altman tests.
Results: Twenty-three patients with a mean age of 10.7 ± 3.7 years and mean forced expiratory volume in one second (FEV_1) of 89.5 ± 23.2% were included. There were no significant differences between tests in final HR ($p = 0.24$), delta HR ($p = 0.33$), HR at 3-min recovery ($p = 0.40$), final SpO_2 ($p = 0.45$), SpO_2 at 3-min recovery ($p = 0.20$), and final dyspnea score ($p = 0.88$). The ICC was 0.852 ($p < 0.001$) for final HR, 0.762 ($p = 0.001$) for final SpO_2 and 0.775 ($p < 0.001$) for final lower limb fatigue. Significant and moderate correlations were found between the tests for final HR (r = 0.75), delta HR (r = 0.61), final SpO_2 (r = 0.61), final dyspnea (r = 0.47) and lower limb fatigue (r = 0.64). The Bland-Altman analysis showed a mean difference in final SpO_2 between tests of 0.3% (limit of agreement – 3.0 to 3.5%).
Conclusion: The use of the 3-minute step test performed remotely was feasible, presenting good reproducibility between tests in children and adolescents with CF.

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Can the 6-minute walking test assess physical activity level among people with cystic fibrosis?

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Introduction: Regular exercise is an essential tool in the therapeutic approach in cystic fibrosis.
Aim: To evaluate the correlation of the exercise capacity assessed by the 6-Minute Walking Test (6-MWT) with quality of life and physical activity in patients with cystic fibrosis.