



## Consumer's Guide to Powered Mobility

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When selecting your first mobility device the choices can be overwhelming. This document will guide you through the selection process as well as offer help in obtaining funding for your device. Strollers, manual wheelchairs and power wheelchairs are all possible options for assisted mobility. Efficiency, durability, comfort, ease of use, and other features will contribute to refining your selection.

This guide focuses on powered mobility which will be used for several years. Therefore, careful selection and consideration is extremely important. We hope that you will find this guide a helpful tool in your decision-making process.

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## Chapter I: Where Do I Start?

Deciding to pursue a power wheelchair can be an exciting, but overwhelming task. Thankfully, there are several things you can do to be more prepared for making this decision. First, you will need to obtain a referral (from your physician) for a wheelchair evaluation. Usually, this evaluation is done by a licensed physical or occupational therapist. Below are some ways you can prepare for this evaluation.

### Before your appointment:

- Talk to other wheelchair users and their families about their experiences
- Browse online user groups or manufacturer websites for information and user feedback. (pp.15-16)
- Attend local trade shows to see and try a variety of products. (p.15)
- Get recommendations for a quality equipment supplier and a knowledgeable therapist in your area.\*
- Contact your local manufacturer representatives. Most large companies have territory managers who will be glad to answer questions and point you to respectable hospitals and clinicians. (p.16)
- Begin thinking about accessible transportation for your power wheelchair.

*\* RESNA (The Rehabilitation Engineering Society of North America) provides the only certification currently available to prove proficiency in Assistive Technology. Their website provides a list of Assistive Technology Practitioners – certified clinicians, and Assistive Technology Suppliers – certified dealers (p.15). Not all good practitioners are certified, and not all certified people are savvy in wheelchairs. However, if no other recommendations exist, this might be a good resource to find qualified practitioners.*

### During your first appointment:

- Ask questions.
- Discuss and try various types of wheelchairs. When possible, sit in and use the chair – don't rely solely on pictures.
- If able, take the wheelchair to your vehicle, home, school, etc. to ensure it will work well in your surroundings.
- Be sure to discuss, understand and agree to all details of the equipment prescription.

*\*Depending on your specific needs, the wheelchair assessment might be a single occasion or a series of appointments to look at different options and/or provide training.*

### After your appointment:

- Keep in touch with your therapist and supplier about the status of the wheelchair order.\*
- Call your insurance provider to help speed up the authorization process.
- If the equipment is denied, your therapist and equipment supplier can help guide you through the appeals process which should definitely be pursued (p. 4).
- If your wheelchair continues to be denied, you can request a fair hearing.
  - Legal counsel is available **free of charge** through your state's Protection and Advocacy Organization (websites can be found by searching the internet by state)

*\*Your therapist, doctor and supplier will assemble the required paperwork, and submit it to your insurance provider for prior authorization. It usually takes a minimum of 3 months from the evaluation until the equipment is delivered.*

### During the delivery appointment:

- Get answers to all of your questions (write them down beforehand so you don't forget)
- Understand the proper use and maintenance of the wheelchair\*
- Find out who to call if there are any problems or questions
- Be sure the power wheelchair is programmed for your specific needs and is appropriately responsive to your input

*\*Often you will also have to educate other caregivers, such as school staff, etc. on proper use of the equipment.*



## Chapter II: Funding

The key to obtaining funding is excellent documentation. You should work with professionals who have expertise and credibility to supply such documentation. It is always recommended to involve a physical or occupational therapist in addition to the equipment supplier and your physician. Your therapist has thorough knowledge of anatomy, physiology, biomechanics, and focuses on your functional needs; the equipment supplier has been trained to know the most current equipment and technology available; your physician provides input regarding your medical needs. Of course there is some overlap, but a good team can make all the difference!

Every funding source has its own specific criteria and requirements when requesting Durable Medical Equipment (DME). The following guidelines are general, so please check your insurance plan's specific requirements and coverage criteria. It is also helpful to bring a copy of this policy to your appointment.

