



**National  
Multiple Sclerosis  
Society**

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# *Clinical Bulletin*

*Information for Health Professionals*

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## **Physical Therapy in Multiple Sclerosis Rehabilitation**

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### **INTRODUCTION**

Rehabilitation is an important part of health care delivery for persons with multiple sclerosis. Since the majority of people are diagnosed between the ages of 20 and 50, the challenges of MS affect those at the peak of their career and childrearing years. Although MS can affect children and teens, it is much less common in this age group.

Rehabilitation team members need information, experience, and sensitivity relating to the variability of symptoms between individuals, and to the unpredictable and fluctuating nature of this challenging, generally progressive disease. Unlike most other neurological disorders, including spinal cord injury, traumatic brain injury, and stroke, there is no “fixed deficit” in MS; symptom profile, lesion burden on MRI, and disease course vary over time. Therapists must be prepared to treat each MS patient individually, and with flexibility, over the long term.

In the treatment of people with MS, there are no protocols or time limits—just a unique opportunity to employ numerous problem-solving skills, interventions, and resources. And because MS affects not just an individual, but a whole family, it is a disease that benefits from a team approach—making coordination and communication with other health care providers extremely important.

### **CLINICAL CHALLENGES**

MS poses a variety of clinical challenges that can impact therapy interventions: For example, the very common symptoms of weakness and fatigue caused by impaired nerve conduction in the central nervous system, can be exacerbated by a variety of factors:

- ◆ An elevated core body temperature (from overheating, overexertion, or infection with fever)
- ◆ Certain medications, such as those used to treat spasticity and pain
- ◆ Obesity and deconditioning

- ◆ Disrupted sleep (caused by bladder urgency, periodic limb movements, spasticity, and pain, among other factors)
- ◆ Affective disorders such as depression
- ◆ Stress
- ◆ Other medical conditions, such as anemia

Many other “invisible” symptoms are cause for frustration in patients, including impairments of sensation, vision, cognition, bowel and bladder, and sexual function—all of which need to be acknowledged and addressed by the rehabilitation specialist.

## THE ONGOING ROLE OF PHYSICAL THERAPY IN MS

The role of physical therapy will vary across the disease course. In general, however, interventions should focus on helping the patient to achieve and maintain optimal functional independence, safety, and quality of life, with the understanding that needs will vary and likely grow over time. In *all* care delivery models—inpatient (acute, transitional, rehabilitation or long-term care), outpatient, or home care—physical therapists (PTs) must:

- ◆ Be prepared to educate patients and their care partners about the critical role of rehabilitation, provide training in specific strategies, and provide resources for equipment and accessible, appropriate community programs.
- ◆ Be ready to assist with case-management and provide emotional support.

## INTERVENTIONS THROUGHOUT THE DISEASE COURSE

### At the Time of Diagnosis

Patients newly diagnosed with MS benefit from education, support and a baseline evaluation by a PT experienced in MS care. At this time, misunderstandings about the disease and its management, the importance of *appropriate* exercise/activity, fatigue issues, and any subtle gait or balance impairments can be addressed. Follow-up should be on an “as needed” basis.

### Following Acute Exacerbations

Physical therapy following an acute exacerbation (also called a *relapse* or *attack*) should have the goal of carefully helping the person return to baseline functioning. It is customary to wait two weeks after the attack before starting or resuming outpatient PT, because of weakness, lack of sleep from IV steroids, or other factors.

### Progressive Disease

Patients with primary-progressive MS do not have remissions; their functioning declines gradually, but steadily, over time. Patients who transition from relapsing-remitting MS to secondary-progressive MS are not able to return to baseline (due to progression of the disease that occurs between exacerbations) and demonstrate a slow decline in function. Because both groups have a huge

emotional burden in addition to their physical challenges, physicians are encouraged to refer a person proactively to PT rather than waiting until he or she is struggling. Focus should be on support, resourcing, avoiding deconditioning, maintaining safety, and maximizing health and independent function. Assessment of the need for mobility aids now and in the future is essential for these patients, and it is especially beneficial for the PT to assist the physician in assuring that the appropriate detailed prescription or letter of medical necessity (LOMN) is provided.

## **Advanced MS**

Patients in advanced stages of MS have significant disease burden, are non-ambulatory, and at risk for other secondary health conditions. Physical therapy for this population will likely be focused on seated trunk positioning and control, transfers, upper extremity strength, respiratory function, and equipment needs. The use of standing devices or standing wheelchairs can be very helpful, providing weight bearing on the long bones, stretching to ease spasticity, relief for bowel and bladder, and improved respiration and speech projection.

