

All that you need to know about Wheelchairs

Advantages of Manual Wheelchairs

So many people wonder, "Why bother to push that chair around when you can get one with a motor?" Well, for those with sufficient balance and strength, there are good reasons...

Manual chairs have a number of advantages over power chairs, and most people would prefer to use a manual chair if at all possible. Consider the following list of "pros," but also be honest with yourself about your strength and energy-you'll need a lot more of both to operate a manual chair rather than a power chair.

Manual chairs are lightweight, and getting lighter all the time thanks to modern metals and composite materials. Lightweight chairs require less strength and energy to push.

Manual chairs have unlimited range, not being tied to the charge capacity of a battery.

"Manual chairs cost less to purchase than power chairs. Maintenance costs are also lower thanks to fewer working parts, and not needing to replace depleted batteries.

"Manual chairs are more discrete than power chairs, being less visually bulky and, with no motor noise, quieter-assuming the manual chair is well maintained.

"Manual chairs are easier to maneuver for slight rotations or small movements, although the newer controls for power chairs are excellent.

"Manual chairs travel more easily than power chairs, whether on an airplane or stored in the back seat or trunk of a car. Depending on options, a manual chair can be stored more easily when broken down to its component parts. Swingaway footrests can be removed, as can the wheels by means of the now-common quick release axles.

"Manual chairs can extend mobility. For those with the strength and agility to master the art of the "wheelie," many curbs and single steps no longer represent an obstacle in a manual chair, as you can safely "jump" a curb or step either going up or down.

Some people resist choosing a power chair because it makes them feel "too disabled." It's important to ask yourself how much of your daily

energy you are willing to invest in pushing a manual chair. If you have marginal upper body strength you could exhaust yourself just getting where you're going. Perhaps you are attending a college that is on a sloping site or live in a hilly town or city. It can be a difficult decision, but consider whether you prefer to trade having more energy in the day against your public image as a power chair rider. Lack of energy from pushing a manual chair around might even make a difference in your ability to hold a job.

Finally, think about how the effort needed to operate a manual chair will affect your health in the long run. Many manual chair riders with twenty or so years of pushing behind them find that their shoulders begin to give out. You are better off using a manual chair if you can, but not at the expense of your long-term health.

Choosing Between a Manual or Power Wheelchair

Some users are on the "cusp" of being able to use a manual wheelchair full-time. Here is some criteria for choosing.

Many low-level quadriplegics have sufficient arm strength to push a chair, perhaps aided by handrims with knobs which are easier to grasp than rims alone. Some of these riders use a manual chair at all times, while others switch between manual and power chairs, depending on distance, surface, whether they might need to be lifted up stairs, load the chair into a car, and other such criteria. You might use a power chair to go to and from work, but use a manual chair at home and at the office. College students often use a power chair on campus, where they often need to travel considerable distances over hilly terrain. A blend of the two types could be the ideal strategy for your mobility. It is an approach that does not waste your energy or overuse your body.

For manual wheelchairs, there are many choices that affect how easy it is to push the chair, and how well it will coast so you don't have to push as much. Proper maintenance is crucial, especially keeping the tires inflated and the frame tight. Modern adjustable wheelchairs require some attention to axle position, seat angle, back height, and other features that also influence the ease of wheeling. Lighter wheelchairs require less force to push, so those on the cusp should take the overall weight of the chair into account in their selection process.

This woman who experiences deterioration of her spine and hips finds she needs one of each:

Continuous use of my arms for moving the chair will only aggravate the problems in my shoulders, but wheeling short distances in my home would help to maintain my ability to move manually.

The power chair is the better method for outdoors because once I'm used to controlling the chair, it would actually be safer. I live in a rural area with no sidewalks and few of the places I would be going are level. Using the power chair would mean greater independence.

There have been some interesting efforts at a "best of both worlds" solution. The Roll-Aid is a motorized unit that attaches to a manual, folding wheelchair. You roll over it until the steering/control arm is between your legs, and the Roll-Aid will attach itself to your chair, allowing you to drive it like a scooter, steering with two hands rather than using a single joystick as with most power chairs.

The Quickie P200 model (now the P222) revolutionized power chairs in a variety of ways. One of its unique characteristics is that the basic chair unit can be lifted off of the motor module, and then manual wheels can be attached. One user of the P200 offers an example of its versatility:

There are advantages and disadvantages in either case:

Manual Chairs

- " Require adequate strength and balance to propel
- " More fatiguing for distances and going up slopes
- " For those with sufficient tone and balance, can contribute to aerobic and muscular health
- " Easier to transport
- " Rider can be lifted up stairs while in the chair
- " Lower maintenance risk from fewer parts
- " Not dependent on charging or potential failure of batteries
- " Typically narrower and easier to make precise movements in small spaces

Powered Chairs

- " Allows those with little strength and stamina to travel distances
- " Can contribute to weakening without a supplemental exercise program
- " Much heavier and more difficult to transport
- " Higher maintenance risk due to greater complexity
- " More costly to purchase and service
- " Great sophistication in programming of controls
- " Variety of types - mid/front/rear-wheel drives - for personal preferences and terrain
- " Can include tilt and/or recline systems for pressure relief if rider is unable to lift their own body

A new trend beginning to appear is the concept of "power-assist," in which motors and programmed sensors are added to a manual wheelchair.

