EUROPEAN RESPIRATORY journal
FLAGSHIP SCIENTIFIC JOURNAL OF ERS

Minimal clinically important difference using one-repetition maximum in COPD

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European Respiratory Journal 2019 54: PA1205; **DOI:** 10.1183/13993003.congress-2019.PA1205

Abstract

Peripheral muscle strength training is a key component of pulmonary rehabilitation (PR). However, the clinical interpretability of changes in muscle strength following PR is limited due to the lack of cut-off values to define clinical improvement. This study estimated the minimal clinically important difference (MCID) for leg extension (LE-MS) and chest press (CP-MS) muscle strength using one-repetition maximum (1-RM) in patients with COPD.

51 patients (44♂; 69.2±7.2yrs; FEV149.4±19.2%predicted) were included. 1-RM was measured on a multigym (BH Fitness G112X). The 6-minute walk test (6MWT) and the modified Medical Research Council (mMRC) dyspnoea scale were used as anchors. All measures were assessed pre/post 12-weeks of PR. MCID were calculated using anchor- and distribution-based methods. Pooled values were obtained using Meta XL with a quality effects model weighting 2/3 for anchor and 1/3 for distribution-based methods.

Significant correlations were only found between the LE-MS and the 6MWT (r=.309; p=.028). The pooled of the anchor- and distribution-based methods resulted in a MCID of 5.14kg for LE-MS and 6.25kg for CP-MS (Fig. 1).

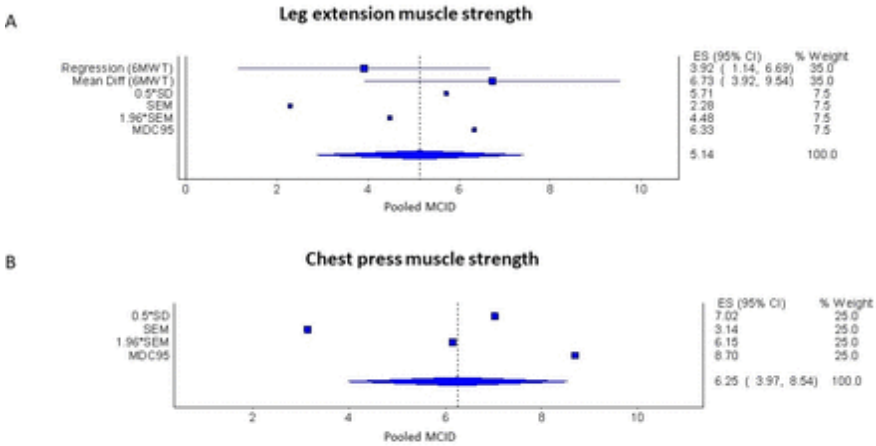

Fig 1. Summary plots of the pooled values of the anchor- and distribution methods for A) leg extension muscle strength; and B) chest press muscle strength. The horizontal plots represent the minimal clinically important difference estimates derived in this study, classified per method. Where appropriate the estimates include the 95% confidence interval.
Legend: 6MWT, 6-minute walk test; CI, confidence interval; MCID, minimal clinically important difference; MDC95, minimal detectable change at 95% confidence level; SD, standard deviation; SEM, Standard Error of Measurement.

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Improvements of approximately 5 and 6kg in LE-MS and CP-MS, respectively, were identified as clinically relevant. Only distribution-based methods could be used to compute the MCID for CP-MS, which could have overestimated this value. Studies with larger samples are needed to consolidate these results.

Measurement properties COPD - management Physiotherapy care

Footnotes

Cite this article as: European Respiratory Journal 2019; 54: Suppl. 63, PA1205.

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