- Usually the reviewer has never met you or your child. A letter of medical necessity (LMN) is used to help the reviewer better understand your functional needs, medical issues, and the anticipated benefits of the prescribed DME.
- The LMN should be concise but thorough. Reviewers do not have time to read details that aren't applicable to the device. Most well-written letters for mobility devices tend to be around two to four pages. However, a LMN can certainly be longer or shorter, depending on the specific situation.
- Photographs are an asset. They speak volumes and are quick to review. Sometimes, they are more descriptive than words, and can help transform a claim number into a face for the reviewer.
- Videos can also help justify medical necessity. In general, it is a good idea to film any potentially difficult request (i.e. integrated standers, seat to floor function, very young driver, etc.) Because watching a video takes additional time, typically it is a good tool to use during the appeal process if needed.
- You and/or your caregiver can also write a letter outlining your views on why the wheelchair is required. These letters, again, are typically reserved for the appeal process or after the approval, describing how your equipment has improved your quality of life and overall independence! This can help you and others with future claims.

### Denials:

In today's funding environment, it is increasing difficult to get equipment approved for coverage. This may cause a lot of frustration and what might feel like wasted time. Unfortunately, denials do occur - even with the best justification. Therefore, you should always start the equipment process early, and appeal any denial decisions. A large percentage of DME gets denied on the first request; likewise, a large percentage of DME appeals get approved. Also keep in mind that every time you do not appeal, you are agreeing that the equipment requested is not really necessary for you, and this can damage your chances of getting equipment approved in the future, as well as that of others. Each battle for equipment approval is not done in vain; it helps improve the overall system, and supports the future of technology for people with disabilities.



## Chapter III: Power Wheelchair Bases

When selecting your first power chair, it is important to remember that there is NO perfect power wheelchair. Every type will have its tradeoffs – you need to match the technology to your lifestyle and preferences as well as your medical needs. There are certain features to consider and compare including drive configuration, the location of the larger drive wheels on the base of the wheelchair.

### Front wheel drive

Large front drive wheels pull the weight instead of pushing it. This allows for improved curb and obstacle climbing capabilities, better handling in soft terrain such as grass and gravel. It also provides very intuitive and tight maneuvering (i.e. turning into a doorway from the hall). Since there are no front casters spinning, you can pull in the footplates closer to the body, while still maintaining a lower seat to floor height.



- Disadvantage of the front wheel drive system is the potential for fishtailing – If you go higher speeds the rear of the chair may “wobble” around. This issue has been resolved on some models but not all. You may also need to get used to having more of the wheelchair behind you, so you need to be cautious when initially turning in tight spaces.

### Mid wheel drive

Mid wheel drive wheelchairs have the tightest turning radius. While turning radius does not always equal maneuverability, it is a very beneficial feature for indoor use. It is also intuitive to drive since the drive wheels tend to be directly underneath the user.



- Major disadvantage is a tendency to “high center” –with 6 wheels on the ground, the drive wheels can get stuck in the air when negotiating a ramp or other obstacle. More and more mid wheel drive configurations offer different tracking and curb assist capabilities. While it is still not the best configuration for outdoor use, this technology is improving.

### Rear wheel drive

Rear wheel drive wheelchairs previously offered the best tracking – that is, they were able to go straight without a tendency to veer off to the side. However, with new gyroscopic technologies, both mid and front wheel drive configurations have improved tracking as well. Due to the inherent tracking characteristics in rear wheel drive, these chairs may be a good choice for heavy outdoor use and/or if you want high speed.



- On the downside, much of the user weight is placed above the drive wheels limiting curb climbing ability. Also revolving front casters (wheels) limit footrest placement options - often increasing overall length of the wheelchair. Additionally, rear wheel drive configurations also tend to be the least maneuverable in tight spaces.



### Ability to accept a ventilator

If you use or are likely to require a ventilator in the near future, you want to make sure that your wheelchair can support it. It may mean opting for a bigger, more rugged base than you would prefer. But, keep in mind the chair must safely support the size and weight of the ventilator, all other accessories you may need to carry (i.e. suction machine), and your weight. It is also important to choose a configuration where you can still use the seat functions (i.e. tilt/recline) if a ventilator is added.



