



National
Multiple Sclerosis
Society

733 Third Avenue
New York, NY 10017-3288

Clinical Bulletin

Information for Health Professionals

Seating and Mobility Evaluations for Persons with Multiple Sclerosis

Jean L. Minkel, PT, ATP

INTRODUCTION

Mobility is an essential function of daily living. Impaired mobility can lead to fatigue, falls and social isolation. For persons with multiple sclerosis (MS), the loss of the ability to get around by ambulating is one of the biggest fears. A question frequently asked by people with MS is, “Am I going to end up in a wheelchair?” For therapists who work with persons with MS, the most honest answer may be, “I don’t know.” Especially at the time of initial diagnosis, it is very difficult to predict who will progress to a complete loss of ambulation and who will be able to continue to ambulate, with or without an ambulatory aid.

For many persons with MS, the “ease of walking around” varies widely over time and can depend on the outdoor temperature and humidity level, the environment—in the home or in the community—and other things that may be going on. For example, getting overly fatigued can affect functional mobility.

FUNCTIONAL MOBILITY

If you ask a person with a disability what “functional mobility” means, the response is often some version of “Go where I want to go, when I want to go.” While this response appears simple and straightforward, it has many implications. Mobility, ideally, should be pain-free, energy-efficient, and safe. Most able-bodied people give their own “functional” mobility very little thought:

- ◆ Walk to bathroom
- ◆ Drive to the store
- ◆ Get on a plane for vacation

Functional mobility takes many forms—one foot in front of another, driving a wheeled mobility device, such as an automobile, or being a passenger in a more complex method of mobility.

Societal Views of Functional Mobility

We are surrounded by messages and expressions that reinforce the value and positive images associated with walking. Phrases such as “one small step for man, one great leap for mankind,” “every journey begins with a single step,” and “pull yourself up by your bootstraps” refer to the positive societal values associated with walking (Iezzoni, 2003).

For some people with MS, the positive image of walking may trump *functional* mobility. To avoid the negative image of using a wheeled mobility device, persons will struggle to keep walking, consciously or unconsciously reducing involvement in activities that require getting out and getting around. Ultimately, the result is to gradually become more and more isolated. The perception is that as long as the person has not “ended up in a wheelchair” the disease has not “taken over” or “won the war.”

Opportunities for Intervention

This bulletin outlines clinical assessment considerations when working with a person with MS who may need positioning support, seating interventions to achieve/maintain skin integrity, and a mobility evaluation.

However, assistive technology that may dramatically improve functional mobility is likely to be ignored or abandoned if a person does not recognize the need or if a piece of technology is provided that does not adequately address the need. The effectiveness of any seating and mobility intervention will be directly related to the readiness of the person with MS to accept the intervention. Information sharing, opportunities for demonstration and trial, and patience on the part of the clinicians working with the person with MS are all critical precursors to the actual assessment process. Once a person is open to participating in the process, the following information may be useful to guide your clinical activities and assist in your treatment planning.

COMPONENTS OF THE SEATING AND MOBILITY ASSESSMENT

1. Interview

Be careful not to assume you know what the person needs. A clinician needs to start by asking questions and listening to the answers; it is crucial to understand and appreciate the individual's needs and priorities prior to the assessment.

The Functional Mobility Assessment (FMA) (Kumar et al., 2012) is a validated outcome measurement tool that helps guide a needs assessment. The FMA allows the consumer to rate her/his personal own satisfaction regarding such factors as comfort, the ability to get around indoors, and even access transportation. By using the FMA during a needs assessment, clinicians will have documented the pre-intervention data to use for comparison with follow-up FMA data.

Other tools are also available, including the Canadian Occupational Performance Measure (COPM; Law et al., 2012) and the QUEST (Demers & Monette, 2002). Though not specifically designed for seating and mobility interventions, both of these assessment tools offer clinicians and clients ways to identify what is important to them in seeking a technology intervention.

If a structured interview tool is not being used, several key questions should be considered as part of an interview.

