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Title: Reliability of the 6-minute walk test in patients referred for pulmonary rehabilitation

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Body: Introduction The 6-minute walk test (6mwt) has been widely used as an easy assessment of physical performance and as an outcome parameter in pulmonary rehabilitation (PR). However, uncertainty remains about the need to perform multiple tests because of the possible occurrence of a learning effect contributing to the reliability of the test. Aims and objectives The aim of this study was to evaluate the reliability of three consecutive 6mwt in a large group of patients referred for PR. Methods From June 2006 to December 2011, 1112 patients referred to a PR center performed a 6mwt on 3 consecutive days (t1-3) as part of the routine pre-PR assessment. Tests were performed during a clinically stable period according to the guidelines of the American Thoracic Society. Retrospectively, absolute differences between the tests were evaluated and correlation coefficients between the three tests were calculated. Results The mean distance of the 6mwt (mean \pm SD) was 352 ± 122 m on t1, 378 ± 124 on t2 and 393 ± 125 m on t3. All differences between the tests were statistically significant ($p < 0,001$). 51% of patients walked their maximal distance on t3 but only 8% on t1. When considering a minimal clinical important difference (MCID) of 54 m, 35% of the patients showed differences beyond the MCID in favour of t3 when compared to t1, 11% when compared to t2 and 22% when t2 was compared with t1. Significant correlations exist between t1-t2 ($r=0,933$, $p < 0,001$), t1-t3 ($r=0,912$, $p < 0,001$), t2-t3 ($r=0,951$, $p < 0,001$). Conclusion These data show that a single 6mwt is not reliable in these patients with severe pulmonary disease. At least two 6mwt are required to obtain a reliable test.