### **Seat to floor height**

Seat to floor height of the wheelchair is extremely important. Small children benefit from sitting lower to the ground - being on peer level for most activities. A generic preschool table is 19" from the floor. It is also ideal if you can access various heights (dining room table, bookshelves, kitchen counters, etc.) This need can be met with elevating seats and/or seats that move to the floor. For adults or larger children, the necessary seat to floor height is often defined by access to regular desk/table heights, drive controls in/access to your vehicle, and lower leg length. During the evaluation carefully assess how high the seat is from the ground, and what you will need during your typical daily activities. The more seat functions you have on the chair, the higher the seat to floor height is likely to be.

### **Transportability**

Some wheelchairs come standard with tie down attachment points, while others may offer it as an option. It is likely that you will need these when using a bus. As for private transportation, most manufacturers recommend that the user be transported outside the wheelchair in a car seat whenever possible. Some wheelchairs have been crash tested for additional safety. A power wheelchair typically does not fit in a regular family sedan, but there are alternative, safe transportation options for minivans, trucks, and SUVs.

### **Transportable or folding power chairs**

A folding power chair may sound like a good idea; but in reality with today's technology, it may be a bit deceiving. A folding, transportable power chair needs to be very light weight by nature; therefore, it is likely to compromise drive performance. It may be a good idea as a secondary chair for lighter use or travel, but consider all variables before you opt for this type of chair as a primary mobility device.

### **Drive performance**

Performance variables may show differences in ruggedness/durability of different bases. While it is recommended to consider these variables, do not let them guide your decision exclusively.

- *Speed*: How fast can the chair go? Keep in mind that most chairs are programmable, so you can start slower, and then speed up as you become more comfortable. Also remember that a typical walking speed is 2-4 mph.
- *Range*: How many miles can the chair run between charges?
- *Incline*: What degree of ramp/other incline can the chair safely navigate?
- *Ground Clearance*: How many inches of *obstacle* can the chair climb?
- *Suspension*: This enables a smoother ride, which improves comfort and helps maintain position, which can be important for users with limited trunk control, strength, and/or startle reflexes.
- *Warranty/Reputation*: Which parts of the wheelchair are covered by warranty, and for how many years?
- *Programming/Electronics*: Can the wheelchair accept alternative drive controls (other than a joystick)? What can be programmed to enhance the user's ability to drive?

### **Growth**

Due to reimbursement/insurance requirements, any wheelchair will typically need to last about 5 years.

### **Aesthetics**

Your wheelchair will become a part of who you are and will help formulate your self image. Therefore a chair which directs attention to the user instead of the mechanics and electronics is preferable.

### **Ability to accept seat functions**

With limited strength and endurance, you might benefit from certain functions in order to tolerate being in the chair for longer periods of time. Tilt, recline, seat elevation, elevating leg rests, and standing are all seat function options (pp. 7-9). Some chairs can be fitted and/or retrofitted with these functions while others cannot. Also verify what is required to add seat functions at a later time if that should become necessary.



## Chapter IV: Seat functions

Seat functions serve many purposes in the areas of prevention, enhanced function and sitting tolerance. Sitting in one position without any movement throughout the day is extremely tiring, and is not the way we live. Seat functions can help ease this by replacing/supporting the body's movements. They also assist gravity to ensure better positioning in the seat. Better posture usually leads to improved function including respiration, digestion, upper extremity function, and it also can help delay some secondary complications such as pressure sores or contractures. Seat functions can be available in both manual (attendant controlled) or powered (user controlled) versions. It is important that you have as much independence as possible, so power seat functions are often preferred. The following describes commonly prescribed seat functions:

### Tilt

When tilting back in space, the entire seating system tilts therefore the seat to back angle and positioning components stay in place.