## **PHYSICAL THERAPY ASSESSMENT**

At the initial session, taking a thorough history is critical. The history should include date of diagnosis, date and nature of initial symptom(s), other health conditions, medications, prior level of activity, and “top three problems” in the order that they interfere with quality of life. This prioritization will guide the goal-setting.

The PT evaluation should be structured to respect fatigue, but provide a good overview of the patient’s baseline. Some standardized testing might be spread out over several follow-up sessions to avoid patient burn-out and frustration. If a patient’s primary problem is “wobbly walking”, for example, a gait assessment should be performed both at the beginning and the end of the initial session to determine impact of fatigue on weakness and balance. It is also very important to have a variety of trial ambulation aids in the clinic—to introduce them to the patient (initial reluctance to accept an aid is common) and to determine “best fit” for the physician prescription.

The use of some standardized assessment tools<sup>1-7</sup> in the assessment process is recommended; however few of those tests routinely used in PT have been evaluated specifically for the MS population. The few measures currently standardized for MS are:

- ◆ MS Functional Composite (MSFC), which includes the 25-foot walk
- ◆ Expanded Disability Status Scale (EDSS)—performed by trained physicians and nurse practitioners
- ◆ MS Fatigue Impact Scale (MSFIS)
- ◆ Disease Steps (DS)
- ◆ MS Walking Scale-12 (MSWS-12), a patient self-report measure

Other tests that are useful include:

- ◆ Berg Balance Scale

- ◆ Tinetti Gait and Balance Assessment
- ◆ Activities Specific Balance Confidence (ABC)
- ◆ Timed Up and Go (TUG)
- ◆ Dynamic Gait Index (DGI)
- ◆ Six Spot Step Test
- ◆ Functional Independence Measure (FIM)
- ◆ 2-minute walk, 6-minute walk
- ◆ Fatigue Severity Scale (FSS)

Two compelling articles by Pearson and colleagues<sup>8,9</sup> challenge the usefulness of many current clinical ambulation measures. He proposes that “the gold standard for measuring ambulatory mobility in neurological disorders should be the total ambulatory activity undertaken by an individual in their usual environment in performing their usual range of daily activities.” This may herald increased use of pedometers, accelerometers or even global positioning systems as better measures of true activity over time, since patients are often not able to provide a meaningful self-report<sup>10</sup>, numerous studies have shown that with proper calibration these devices can be useful in establishing a more accurate account of activity.<sup>11–13</sup>

The PT evaluation can include a broad overview, so it’s important to prioritize time spent, with the patient’s primary issues addressed first.

#### ◆ **Posture, Trunk Control, Balance, Transfers**

It is important to assess seated and standing posture and static and dynamic balance. Balance impairments are common in MS, increasing the risk of falls.<sup>14–15</sup> When appropriate, transfers to and from bed, chair, toilet, car and floor should be evaluated—noting quality, safety, and level of assistance needed. Begin a fall risk/safety profile to guide treatment planning.

#### ◆ **Ambulation/Mobility**

For the ambulatory individual, the desire to continue walking or “to walk better” is usually a primary goal. Vision, sensation, vestibular or cerebellar deficits, spasticity, muscle weakness, fatigue and shoe wear need to be considered in addition to posture and balance. The most appropriate ambulation aid(s) should “normalize” the gait pattern with improved alignment, stability, control and confidence and a *decrease* in energy expenditure. A person’s needs often vary with level of fatigue, temperature, distance to be walked or time of day. Popular options are folding canes (with palm grip handles), forearm crutches, and four-wheeled rolling walkers (with large swivel wheels for easier maneuvering outdoors and on carpets, a flip-up seat *without* a front cross bar for more erect posture when walking and the opportunity to sit and rest when needed, a flexible backrest, and user-friendly hand-brakes). It is important that the ambulation aid be as light weight as possible to minimize fatigue. Other effective ambulatory aids for patients with foot drop include custom ankle-foot-orthoses (AFOs) made of lightweight plastics—

articulated or solid—or the newer ultra lightweight carbon composite materials, hip-flexion-assist-orthoses (HFAO), or the new wireless functional electrical stimulators (FES). Studies have shown that FES has the potential to improve walking speed, maximum voluntary contraction (MVC) and moter evoked potential (MEP) with fewer falls.<sup>16-19</sup>

#### ◆ **Range of Motion (ROM)**

Both passive and active functional ROM should be assessed in the extremities and trunk, limiting detailed goniometric measurement to noted problem areas for time and fatigue reasons. Sedentary or inactive persons with MS often present with significant tightness in hip flexors, adductors, hamstrings and heel cords. Limited overhead reach is often noted in those with slumped posture due to tightness in the pectoralis minor, major and latissimus dorsi. Poor head control due to postural and substitution patterns often leads to tightness in the upper trapezius and posterolateral cervical muscles.<sup>20</sup>