◆ **To Assess Mobility Needs/Methods**

- ◆ Describe your current method of getting around:
 - ❖ What is working for you?
 - ❖ What are you having trouble doing/Where are you having trouble maneuvering?
- ◆ Tell me how you were getting around 2 years ago during the holiday season?
- ◆ Tell me how you were getting around last year during the holiday season?
 - ❖ Has there been a change in HOW you get around?
 - ❖ If yes, what do you think are the reasons for the changes?

Note: Asking about holidays is useful because people tend to remember them well and/or have photos to document them; family members who were there may be able to contribute helpful information about the person's use of mobility aids.

- ◆ Over the past year, have there been changes in WHERE you go?
 - ❖ If yes, what do you think are the reasons for the changes?

◆ **To Assess Environmental and Transportation Accessibility**

Closely related to understanding a person's current mobility status is the need to understand the accessibility of the person's daily environments—including home, work, and other frequent use environments:

- ◆ Are there any steps leading into your home?
 - ❖ If yes, how many?
 - ❖ If yes, is there another entrance with either fewer steps or no steps?
- ◆ How do you get around in the community?
 - ❖ Are there any public transportation options in your community?
 - ❖ If using personal transportation, what kind of vehicle is being used?

◆ **To Assess Problems with Sitting Balance and the Need for Postural Supports**

- ◆ Do you have any problems keeping your balance when you are seated?
 - ❖ Do you easily lose your sitting balance?
 - ❖ Can you reposition yourself, if you lose your balance?

◆ **To Investigate Problems with Skin Integrity**

- ◆ Do you have any problems with your skin—red marks, sores, open areas?
- ◆ Are you able to re-position yourself when you are uncomfortable?

The answers to these interview questions begin to define the scope of the full specialty assessment:

- ◆ Evaluation of **Mobility Impairment** only is indicated if the person has:
 - ◆ Limited mobility range due to unsteady gait, fatigue and/or frequency of falls
 - ◆ Normal sitting balance with the ability to reposition trunk once balance is disturbed
 - ◆ Not at risk for skin breakdown—adequate sensation across seated surface and ability to reposition if uncomfortable
- ◆ Evaluation of **Seating and Mobility Impairment** is indicated if the person has:
 - ◆ Limited range in mobility—perhaps unable to walk, or unable to effectively self-propel a manual chair
 - ◆ Needs external support to maintain upright sitting position, especially on a mobile base (e.g., when driving/riding in a wheelchair or automobile)
 - ◆ Not at risk for skin breakdown—adequate sensation across seated surface and ability to reposition if uncomfortable
- ◆ Evaluation of **Seating, Mobility and Skin Integrity** impairments is indicated if the person:
 - ◆ Has a wound or a history of a wound that is now healed
 - ◆ Has contractures of the extremities and/or non-symmetrical alignment of the pelvis and trunk—fixed or flexible deformities leading to uneven pressure distribution
 - ◆ Is at risk for skin breakdown because of impaired sensation and/or diminished ability to reposition pelvis and trunk while in the seated position
 - ❖ Assess need for power seating functions to compensate for loss of ability to reposition oneself in order to prevent skin breakdown caused by sustained pressure.
- ◆ If a power chair or scooter may be appropriate for the individual, determine safety to self and others while operating a power wheelchair/scooter.
 - ◆ Assess upper extremity range of motion and strength to determine the best access method for a scooter or a power chair
 - ◆ Assess vision to determine impairments that may impact safety to self and others when driving a power chair/scooter
 - ◆ Assess judgment and problem solving skills to determine suitability for power mobility.

2. Assessment for Mobility Impairment

Mobility assessments should include:

- ◆ Review of systems (shortness of breath, reported visual and hearing functions, any other medical conditions currently being treated)
- ◆ Demonstration of sitting balance and the ability to re-position oneself in the seated position.

When a person first experiences difficulties with ambulation, the symptoms often include fatigue, loss of balance when walking, increased frequency of reported falls, and decrease activity level resulting in increased isolation.