#### *Benefits of Tilt:*

- Reduces pressure from ischial tuberosities (sit bones) without compromising seated posture – helps prevent pressure sores
- Compensates for limited trunk stability – even a slight tilt utilizes gravity to help extend the trunk and maintain a more upright and stable position
- Provides safer negotiation of inclines – can increase ground clearance through slightly tilting the seating system
- Facilitates improved respiration and digestion through increased trunk extension
- Allows the user to utilize gravity for postural control and proper positioning in the seating system
- Helps inhibit abnormal tone and reflexes

### Recline

Recline refers to opening (or closing) the backrest angle relative to the seat.

#### *Benefits of Recline:*

- Provides passive range of motion – reducing risk of contractures at the hip
- Distributes pressure over largest surface of body (reducing risk of pressure sores – especially when combined with tilt)
- Increases sitting tolerance - allows dynamic sitting posture/movement
- Improves postural stability which can help reduce fatigue
- Allows easier catheter/urinal use or positioning for diapering without requiring a separate transfer
- Increases respiratory capacity through increased trunk extension



### Elevating Legrests

Elevating legrests change the angle of the legrest relative to the seat. It may be available with articulation, which means that the footplates move down on the legrests while elevating. This allows for better knee extension, especially for taller users.

#### *Benefits of Elevating Legrests:*

- Assists with lower extremity circulation
- Facilitates range of motion at the knees
- Supports the need for casts, splints, or prosthetics
- Provides change in lower extremity position – controlling pain or neuropathy symptoms
- Can help reduce edema (swelling) - **only** if the legs are positioned above the heart (i.e. with a combination of elevating legs plus tilt or tilt/recline)



### Seat Elevator

A seat elevator will raise and lower the user in their seated position without changing the seating angles in order to provide varying amounts of vertical access.

#### *Benefits of Seat Elevator:*

- Provides access to higher surfaces for functional needs (i.e. stove, microwave, sinks, countertops, light switches, etc.)
- Improves range of reach - providing more independence
- Facilitates lateral transfers (allowing use of downward gradient for safer and easier transfers)
- Allows eye contact which may reduce neck pain and improve self confidence



### Seat to Floor

The seat lifts off from the base and moves forward then lowers the occupant to the floor.

#### *Benefits of Seat to Floor:*

- Provides peer interaction for young children – can participate in circle time and other floor activities
- Allows access to lower surfaces – floor mats in therapy, low book shelves, items/toys on the floor, etc.
- Promotes independent transfers - Some children or small adults may be able to transfer independently when being lower to the ground by crawling or scooting in and out of the wheelchair
- Facilitates responsibility and confidence by allowing the user to care for and interact with pets



## Standing

Some wheelchairs (manual and power) offer integrated standing in the wheelchair. This makes standing a more frequent, integrated activity, and allows it to become a functional part of the day. Some tradeoffs may exist with standing wheelchairs, such as increased seat to floor height and a heavier wheelchair base.

### *Benefits of Integrated Standing:*

- Allows increased environmental access vertically
- Improves functional reach to: shelves, the stove, sinks, fire alarms, light switches, payphones, vending machines, water fountains, grocery store shelves, etc. – which allows greater independence and self sufficiency
- Preserves/improves Bone Mineral Density (BMD)  
- Recent studies indicate that dynamic loading of the bones (i.e. driving while standing) is better for increasing BMD as compared to static loading (i.e. using a separate stationary stander)
- Reduces the risk of pressure sores by transferring all pressure off the sit bones (ischial tuberosities)
- Can help delay secondary skeletal complications and deformities from prolonged sitting such as kyphosis, scoliosis, and lower extremity joint contractures



- Decreases frequency of urinary tract infections – allowing gravity to assist with bladder emptying
- Allows the option to use a public restroom/urinal for some males
- Promotes lower extremity muscle activation reducing atrophy in patients with voluntary muscle control
- Improves respiratory function, speech, breath support and cough quality
- Reduces the risk of gastro-intestinal complications by expanding the abdominal cavity creating less pressure on the internal organs
- Increases self confidence by providing the ability to assume a standing position and hold eye-to-eye conversations



## Chapter V: Seating Systems

Professional guidance for selecting the proper seating system is extremely important. There is no gold standard in seating. Since every person is unique, all components of the system have to be matched to the specific user. It is highly recommended to work with a qualified therapist to determine the best seating system for you.

