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# Rehabilitation in multiple sclerosis

## Commentary on the recent AAN systematic review

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**M**ultiple sclerosis (MS) is one of the most common causes of nontraumatic neurologic disability in young adults in the United States. Historically, MS care focused on rehabilitation and symptomatic management; however, this focus broadened with the development of disease-modifying therapies (DMTs), resulting in pharmacologic treatments that effectively reduce relapses and potentially slow the progression of disability. Consequently, DMTs often dominate many discussions regarding MS care, regardless of the fact that they do not reverse disability or restore function, arguably the primary goal of those with MS. Comprehensive, multidisciplinary care goes beyond the management of DMTs in MS treatment plans and strives to improve patient outcomes, functionality, and quality of life, goals that will likely prove to hold considerable importance as health care reimbursement transitions from a fee-for-service to a value-based paradigm. It is therefore likely that achieving improvement in some of the outcomes delineated in the American Academy of Neurology's (AAN) quality measures for MS will necessitate involvement of rehabilitation specialists.<sup>1</sup>

The Guideline Development, Dissemination, and Implementation Subcommittee of the AAN recently published "Summary of Comprehensive Systematic Review: Rehabilitation in Multiple Sclerosis."<sup>2</sup> The objective of this systematic review was to examine, within an evidence-based practice (EBP) framework, research studies investigating rehabilitation treatments in MS and clearly states that their analysis was limited by a lack of well-designed studies of rehabilitation in MS. This review found that there is moderate evidence supporting the efficacy of 8 weeks of weekly physical therapy for improving disability in the context of balance and gait but not upper extremity function. Beyond that, it found weaker evidence for several other rehabilitative interventions in MS, suggesting that comprehensive cross-specialty rehabilitation, individualized exercise programs, motor balance training, breathing-enhanced arm exercises, and inspiratory muscle training possibly are effective but require further study.<sup>2</sup>

It is notable that most of the interventions addressed in this systematic review involved physical therapy and seemingly omitted several disciplines of importance to people with MS. This may suggest that the data supporting physical therapy data are more robust. However, it may also suggest that because rehabilitation professionals from physical therapy, occupational

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## Supplemental Data

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therapy, speech language pathology, and exercise physiology were not represented on the review panel, their input was not included in the systematic review. Two examples in which the inclusion of these rehabilitation professionals may have been helpful include (1) commenting on the use of clinically accessible outcomes such as the Functional Independence Measure in the inpatient (instead of the outpatient) arena and (2) the utility of an occupational therapist in improving upper arm dexterity. Citations for rehabilitation studies focused on upper extremities are included in table e-1 at [Neurology.org/cp](http://Neurology.org/cp).

In addition to this lack of specialist diversity, the AAN systematic review also presents an incomplete review of the evidence published, perhaps because the AAN review paradigm is geared more towards grading studies of pharmacologic agents. Research methodologies in rehabilitation are less robust than those of therapeutics, and Class I evidence is difficult to obtain in rehabilitation studies because of obstacles to conducting placebo-controlled, double-blind studies. Some data were likely not cited due to a weak level of evidence, and other studies were excluded if they had no control group or fewer than 20 participants. Although it was published in late 2015, this systematic review only covered literature up to 2013, thus not including relevant studies published in the last 3 years.

Despite these criticisms, we laud the authors for reviewing the important topic of the role of rehabilitation in MS and highlighting the need for further research in this area. Without a doubt, data for rehabilitation in MS are not as robust as those for DMTs. It is important to point out that the absence (or relative lack) of high-quality evidence does not prove lack of effect, as suggested in the initial definition of evidence-based medicine (EBM). EBM is “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of an individual patient.”<sup>3</sup> To be most effective, it requires “integrating individual clinical expertise with the best available external clinical evidence from systematic research”<sup>3</sup>; therefore, it follows that both clinical acumen and comprehensive quality evidence are necessary components to EBM.