Many persons at this stage of changes in mobility may have already adopted the use of an ambulation aid such as a cane or walker. The ambulation aid may continue to be very effective, especially in familiar, controlled environments like a person's home or even a work site. More frequent falls may occur when the person needs to travel further distances or get around in a less familiar or controlled environment. This means that a person may use different mobility aids in different situations, depending on the environment, activities, time of day, and fatigue level, among other factors.

Keeping in mind that an individual may use more than one of these devices, the usual algorithm to determine the best match for assisted mobility is:

1. Ambulation aide (cane, crutch or walker)
2. Self-propelling manual chair
3. Scooter
4. Power chair
5. Power chair with power seating functions
6. Specialty positioning chair, pushed by someone else (dependent mobility)

For persons with MS, independent self-propulsion of a manual chair may be as taxing as ambulating—which means that a manual chair is not always the optimal first option in wheeled mobility. The best method for making this determination is to properly configure the position of the rear push wheels (moving them as far forward as possible without compromising stability) (Paralyzed Veterans of America, 2005).

A quick rule of thumb for set-up of a manual wheelchair is to check the position of the wheel axle relative to the index finger when the person's arm is in a relaxed position on either side of the trunk when sitting in the chair—see next page.



www.touchstonerehabilitation.com/wheelchair-positioning-and-propulsion.html

With the axle in this position under the index finger, the wheel is optimally positioned to make the chair easy to push. **A note of caution:** In this “easy to push” position, the wheelchair is quite “tippy”. Manual wheelchair propulsion and skills training is necessary to teach the person how to adjust his/her trunk position to safely negotiate inclines without tipping over. With proper manual wheelchair skills training, people can learn to pop a wheelie, negotiate small curbs, and safely ride up and down ramps and inclines.

During the initial assessment, it is important for the clinician to “spot” a person, much like spotting during gait training. The most important aspects of a manual mobility assessment initially include:

- ◆ Assess ability to push the chair on a flat level surface at the speed of a walking person.
- ◆ Observe any shortness of breath when the person is propelling.
- ◆ Assess ability to push at least the distance of a city block— $\frac{1}{16}$ and $\frac{1}{8}$ mi (100 and 200 m), without fatiguing or slowing down.

If the person is pushing more slowly than walking speed, gets out of breath quickly, and/or fatigues after a relatively short distance, a self-propelling manual wheelchair may not be an effective method of wheeled mobility, especially in a community environment. Consider introducing the person to power mobility.

3. Assessment for Power Mobility

◆ Assessment for Scooter Use

If the person is not able to effectively self-propel an optimally configured manual wheelchair, the next wheeled mobility option to consider is a scooter. Increasingly, there are “public access” scooters available in mainstream environments like shopping malls and grocery stores. Accessibility to these types of devices may mean that your client has experience in operating a scooter and feels comfortable at the controls. And many people do not view a scooter as a “wheelchair” and do not assign the same negative connotations they do to “needing a wheelchair.”

Therapists often have concerns about lack of “adjustability” of scooters to meet the potentially changing needs of a person with MS. This is a delicate issue. Some individuals with MS will only accept a scooter and will reject (and often abandon) any other type of mobility device. Even though a therapist’s goal may be to provide a mobility option that can

be adjusted to meet a person's changing needs, a "clinically appropriate" power chair that is abandoned does not meet anyone's needs. If the person with MS is able to demonstrate safe and effective use of the scooter in multiple environments—at home, work and public spaces—at the time of the assessment, it may be best to meet the current needs with a device that is acceptable to the person, and then re-assess when and if there is a significant change in driving skills.

◆ **Assessment for Power Chair Use**

Operating a scooter safely requires sufficient upper extremity strength to keep two hands on the steering tiller while operating the device. As with any power operated device, the operator has to have adequate visual perceptual skills to know when to slow down in congested areas and when to come to a stop. Test driving is one of the best methods to determine the safety of a person's operating skills. For individuals who are having difficulty either maintaining control of the tiller (due to fatigue of the upper extremities) or safely maneuvering a scooter in congested areas, operating a traditional power chair is often easier. However, a person's perception that the scooter is "acceptable" while a power chair is not, may delay the transition to the more manageable device.