#### ◆ **Motor Function**

Assessment should focus on gross strength, with emphasis on *function*, in the extremities and trunk. Limit specific muscle testing to problem areas to minimize fatigue. Quality and control of movements, as well as substitution patterns, need to be noted. A key is to prevent or correct “secondary” or “disuse” weakness, commonly seen in persons with MS who have assumed a sedentary lifestyle or embraced compensatory movement patterns. Weakness due to inactivity and poor posture is frequently found in the trunk, lower abdominals, gluteus medius and maximus, middle and lower trapezius, and high anterior neck flexors. Muscle imbalances of anterior/posterior tightness versus weakness (such as the iliopsoas and gluteus maximus) frequently respond favorably to a corrective exercise program and postural correction and awareness.<sup>20-21</sup>

#### ◆ **Neurological Function**

Assessment of neurological symptoms is necessary for development of treatment interventions (to supplement pharmacologic therapies) for improved safety, control and function. Common problems include abnormal tone—usually hyper-tonicity (which may be constant, fluctuating, or intermittent)<sup>22</sup>—clonus, and tremors (can be “resting”, “intention” or both). Note interference with function. Other deficits relate to coordination, sensation (hyper or hypo), proprioception and pain. Referral to a neurologist, physiatrist, or pain specialist for additional treatment interventions may be warranted.

#### ◆ **Respiratory Function**

It is important to recognize that respiratory problems are common in more disabled patients, but also exist in a large number of persons with MS that have minimal disability.<sup>23</sup> One recent study showed marked reductions in exercise capacity (VO<sub>2</sub> peak) in MS patients with only a mild degree of disability.

#### ◆ **Wheeled Mobility**

The use of a wheelchair or scooter is often appropriate when long distances must be covered and energy conservation is required, allowing needed community access. Some persons with

MS prefer a standard wheelchair because of its portability, but adequate upper body strength and endurance are needed. In most cases, motorized wheeled mobility is the better choice for long term independence. A scooter (or “power operated vehicle”) is useful for individuals with significant fatigue, weakness, paraparesis or ataxia who retain good dynamic sitting balance and transfer skills. A power wheelchair would be more appropriate for individuals who are minimally or non-ambulatory and require additional seat and trunk support. In all cases, consideration must be given to vision, cognition, safety awareness, and access to home and vehicle.<sup>25</sup>

#### ◆ Other Important Considerations

Persons with MS have many other issues that need to be considered as part of the PT evaluation, goal-setting and when making referrals to other team members. In addition to vision, cognition and speech or swallowing problems, it’s important to consider each patient’s safety profile, support/social network, emotional stability (depression is common), and vocational/homemaking history. Another issue is access to care. Patients living in rural areas or with limited transportation options will need a more creative program for home or their immediate community. It is no surprise that patients living in urban or suburban areas are most likely to use physical therapy.<sup>26</sup> Telerehabilitation is possibly the wave of the future, is well accepted, and showed positive outcomes in a pilot study.<sup>27-28</sup>

## GOAL SETTING AND TREATMENT PLANS

It is essential that the short-term therapy goals be *patient driven* (their “wish list”), functionally focused, realistic and attainable. Each PT should attempt to teach corrective exercises and activities that can easily be followed in the home or community to supplement any clinic equipment that might be used. Some “food for thought”: If leg weakness, fatigue, and impaired gait are primary issues, the patient will benefit more from functional activities done in (supported) standing than s/he will from 3 sets of 10 leg lifts or 20 minutes on a stationary bicycle. There is a lot to be said for specificity of training with this population. In every case, fatigue must be respected, overheating avoided, and rest intervals provided—excellent opportunities for education and resourcing (which should be billed as “therapeutic activities”) during the treatment session. Long-term goals should include an effective home and community program with less dependence on formal physical therapy.

## HOME PHYSICAL THERAPY PROGRAMS

The key components of a successful home program are that it is enjoyable, varied, goal-oriented and realistic. Compliance issues include fatigue, poor motivation, depression, lack of needed support or assistance from family and friends, time constraints, and cognitive dysfunction (usually short-term memory, attention, or sequencing deficits, which requires the therapist to provide the exercises in written instructions and pictures). Emphasis needs to be placed on corrective exercises to: (1) improve function (restoring alignment, mobility, and strength/endurance lost due to inactivity/disuse or compensatory movement patterns), (2) manage spasticity (slow stretching, cold packs, controlled position changes), and (3) control energy management (careful pacing, flexible

work and activity schedules, pro-active resting vs. reactive “collapse”, avoiding overexertion/overheating, and substitution of less stressful/strenuous/frustrating activities). Compliance is enhanced if the patient notes slow steady progress toward reaching the goals of improved symptom management and increased activity and participation both at home and in the community.