As previously stated by one of the authors of this AAN systematic review, “rehabilitation [is] still the only way to improve function in multiple sclerosis.”<sup>4</sup> The Consortium of MS Centers (CMSC) has long been a platform for multiple medical disciplines to share evidence and treatment strategies and to enhance the care of people with MS, and the International Organization of Multiple Sclerosis Rehabilitation Therapists (IOMSRT) is its rehabilitation arm. This multidisciplinary collaborative effort recently published “Advances in Multiple Sclerosis: A Practical Guide to Rehabilitation in Multiple Sclerosis” ([cmeaims.org/rehab-primer-cme.php](http://cmeaims.org/rehab-primer-cme.php)), which provides specific information about various rehabilitation strategies, mobility assessments, adaptive/assistive devices, cognitive impairment, speech/language interventions, and general health and wellness issues in MS.<sup>5</sup> In brief, it is believed that rehabilitation favorably influences not only symptoms of MS but also functional mobility, activities of daily living, and participation in vocational and social activities. For example, various rehabilitation interventions have been shown to improve balance,<sup>6–8</sup> walking speed and endurance,<sup>9–11</sup> aerobic capacity,<sup>11,12</sup> strength of the extremities,<sup>12</sup> functional independence,<sup>13</sup> and quality of life.<sup>14</sup> Rehabilitation strategies have also been shown to decrease falls,<sup>6,15</sup> fatigue,<sup>8,12,14,16,17</sup> and overall disability.<sup>18</sup> Generally, cognition<sup>19–22</sup> and mood<sup>23</sup> have been shown to improve with rehabilitation. A recent systematic review reported some evidence that memory rehabilitation is effective for people with MS; however, some of the included studies were found to have a high risk of bias related to methodology used.<sup>24</sup> Rehabilitation studies for common symptoms in MS are presented in table e-1.

Despite our disagreement with the degree of evidence supporting rehabilitation in MS, we agree that larger studies with better research methodologies and higher-quality evidence are needed in rehabilitation. Similar to studies of the DMTs, questions regarding the length of the study and the appropriateness of rating scales such as the Expanded Disability Status Scale (EDSS) are relevant in studies of rehabilitation; of note, many of the studies in the systematic review included individuals with ambulatory dysfunction (some requiring an assistive device),

a range in which the EDSS may not be sufficiently sensitive. Additional issues that potentially confound studies in research include variability in patient effort and the therapeutic intervention utilized. Finally, there are considerable barriers to designing multidisciplinary, double-blind, randomized placebo-controlled studies with large sample sizes in rehabilitation, especially as funding for rehabilitative studies is typically limited.

The AAN systematic review could have, to a greater extent, highlighted the problems created by these methodologic issues and barriers to higher-level research in rehabilitation and argued for solutions that may ultimately influence funding agencies. The question is how to fulfill this need for well-designed trials in rehabilitation. Organizations such as the AAN, CMSC, and IOMSRT have a role in developing and disseminating clearly defined interventions, appropriate endpoints, and effective outcome measures. Collaboration with organizations specific to neurologic rehabilitation, such as the American Physical Therapy Association's Neurology Section, the American Occupational Therapy Association, and the American Speech-Language-Hearing Association, may help enhance and expand MS-specific rehabilitation research currently being performed by rehabilitation scientists and exercise physiologists. Standardized protocols and validated endpoints are needed for all larger studies, especially ones involving multiple centers. It is essential to formulate well-designed trials of rehabilitation therapies and techniques, and to overcome the major challenges of having a placebo group and blinding participants in rehabilitation studies.

Finally, there is the concern that the findings of this systematic review will inhibit the integration of comprehensive, multidisciplinary care into treatment plans for MS. This may occur as a result of external forces limiting access or reimbursement of rehabilitation due to a misinterpretation of this review and an underestimation of the positive effects of rehabilitation for persons living with MS. A recent survey of the North American Research Committee on MS supports long-held concerns that the payer industry can adversely affect access to MS DMTs; it seems reasonable to assume that these restrictions also exist (and perhaps to a greater extent) in regards to rehabilitative services, especially as the evidence base of these interventions is less.<sup>25</sup> The patient information sheet of this review also has the potential to limit an individual's decision to participate in rehabilitation, as it suggests that the evidence supporting these interventions is limited. Either way, this will lead to greater underutilization of rehabilitation in MS, leading to unfavorable outcomes for individuals with MS and arguably lower reimbursements for neurologists and rehabilitation professionals caring for them in the upcoming outcome-based reimbursement paradigm. The need for well-designed research trials of rehabilitation in MS remains ongoing and imperative.

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## AUTHOR CONTRIBUTIONS

M.H. Sutliff: drafting/revising the manuscript, acquisition of data. S.E. Bennett: drafting/revising the manuscript. P. Bobryk: drafting/revising the manuscript. J. Halper: drafting/revising the manuscript. L.A. Saslow: drafting/revising the manuscript. L.T. Skutnik: drafting/revising the manuscript. C. Smith: drafting/revising the manuscript. K. Zackowski: drafting/revising the manuscript, study concept or design. D.E. Jones: drafting/revising the manuscript, analysis or interpretation of data.

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