When this kind of resistance occurs, ask if the person would be willing to "test drive" a power chair as a means of comparison. Power chairs are available in a variety of configurations. Some are designed to look much like "car seats" with "scooter-like" aesthetics. Power chairs are described by the location of the "drive wheel"—the wheel on the base of the chair to which the motor is attached.



Rear Wheel Drive



Mid Wheel Drive



Front Wheel Drive

The location of the drive wheel affects the driving characteristics of the chair, especially the space needed to make a turn. Test driving one of each style chair gives the person a chance to feel the differences in driving performance and make an informed choice based on both environmental needs and ease of operation. Canning and Sanchez (2005) outline the features and functions to be considered when choosing either a manual chair or power chair model. *Multiple Sclerosis: Choosing the Right Mobility Device for You* is an excellent guide for consumers.

The Wheelchair Skills Test (WST; Kirby, 2004) is another valuable assessment tool for either a manual chair or a power chair. It tests a series of essential skills a person will need to safely use the wheelchair in the home and community environment. If safe operation of any device is a concern, use of an objectively scored driving test is an effective method to demonstrate to the person the concerns you have regarding her or his safety and the safety of others in

the environment. This skills test can also be used as part of a structured driver's training to ensure safe and proper use of the equipment following delivery.

4. Seating Assessment: Need for Postural Support

To quickly assess the need for postural support (beyond what a standard or Captain's seat provides), check the person's unsupported sitting balance. Ask the person to sit over the edge of the treatment mat and lift both hands up off the support surface at the same time. This test helps to identify the person's sitting balance as a:

- ◆ **Hands-Free Sitter**—a person who is able to lift both arms up off the surface without change in the position of the trunk, indicating an ability to use the intrinsic muscles of the trunk to hold an upright sitting position. A person with this type of trunk control can also shift position easily when uncomfortable and requires minimal posteriorly-mounted support.

The seating requirements for the hands-free sitter focus primarily on comfort. Scooters and power chairs come with a wide array of seating options. The standard scooter seat is similar to a boat seat, with low backrest and foam seat cushion. A "Captain's seat"—a more deluxe model with higher back and more contoured seat cushion that resembles an automotive seat—is also available on scooters. For the hands-free sitter, a Captain's seat may be a good option on either the scooter or the power chair. Captain's seats, however, are not adjustable and cannot be modified. If, in the future, the person requires more trunk support, the Captain's seat will need to be lifted off the base and replaced with a more adjustable "rehab-style" seat.

- ◆ **Hands-Dependent Sitter**—a person who often uses one or both hands to maintain balance while seated. When asked to lift both hands off the mat at the same time, you will observe the trunk collapse to compensate for the loss of arm support, indicating the person's inability to use the intrinsic muscles of the trunk for support against gravity. For a hands-dependent sitter, posterior and lateral supports may be needed to support the trunk in order for the upper extremities to be free to engage in function.

- ◆ **Prop Sitter**—a person with significant loss of sitting balance. A prop sitter is unable to maintain sitting balance even if permitted to use his/her upper extremities for support, and will fall if not provided maximum external support in the seated position. The seating system for prop sitters, which is often custom-made, includes custom-molded supports for the seat and the backrest.

For hands-dependent sitters or prop sitters, a more extensive seating evaluation will be needed. This assessment is ideally done with at least one team member who has experience in recommending more advanced seating systems. The more experienced team member may be an occupational therapist (OT) or a physical therapist (PT) working with a rehab technology supplier (RTS), or may be a very experienced RTS who is able to lead the assessment process by guiding and asking questions of both the client and a less experienced therapist.

Mat Evaluation

The seating evaluation starts with the unsupported seating balance test. Once the person's sitting balance is recorded, the person is placed in a supine position for the "mat evaluation" (see RESNA video for a demonstration: Part 1, www.youtube.com/watch?v=yHjn4y9H-6M&feature=channel&list=UL and Part 2, www.youtube.com/watch?v=J04eKjR49fl&feature=channel&list=UL).