## EXERCISE AND MS

Historically, exercise was “something to be avoided” by persons with MS, as physicians feared the ramifications of fatigue and overheating. As a result, generations became deconditioned prematurely due to inactivity. Although the benefits of exercise and activity have long been recognized as an important part of wellness, it was felt that this could not be tolerated by those challenged by MS. Petajan and colleagues published a pivotal study in 1996 that demonstrated the tolerance for and benefits of aerobic training for some individuals with MS.<sup>29</sup> Since then, the literature has slowly increased in quality and volume to show positive statistical outcomes for various interventions to improve balance, gait, endurance, strength and quality of life (QOL). Because deconditioning, osteoporosis and falls are so common in this population, it is important that a customized, safe and effective exercise program become part of their wellness lifestyle. Persons with MS have demonstrated the ability to improve core stability, increase aerobic fitness, tolerate low-level resistance training, and have enjoyed enhanced activities of daily living (ADLs) and a higher quality of life (QOL).<sup>30-34</sup> One trial of > 100 showed improvement in 70.8% of those in an individualized rehab program vs 13% in the wait-list control group. In addition, 58.7% in the control group deteriorated vs 16.7% in the active group.<sup>45</sup> Other recent studies have documented improvement in muscle fiber size, gray matter volume, white matter integrity, neuronal growth factors, immune factors and growth hormones.<sup>46-48</sup> A guideline: All exercises and activities should be a “challenge”, but *never* a “struggle.”

Ideally, many persons with MS will eventually be able to participate in community-based activity programs such as water exercise in a *cool* (<85 degrees) pool,<sup>49-51</sup> gentle yoga,<sup>52</sup> tai chi;<sup>53</sup> (or water-based tai chi), hippotherapy,<sup>54</sup> or carefully guided fitness center and aerobic activities. In each case, it’s important that the program leader be aware of the special needs of those with MS and be willing to modify the programs appropriately (e.g. rest breaks, fans for cooling, supports for standing or sitting). MS Day Programs are another excellent outlet for therapeutic recreational and social activities.

## FOLLOW-UP

Optimal follow-up for outpatient therapy will vary according to individual needs, and typically varies from the “traditional” (orthopedic or fixed deficit neurological condition) model of 2–3 times/week for 6–8 weeks. Dedicated *one-on-one* sessions should be scheduled “as needed” since the need for rehabilitation is life long and likely to increase with age. Consideration must be given to the numerous compliance challenges, including transportation, weather (cold causes stiffness, high heat and humidity cause weakness), and lack of energy, motivation or support. Continuity with therapy provider(s) is another important consideration for improved compliance with follow-up. Initially it

might be appropriate for patients to be scheduled 1–2 times a week to meet short-term goals. Then the frequency should lessen to weekly or every other week until symptoms are controlled and an effective home/community program has been established. At that time follow-up should be “prn” to revise or augment the program or trouble-shoot any new problems.

Another major factor is insurance constraints, since the patient may have limits on number of visits per year, per condition, or per lifetime. Physical Therapists have the opportunity to advocate for coverage of appropriate and cost-effective follow-up for this challenging chronic condition, since attaining and then *maintaining* (by periodic therapy oversight) *safe independent function* is a worthwhile and cost-effective goal. Here is a statement from the National Multiple Sclerosis Society’s National Clinical Advisory Board that can be used effectively with case managers and insurers:

**Rehab in MS is a process that helps a person *achieve* and *maintain* maximal physical, psychological, social and vocational potential, and quality of life consistent with physiologic impairment, environment, and life goals. Achievement and maintenance of optimal function are essential in a progressive disease such as MS.<sup>55</sup>**

## SUMMARY

Physical therapists are extremely important members of the healthcare team for persons with MS, as this challenging disease can be frustrating for the patient, therapist, and family. There are no special treatments to learn, but to be a successful MS therapist, one must be willing to:

- ◆ learn about this unique chronic disease (go to [www.nmss.org](http://www.nmss.org) and [www.mscares.org](http://www.mscares.org))
- ◆ listen with sensitivity
- ◆ evaluate with patience and care
- ◆ be flexible and prepared to think “out of the box” in establishing effective individual treatment plans
- ◆ be a “cheerleader” and problem-solver in empowering patients and families to better manage symptoms and overall health
- ◆ be there for the long term; develop and maintain a current file of resources (equipment suppliers, orthotists, AT specialists, other rehab professionals, cooling products, accessible community programs, useful websites, etc.)

A final quote worth sharing:

**With the advent of disease modifying agents to prolong time between attacks and slow disease progression, OT and PT interventions are more important and more cost-effective than ever before. Interventions have the potential to last longer and have greater impact on improving quality of life.<sup>56</sup>**

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