Clinician's Commentary

Multiple sclerosis (MS) is a debilitating condition with numerous physiological impairments that lead to functional limitations affecting quality of life. In particular, functional ambulation—the ability to walk during activities of daily living (ADL)—is often impaired, limiting both performance of ADL and participation in community and social events. Given the implications of impaired functional ambulation and the role of the physiotherapist in optimizing mobility and function, understanding both the degree of functional ambulation ability and its determinants in MS is important for clinical decision making and treatment planning.

In their study, Wetzel et al.¹ examined the contributions of clinical indicators of health status, physical function, and pulmonary impairment to performance on a common clinical measure of functional ambulation, the 6-Minute Walk Test (6MWT), in people with MS. As the authors note, the 6MWT is a valid and reliable measure² that can be conducted with minimal equipment and at a low cost. Examination of the determinants of 6MWT performance in the MS population is useful because (1) people with MS have a unique combination of neuromuscular and systemic cardiopulmonary deficits that can influence functional ambulation, and (2) the determinants of 6MWT performance vary across populations. For example, while aerobic capacity and pulmonary function are the predominant factors influencing 6MWT distance in healthy individuals and in those with cardiac and respiratory diseases,³ balance and neurological impairments are the primary limiting factors affecting functional ambulation in the stroke population.^{4,5}

As anticipated, the participants with MS in this study had reduced functional capacity for ambulation, demonstrated by reduced 6MWT distances (representing, on average, only 65% of age-predicted 6MWT distance). Furthermore, level of functional ambulation was related to level of disability: individuals with mild disability (score of <4 on the Expanded Disability Severity Scale, or EDSS) achieved greater 6MWT distances than people with moderate disability (score of 4–6.5 on the EDSS). While a number of factors were associated with 6MWT performance (including disability, balance, balance confidence, lower-extremity power, and pulmonary function), regression analysis revealed that balance, balance confidence, and lower-extremity power were all significant independent explanatory factors for 6MWT performance. In particular, it was noted that the measure of lower-extremity power (the functional stair test, or FST) alone explained 79% of the variation in 6MWT performance. Wetzel et al. propose that the measures of

lower-extremity power and balance confidence used in their study (the FST and the Activities-specific Balance Confidence [ABC] Scale) could be useful clinical measures for explaining functional ambulation and identifying at-risk individuals in the MS population.

The results of this well-conducted study raise a number of important issues and highlight areas in need of greater understanding. For example, it is interesting to note that despite the well-documented problem of fatigue known to affect people with MS,⁶ the index of fatigue used in this study, the Fatigue Severity Scale (FSS), was not correlated with 6MWT distance. Does this mean that fatigue was not a factor in functional ambulation for these individuals? Not necessarily. It is possible that the particular items included in the FSS do not reflect elements of fatigue that influence sustained ambulation. It is also possible that fatigue did not emerge as an important factor because the 6MWT itself is subject to variations in how it can be performed. While the ATS guidelines on 6MWT administration instruct participants to walk as far as they can in 6 minutes and take rest breaks as needed,² participants are not instructed in how to gauge their output over the course of the test. As a result, different people may use different strategies to complete the test. For example, one person might start the test at a very fast pace, walking at near-maximal effort, then tire and then slow down over time; another might pace him- or herself from the beginning at a sub-maximal effort in order to complete the test without excessive fatigue. Currently there are no measures to reflect the strategy a person uses to complete the 6MWT, and even if the primary outcome (total distance) is the same for the two people described above, the interpretation of their scores should differ, as essentially they performed two different tasks. This concern is not unique to the 6MWT but is common to many tests that depend on the participant's effort for the outcome—such as strength testing, exercise capacity, and reaction time. Continued study of this issue is warranted to ensure that the validity of effort-dependent tests is maintained.

The primary conclusion of this study is that balance confidence and lower-extremity power are the main determinants of 6MWT performance in people with MS. Statements such as this are likely to be widely cited; while they may be true for groups of people with MS, however, practising therapists must use caution in applying such generalizations to individual patients. For example, a particular individual might have a range of specific impairments that influence his or her capacity for functional ambulation; balance might be less of an

issue for a given person, but he or she might have greater cardiovascular deconditioning that limits 6MWT performance. While Wetzel et al.'s results can help direct clinicians' hypotheses about the impairments their clients might potentially experience, it is important to evaluate each client individually and to consider all the possible influences on function. Readers should also be careful not to misinterpret the findings and assume that because the ABC Scale and the FST predicted much of the variability on the 6MWT, these tests can be substituted for the 6MWT in evaluating people with MS. While improving the efficiency of testing procedures in the clinical environment is certainly an important effort, it should not be undertaken at the expense of losing important information, and neither the ABC scale nor the FST is an appropriate substitute for the 6MWT.

Understanding the determinants of functional ambulation in the MS population is important for guiding clinicians as to what elements of physical functioning and behaviour may be targeted among patients for whom improved functional ambulation is a goal. For example, interventions that improve balance confidence and dynamic strength may also lead to improved community ambulation. With such information in hand, physiotherapists are better equipped to develop and evaluate evidence-based interventions to maintain and even improve functional ambulation in people with MS, in order to maximize participation in meaningful activities and optimize quality of life.

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