With the person in a supine position, assess the following:

- ◆ **Pelvic Mobility**—is the pelvis *able* to be positioned in a position that is:
 - ◆ **Neutral tilt** (not in a posterior tilt or anterior tilt)
 - ❖ Posterior tilt—contributes to sacral sitting
 - ❖ Anterior tilt—contributes to pubic sitting
 - ◆ **Level**—the pelvis does not have an "obliquity"—one side higher than other
 - ❖ When one side of the pelvis is higher than the other there is uneven weight bearing on the ischial tuberosities—which can lead to uneven pressure distribution, a risk factor for skin breakdown.
 - ◆ **Flat**—the pelvis is not rotated with one side forward of the other
 - ❖ When one side is rotated forward, the person may appear to have a leg length discrepancy; and will the trunk and pelvis not be supported evenly against the back support.

If the pelvis cannot be positioned in this "ideal" position, record the actual position of the pelvis—which will need to be accommodated once the person is re-positioned in a seated position.

◆ **Hip Flexion Range of Motion**

- ◆ Test hip flexion on the left and right sides separately.
- ◆ To get a true hip flexion (ball and socket) measurement, keep the knee bent so that the hamstring does not limit hip flexion.
- ◆ Test only the motion of the ball-and-socket at the hip, not the "full" hip flexion that includes rotation of the pelvis.
 - ❖ STOP flexing the hip when the pelvis begins to rotate backwards (indicating pelvic motion rather than hip flexion).
- ◆ **Note:** The range of the ball-and-socket motion of the hip joint is often a good starting point to determine the seat-to-backrest angle of the wheelchair and seating system. To sit in a standard chair with a 90 degree seat to backrest angle, a person will need 90 degrees of hip flexion. Persons with less than 90 degrees of hip flexion will need specialized seating to accommodate the lack of hip range.

- ◆ **Hamstring Tightness Test**—knee extension range with the hip flexed
 - ◆ The hamstring muscle is a two-joint muscle, crossing the hip and the knee.
 - ◆ Flexing the hip stretches the proximal end of the hamstring muscle. Because one sits with hips flexed, the testing of hamstring tightness starts with the hip flexed (without pelvic rotation) and the knee flexed.
 - ◆ Slowly extend the knee into extension, noting any significant tightness at the back of the knee.
 - ❖ Persons without significant hamstring tightness can be moved to at least 100 degrees of knee extension with the hip flexed.
 - ❖ Persons with tight hamstrings may only get to 90 degrees of knee extension with the hip flexed.
 - ❖ Persons with significant hamstring tightness cannot even get to 90 degrees of knee extension.
 - ◆ The degree of hamstring tightness—as measured by the amount of available knee extension when the hip is flexed—helps determine the location for the footrests relative to the front edge of the seat. Persons with:
 - ❖ 100 degrees of hamstring range will be able to use standard footrests.
 - ❖ 90 degrees of hamstring range will need the back of the footrests to be in direct line with the front edge of the seat (check to be sure the front caster of the chair can still fully rotate, when the footrest is at the front edge of the seat).
 - ❖ Less than 90 degrees of hamstring range will need specialty “contracture” footrests.
 - ◆ **Note:** Improper accommodation of a person’s hamstring range is one of the primary reasons people slide out of their chairs. Placing the person’s feet on a standard footrest will pull the pelvis into a posterior tilt, pulling the pelvis forward and away from the backrest.
- ◆ **Head and Trunk Alignment**
 - ◆ Observe and record the position of the head over the trunk and the trunk over the pelvis. If the head, trunk and pelvis are not in alignment, try to passively re-align the person. In this supine position, the person with no spinal deformities should be able to be passively aligned. If you are not able to passively align the head, trunk and pelvis, note the asymmetries as these same asymmetries will be present when you sit the person over the edge of the mat.

Upright Seating Assessment—Hand Simulation

Following the supine assessment and collection of information about pelvic mobility, hip flexion and hamstring tightness, the next step is to assess the person in the upright seating position. For Hands-Dependent and Prop Sitters, position the person over the edge of the mat, accommodating the hip and knee range of motion and provide postural support through “hand simulation” (using your hand to simulate the support that would be provided by the wheelchair).