The system supplement the pushing of the wheels in order to reduce the amount of physical exertion required to push the chair. This holds some promise for the abovementioned borderline quadriplegic who might be able to continue to use a manual chair without risk of straining their shoulder tissues.

Cushions

Cushion design and engineering has made it possible for people to spend full days being active using a wheelchair. Choosing the right one is key to comfort, support, and safety.

Although your wheelchair and cushion are separate purchases, which chair you choose is significantly affected by the type of cushion you will use. Chair and cushion are a team, each influencing the other. The proper combination of chair and cushion will enable you to sit in a neutral and stable posture and to operate the chair safely and use your energy efficiently.

Cushions come in various depths and sizes which need to be accommodated by the size of your wheelchair frame. The actual length of footrests, the height of the chair back, the position of armrests, and other features are influenced by how high or low you will be sitting on a cushion. Clearly, you need to decide which cushion is best for you before you can make a final decision about which chair is best, certainly before you specify the exact dimensions of your chair.

Wheelchair cushion development is quite lively, as designers and engineers continue the quest for the ideal cushion. A number of manufacturers, such as Jay and Roho, exist solely for the design and production of seating and support systems for wheelchairs. Most of the major wheelchair makers, including Everest & Jennings, Invacare/Pindot, and Otto Bock Reha also offer an assortment of cushions.

Cushion design is by no means a simple topic, and there are many choices to make as you decide on the right one for you. There are four basic types of cushions-foam, gel, air floatation, and urethane honeycomb-as well as designs and systems for those with advanced needs.

What kind of cushion you choose will depend on a variety of factors, including how much time you spend in your chair, how much you move around in your chair, and how stable your posture is.

One important task of the wheelchair cushion is the prevention of pressure sores. Given how long many wheelchair users sit, and the reality of posterior muscle atrophy for spinal-cord injuries and other disabilities,

pressure ulcers are a real and serious danger. The cushion is a primary tool for pressure sore management.

The other crucial task for a cushion is postural stability. Even if you are able to walk or are an amputee with sufficient built-in cushioning, the right cushion helps to support your spine. If you already have some asymmetry in your body, you need to be supported in a way that will not increase any spinal deformity. For manual chair users, greater stability in your chair also means you can push the wheels with more confidence and strength.

The wrong seating system leads to poor posture which leads to physical problems which leads to becoming more sedentary which leads to a negative emotional and personal experience. It's a dangerous chain of events. posture is key.

Position and Angle of the Wheels

One of the major developments in modern wheelchair design has been the ability to adjust wheel position - which makes for greater comfort and efficiency when pushing.

Most modern manual chairs have the ability to adjust the axle position forward or back in relation to the back of the chair. This is the point of pivot, where your weight is applied to the chair. When the wheel is moved forward on the axle, more of the chair weight is behind the axle, and so it will tip more easily, lifting the front casters off the ground. At the least you want to be able to slightly lift the casters with a bit of an extra push to soften your ride over bumps in the sidewalk, for instance. At most, you might use the technique of doing "wheelies" to go up and down curbs. The axle position will control how efficiently you can perform these maneuvers without putting yourself at risk of falling backwards in your chair. When you begin wheeling, you might begin with a more stable rearward position, and then move the axle forward as you gain more experience driving.

Correct wheel position is also determined by your weight, and how your weight is proportioned. For example, taller people have longer legs, and so have more body weight forward in the chair. More weight forward in the chair allows for a more forward wheel position without risk of falling. If you wear heavy shoes such as boots, you might take that into account by moving the wheels forward. Amputees have much less forward body weight, so must use a rearward wheel position. They might even require a chair frame or adapter that allows the axle to be placed behind the vertical line of the chair back.

If the wheels are too far back, they can be hard to reach for pushing, forcing you to pull your arms farther back to reach them. When the wheels are farther back your chair will want to roll toward the street on sidewalks which are always sloped toward the street for water drainage. You will have to push harder on the downhill wheel to compensate for gravity pulling the front end sideways.