Seating systems can vary from a simple seat and backrest to a system supplied with many parts and accessories. It is beyond the scope of this guide to describe details of all seating systems. The following lists some considerations and possible accessories:

- Seat Cushion (foam, gel, air, honeycomb plastic, hybrid, etc.)
- Backrest (planar, contoured, custom molded, etc.)
- Footrests (flip-up, swing-away, elevating, angle adjustable, etc.)
- Headrest
- Lateral Trunk Supports (stationary, swing-away, removable, adjustable, etc.)
- Hip/Thigh Guides
- Knee Blocks
- Seatbelts/Trunk Harnesses
- Armrests (size, height adjustable, angle adjustable, removable for transfers, etc.)
- Support Tray
- Backpack/Medical Necessities Bag



## Chapter VI: Drive Controls / Electronic Interfaces / Access Methods

The advancement of power wheelchair electronics in the recent past has been quite amazing. There are a variety of access methods available for you to control the movement of a power wheelchair as well as operate power seat functions. In fact, even if only one part of your body can move with very little strength, you can use a power wheelchair - including all power seat functions - independently.

With progressive medical conditions (such as ALS, MS, SMA or Muscular Dystrophy), it is wise to consider future needs not only with seating, but also with electronics and drive controls. Some wheelchairs have “expandable controllers,” which means that alternative access methods can be added later even if you start with a standard joystick.

Many variables on a power wheelchair can be programmed by your therapist or provider to ensure that the chair correctly responds to the input received. Programming typically is not done by the end user, but requires a trained provider to ensure safe parameters are used.

There are different categories of access methods:

### Proportional Control

Proportional means that the speed of the chair is proportional to the displacement of the control unit – for example, as the user moves the joystick further forward the chair will go faster and faster. In addition, proportional control allows you to move in any direction; wherever the joystick travels, so does the wheelchair! If you are physically able to use a proportional control, it is usually the preferable method. Some examples of proportional wheelchair controllers include, but are not limited to:

- ***Standard Joystick***

Various handles can be used to help you grasp and control the joystick  
These can be mounted virtually anywhere on the wheelchair for improved access



- ***Mini Joystick***

For people with very little strength/movement; can be placed in various locations (typically the mouth, chin, or a finger)



- ***Foot Control***

Used like a gas pedal on a car; for access with your foot

- ***Tablet Control/Touch Pads***

Small touch pad or larger tray which works like a mouse pad on a lap top

- ***Proportional Head Array***

Some head controls (such as Peachtree®) use proportional control



### Switch/Digital Control

Switch control offers movement in 4 distinctive directions, 90° apart (forward, reverse, left, right). It is an alternative if proportional driving is not possible. Switch controls are often also used for access to your computer and/or communication device. Some therapists prefer switches as a training tool for first time drivers, assuming that it is easier to understand directionality and cause and effect through their use. Keep in mind, however, that proportional control provides a more natural way of moving about and should also be attempted whenever possible. Some examples of switched wheelchair controllers include, but are not limited to:

- **Multiple Switch Head Array**  
Most commonly used switch for head control
- **Button Switches**  
Can be used with any body part and are available in a variety of sizes/colors
- **Fiber Optic Switches**  
Usually placed in the tray – for very little movement with fine motor control
- **Proximity Switches**  
Switches that are activated when you get close to them
- **Single Switch Scanning**  
Requires consistent movement with reasonable response time – allowing you to drive the wheelchair and control seat functions through one single switch



### Attendant Control

An attendant control allows a caregiver to control the chair if the occupant becomes too fatigued. It is not practical for a caregiver to manually push a typical power wheelchair because these chairs are extremely heavy (200-300+ pounds). Additionally, an attendant control can be useful in busy or potentially dangerous environments for very young children who are just beginning to drive. There are two main types of attendant controls:

- **Joystick**  
Typically mounted behind the wheelchair
- **Co-Pilot**  
A stroller-like handle used simply pushing the chair like you would a shopping cart or stroller with very light touch and natural control.