The goal of hand simulation over the edge of the treatment mat is to help determine the desired supported sitting position to be achieved in the wheelchair. Ideally, there is an exchange of information during hand simulation—checking with the person being supported about her or his comfort and desire to remain in that position. LISTEN CAREFULLY TO THIS FEEDBACK. If the person is comfortable and likes the supported position, the RTS can facilitate the translation of this “hand simulation” into wheelchair seating products to replicate the amount and type of support being provided by the therapist.

When sitting the person up, respect the available hip flexion range and hamstring tightness. For persons with very tight hamstrings, a mat table is recommended, which allow the knees to flex under the mat and accommodate the tightness of the hamstrings.

Once the person is sitting up, position the pelvis in a neutral position, if possible, and support the trunk manually to assess the following:

◆ **Flexible Lateral Trunk Curve**

If a person leans to one side more than the other, manually provide the needed support, and look to see if the added support corrects the alignment of the trunk. If the spine is re-aligned with this maneuver, properly positioned trunk supports may be needed to support the trunk when the person is seated in a wheelchair.

◆ **Non-flexible Lateral Trunk Curve**

If the person leans to one side, and trunk alignment does not change when you supply manual support, a skeletal deformity is indicated. This deformity will require specialized seating to accommodate it.

◆ **Kyphotic Trunk Position**

If the person sits with a posterior pelvic tilt; rounded back and forward head; it is important to check the flexibility of the kyphotic curve.

- ◆ If the pelvis can easily be moved out of the posterior tilt, into a neutral position—start there. Support the pelvis in the neutral position. With the pelvis in neutral, you will need to assess the flexibility of the kyphosis. Position your hands—one hand just below the apex of the kyphosis, and the other hand brought forward onto the sternum. Use gentle pressure to try and straighten out the trunk.
- ❖ If the trunk easily straightens, this is a flexible kyphotic curve—which can be supported by firm posterior pelvic support and a firm back rest—mounted onto the wheelchair in a slightly reclined position—to allow gravity to assist in positioning of the trunk.
- ❖ If the pelvis and trunk do not easily move to a corrected position, then the pelvis and trunk need to be accommodated. Often a tilt chair is very useful in accommodating the kyphotic curve, allowing the person to be tilted back, allowing the head (and eyes) to be positioned in this person’s upright position.

5. Skin Integrity

For persons who rely on wheeled mobility full time, there may be an increased risk of skin breakdown (pressure sores). The Braden Scale (Bergstrom et al., 1987) is an excellent tool to assess a person's risk factors for skin breakdown. The scale addresses a variety of risk factors including nutrition, mobility, sensation, and exposure to moisture. For therapists working with persons who are unable to shift their own position while sitting in a wheelchair, the biggest risk factors to address are mobility and sensation.

- ◆ **Impaired Sensation**—Ask about level of sensation, especially on the seated surfaces—the buttock, back of legs and back of trunk—and whether the person ever has the sensation of being uncomfortable when sitting for long periods of time.
 - ◆ A person who *does* have this type of discomfort likely has adequate sensation.
 - ◆ A person who *does not* have this type of discomfort is unlikely to shift position in order to interrupt continuous pressure, especially under bony prominences of the ischial tuberosities and the greater trochanters.
- ◆ **Impaired Mobility**—With or without impaired sensation, a person who is not able to adequately shift his or her own position when sitting in the chair is at increased risk for the development of pressure sore due to immobility.

Pressure Redistribution

When working with persons with impaired sensation and/or impaired mobility, a clinician needs to determine the most effective means of pressure re-distribution.

- ◆ For persons with impaired sensation, but enough motor ability to shift their own position, the person should be taught a pressure relief maneuver—either leaning forward or side to side far enough to take the weight off the ischial tuberosities and trochanters.
- ◆ Individuals who cannot shift position independently need power seating to change position and re-distribute pressure during periods of sitting. The options for power seating include power tilt, power recline and a combination of tilt and recline. With these power seating functions, a person is able to remove the pressure on the seated surfaces and re-distribute it onto the trunk (with tilt) or onto the full trunk and legs (with recline and elevating leg rests).

