Physical Fitness Assessment Across the Disability Spectrum in Persons With Multiple Sclerosis: A Comparison of Testing Modalities

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- PMID: 26247510

- DOI: 10.1097/NPT.0000000000000099

Abstract

Background and purpose: Appropriate assessment of physical fitness (ie, aerobic capacity and muscular strength) is necessary for the design and evaluation of exercise training in multiple sclerosis (MS). However, this is challenging in persons with substantial disability, because of physical inaccessibility and insensitivity of certain exercise testing modalities. This study compared different methods of measuring cardiorespiratory (arm ergometer vs recumbent stepper) and muscular (hand-held dynamometry vs computerized dynamometry) fitness across the MS disability spectrum. Associations between physical fitness and other measures that represented all domains of the International Classification of Functioning, Disability and Health (ICF) were also examined.

Methods: Sixty-four participants with MS completed 2 symptom-limited cardiorespiratory fitness and muscular strength tests. We also assessed disability, cognition, fatigue, walking speed and endurance, health-related quality of life, and activities of daily living.

Results: Across all levels of disability, peak aerobic capacity assessed by recumbent stepping was higher compared with arm ergometry ($P < 0.001$). Peak torque of the knee extensors and knee flexors was significantly higher assessed by computerized dynamometry compared with hand-held dynamometry ($P < 0.001$). Aerobic capacity and peak torque decreased as a function of increasing disability ($P < 0.001$). Significant,

moderate to strong correlations were observed between the physical fitness measures and measures representing all domains of the ICF, irrespective of the fitness testing mode.

Discussion and conclusions: Overall, peak physical capacity was higher when assessed by recumbent stepping and computerized dynamometry. The assessment and prescription of exercise in MS should be based on these modalities to provide the most appropriate stimulus for exercise training adaptations. There continues to be an important association between physical fitness and other measures that represent all domains of the ICF, regardless of fitness assessment mode.Video Abstract available for additional insights from the authors (see Video Abstract, Supplemental Digital Content 1, http://links.lww.com/JNPT/A109).

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