## Chapter VII: Resources

*Disclaimer: These links are for convenience only. Permobil assumes no liability of any kind for any information contained in any referenced site.*

### Conferences/Trade Shows:

- Abilities Expos - [www.abilitiesexpo.com](http://www.abilitiesexpo.com)  
User oriented expos in several cities across the country.
- Medtrade - [www.medtrade.com](http://www.medtrade.com)  
Professional oriented trade show, the largest in the country. Open attendance to anyone.
- RESNA - [www.resna.org](http://www.resna.org)  
Professional organization and annual conference at varying locations. The conference offers open attendance to the expo one day.
- International Seating Symposium - <http://www.iss.pitt.edu>  
Annual conference alternates between Vancouver and Orlando. The conference offers open attendance to the expo one day.

*\*In addition to the conferences listed above, there are many local expos organized by suppliers and/or schools. Ask your therapist and suppliers for information on upcoming events.*

### Professional Organizations:

- RESNA - [www.resna.org](http://www.resna.org)  
Organization for all Assistive Technology providers, clinicians, researchers and suppliers. Provides info on annual conference/expo as well as a list of certified professionals.
- NRRTS - [www.nrrts.org](http://www.nrrts.org)  
National Registry of Rehabilitation Technology Suppliers. Professional and voluntary organization of suppliers/dealers. You can find registrants in your area through their website as well as professional code of ethics.
- APTA – [www.apta.org/consumer](http://www.apta.org/consumer)  
American Physical Therapy Association, professional organization for physical therapists. You can search for a PT with expertise in wheelchair and seating in your area.
- AOTA – [www.aota.org](http://www.aota.org)  
American Occupational Therapy Association, professional organization for occupational therapists

### End User Websites & Web Chat-room Sites:

- Wheelchair Junkie - [www.wheelchairjunkie.com](http://www.wheelchairjunkie.com)  
A chat forum for wheelchair users - mostly active adults.
- Able Data - [www.abledata.com](http://www.abledata.com)  
Comprehensive information on various aspects of assistive technology, link to manufacturers, etc.
- Wheelchair Net - [www.wheelchairnet.org](http://www.wheelchairnet.org)  
Comprehensive information on various aspects of technology, training, latest research, etc.

### Magazines:

- *New Mobility* - [www.newmobility.com](http://www.newmobility.com)  
User oriented magazine. Adjunct publication “Kids on Wheels” is a comprehensive guide to pediatric mobility issues.
- *Mobility Management* - [www.mobilitymgmt.com](http://www.mobilitymgmt.com)  
Interesting articles, product information, mostly targeting professionals.
- *Exceptional Parent* - [www.eparent.com](http://www.eparent.com)  
Magazine focusing on parenting a child with disability. Also offers educational sections via teleconferencing.



**Manufacturers:**

There are many available products related to wheelchairs (cushions, seating accessories, switches, etc.) This list is not intended to be comprehensive, rather provide references for some of the largest and most widely used manufacturers with products related to powered mobility:

- Permobil - [www.permobil.com](http://www.permobil.com)  
Manufacturer of powered wheelchairs, functions and seating ranging from pediatric to adult.
- Pride Mobility Products - [www.pridemobility.com](http://www.pridemobility.com)  
Manufacturer of powered mobility products and related items ranging from pediatric to geriatric.
- Invacare - [www.invacare.com](http://www.invacare.com)  
Manufacturer of power and manual mobility, hospital beds, bathroom equipment, accessories, etc.
- Sunrise Medical - [www.sunrisemedical.com](http://www.sunrisemedical.com)  
Manufacturer of power and manual mobility, hospital beds, bathroom equipment, accessories, etc.
- Adaptive Switch Labs (ASL) - [www.asl-inc.com](http://www.asl-inc.com)  
Manufacturer of switched solutions/adaptive controls for more complex access requirements.
- Switch It - [www.switchit-inc.com](http://www.switchit-inc.com)  
Manufacturer of switched solutions/adaptive controls for more complex access requirements.
- Enabling Devices [www.enablingdevices.com](http://www.enablingdevices.com)  
Affordable adapted toys, switches, etc.