When exploring power seating functions—prior to ordering—it is important to arrange for a demonstration chair that offers tilt and/or recline functions so that the person can experience the position change provided by each type of power seating.

SUMMARY

- ◆ A careful interview to identify the person's desired goals and intentions for improved mobility is the most important tool in a clinician's skill set.

- ◆ Following the interview, a supine mat assessment and hand simulation of postural support for hands-dependent sitters and prop sitters will assist all team members (client, therapist and supplier) to understand the goals for supported seating position.
- ◆ As appropriate seating supports are identified, address the risk factors that may impact skin integrity. To maintain skin integrity, the person must have adequate sensation and be able to shift position independently in order to redistribute the pressure on the seated surface. For persons who are not able to reposition effectively, power seating should be considered as method of pressure relief.
- ◆ The final choice of a particular mobility device—manual chair, power chair or scooter—depends on the outcome of all three tools—the interview, mat assessment and hand simulation, and assessment of risks to skin integrity.
- ◆ Ultimately, the most effective intervention with regard to seating and mobility is the device that is comfortable and will be used by the person who is experiencing mobility limitations. Optimal interventions are the result of a team of people working together, keeping the person with MS at the center of the decision making process.

Restoring mobility is very satisfying. Seek out other professionals to help you assist persons with MS to experience the benefits of restored mobility and a significant increase in quality of life.

REFERENCES

- Bergstrom N, Braden B, Laguzza A, Holman A. The Braden Scale for predicting pressure sore risk. *Nursing Research* 1987; 36(4):205–210. For more information about the Braden Pressure Sore Risk Tool, www.bradenscale.com and www.bradenscale.com/images/bradenscale.pdf.
- Canning B, Sanchez G. Manual versus power wheeled mobility for clients with MS. *International Journal of MS Care* 2005; 7(3):87–92.
- Demers L, Monette M, Lapierre Y, et al. Reliability, validity, and applicability of the Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0) for adults with multiple sclerosis. *Disability and Rehabilitation* 2002; 24(1–3):21–30.
- Iezzoni I. *When Walking Fails: Mobility Problems of Adults with Chronic Conditions*. Los Angeles: University of California Press, 2003.
- Kirby RL, Dupuis DJ, MacPhee AH, et al. The Wheelchair Skills Test (version 2.4): Measurement properties. *Arch Phys Med Rehabil* 2004; 85:794–804. For more information about the Wheelchair Skills Test, www.wheelchairskillsprogram.ca.
- Kumar A, Schmeler M, Karmarkar A, et al. Test-retest reliability of the functional mobility assessment (FMA): A pilot study. *Disability and Rehabilitation: Assistive Technology*, ahead of print, pages 1–7; pending publication, 2012. More information available at www.informahealthcare.com/doi/pdfplus/10.3109/17483107.2012.688240.
- Law M, Baptiste S, McColl M, et al. The Canadian Occupational Performance Measure: An outcome measure for occupational therapy. *Canadian Journal of Occupational Therapy (CJOT)* 1990; 57(2):82–87.

Minkel JL. Seating and mobility considerations for persons with a spinal cord injury. *Physical Therapy* 2000; 80(7):701–709.

Paralyzed Veterans of America. *Preservation of Upper Limb Function Following Spinal Cord Injury: A Clinical Practice Guideline for Health-Care Professionals*. 2005. Available at www.pva.org.

Saftler Savage, F. Maximizing comfort and function: Positioning intervention. *International Journal of MS Care* 2005; 7(3):93–100.

Wheelchair Skills Test (WST)© Version 4.1 Manual. This manual and related materials can be downloaded from www.wheelchairskillsprogram.ca/eng/testers.php.

RESOURCES FOR PATIENTS

lezzoni L. *Multiple Sclerosis: Choosing the Right Mobility Device for You*. 2012. Available at www.nationalMSSociety.org/MobilityGuide

Users First [a program of United Spinal Association]. *Users First Mobility Map*. 2012. Available at www.usersfirst.org/resources/mobilitymap.