

Responsiveness of functional assessments to monitor change in balance, walking speed and strength of older adults: A systematic review of the minimal detectable change.

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Age-related change in physical health can negatively impact the performance of functional activities which can affect quality of life and well-being (Kojima et al., 2016, *Journal of Epidemiology and Community Health*, 70, 716-721). Physical activity interventions have been used to counter the effects of aging on functional movement (de Labra et al., 2015, *BMC Geriatrics*, 15, 154; Richardson et al., 2019, *European Journal of Sport Science*, 19, 234–246). However, the ability to observe change is influenced by the size of error within observed outcome values (Hopkins, 2000, *Sports Medicine*, 30, 1-15). This can be indicated via the Minimal Detectable Change (MDC) statistic (Haley & Fragala-Pinkham, 2006, *Physical Therapy*, 86, 735-743), providing a quantifiable value defining the responsiveness of the functional assessment; a lower MDC suggests a better ability to detect a small improvement or deterioration in functional ability (Haley & Fragala-Pinkham, 2006, *Physical Therapy*, 86, 735-743). The objective of this study was to systematically review and evaluate the responsiveness of different functional tests via the MDC across different older adult population cohorts. The systematic review protocol was published in PROSPERO (CRD42019147527) and involved searching ISI Web of Knowledge and PubMed databases from inception to September 26th 2020. Studies were included if the older adults were on average over the age of 60 and recruited from community dwellings, hospital and residential homes settings or had musculoskeletal conditions (health subgroup). The MDC values were extracted for gait speed, grip strength, balance, timed up and go, and repeated chair stand tests and were analysed based on health subgroup. Comparisons of MDC were also made between the functional test, study design (between- and within-rater designs) and MDC calculation methodology. Regression analysis was performed to explore the impact of these factors on the MDC ($p < 0.05$). A detailed overview of the results can be found in a full paper available in an open-access repository (<https://medrxiv.org/cgi/content/short/2022.06.06.22276029v1>). In summary, thirty-nine studies met the inclusion criteria and MDC values were not available for all assessments across all population cohorts. The MDC was affected by the functional test used, population and MDC calculation methodology. Thus, the MDC should be assessment and population specific, and this should be considered when using the MDC in the evaluation of interventions such as physical activity used to counter changes due to aging.