Another "wheel" decision is the amount of camber you want on your wheels. Camber is the angle of the wheels toward your body as they rise from the floor. Some rigid frame chairs are available in various fixed camber angles where the axle housing is welded in place at the given angle. Other designs allow for choices in camber with a nominal amount of work with simple tools. Most chairs use an adjustable plate that holds the axle and allows the camber to be changed.

The greater the camber, the wider the wheelbase, and therefore the greater the lateral stability of the chair as you turn corners or lean over. Athletic chairs used for racing, tennis, rugby, and so on have severe camber angles. Those things really move fast! The camber is necessary to keep them-and the riders-upright. For a day-to-day chair you would use less camber because the added width at the floor will become an obstacle to passing through narrow spaces. It is extremely common in a chair rider's life that a matter of a quarter of an inch can make the difference between getting where you need to go or being prevented access.

These are the most critical dimensions of the wheelchair...

If you already are using a chair, you have some idea of what measurements are right for you. They might even be exactly the same as your existing wheelchair, but this is also an opportunity for you to make refinements. Perhaps you want to sit a bit higher or lower, perhaps there is pressure against your hips and your seat should be another inch wider. These are some of the issues you'll take into account as you determine the final specifications of your new wheelchair.

The model of wheelchair you choose might allow some adjustability once you receive it. Many ultralightweight wheelchairs, for instance, allow changes in the height of the main wheel and caster axles. Yet other models have a separate adjustment for the angle - or "dump"- of the seat. You might want to take these issues into account when you make your final product choice.

wheelchair seats are not necessarily level. They typically slant towards the back - either a little or maybe a lot - to provide greater stability. So you will be asked to determine two seat height numbers, one for the front and one for the rear. These are measured from the floor.

Begin with the front floor-to-seat height. Measure the length of your leg from the heel to the inside of the knee, and add two inches, or the desired clearance from the bottom of the footplate to the ground. Then subtract the thickness of your cushion (when you are sitting on it, compressing it). That will be your minimum front seat-to-floor height. You may want more ground clearance or need to sit higher up - the choice is yours - in which case you might add an inch or two.

The rear seat-to-floor dimension will be at least equal to - and usually less - than the front dimension. If you have limited upper body balance, you will want to use more seat dump. Keep in mind that a substantial angle will make it harder to transfer out of the chair. If the dump is extreme, it can also lead to curvature in your spine in the long run because your pelvis will rotate back severely. Use only as much as you need to be stable and safe.

The seat width is the dimension across your hips, plus space for clothing. Take into account the type of clothing you wear such as a sportcoat and jacket if they are common to your wardrobe. If you use clothing guards, ensure that there will not be pressure against your hips, which could cause skin breakdown. Of course your goal is to keep the seat and total width of the wheelchair narrow for access reasons, but try not to end up squeezed into your chair. You need a little room to shift your weight, which is also important for preventing pressure sores.

Seat depth is a function of the length of your thighs and, well frankly, the size of your bottom! Measure from where your backside contacts the chair back to just behind your knee. Choose the deepest seat depth option that is at least one inch shorter than your measurement. Allow more space behind the knee if you need it to be able to lift your leg for making transfers, but in general try to keep as much contact with the seat along your upper thighs as possible. Using a seat depth that is too shallow robs you of stability, and increases the pressures on your ischial bones, another major pressure sore location.

Getting these four dimensions correct will lead to natural, effortless posture, and provide you with a solid foundation for an active, comfortable day of wheeling.

Tires

A quick overview of the basic types - solid, pneumatic, and inserts.

Tires influence the comfort of your ride and the amount of maintenance your wheelchair will need. Some riders also consider the choice of tires an

important aesthetic consideration. Generally, wheelchair tires are made of a gray rubber designed not to leave scuff marks on floors. You are unlikely to find them in your local bicycle shop. Your choices range from pneumatic tires to solid rubber tires, with tires that attempt to offer the best of both in between.

Pneumatic tires have inflatable tubes in them like bicycle tires, so they offer a more cushioned ride and are better able to squeeze their way over obstacles. Like bicycle tires, they can be punctured by a tack or piece of glass picked up on the street. The risk of punctures is greater for power chair tires because the extra weight of the wheelchair against the pavement can help a sharp object pierce the rubber. Obviously, getting a flat tire means you might find yourself stranded someplace away from home, or need to go back for a repair riding on the deflated tire. Riding on a flat tire can cause damage to the rim of the wheel. Flats can be minimized by using heavy duty, thorn-resistant tubes or Kevlar tires. (Kevlar is a material used for bulletproof vests.)

The risk of punctures is greater for power chair tires because the extra weight of the wheelchair...

Pneumatic tires need replacement more often, since the depth of the rubber before reaching the fiber lining is thinner than a solid tire. The rubber wears down from normal use, particularly the more shallow treads of most manual wheelchair tires. Knobby tires with a deeper tread are also available. They will last longer and provide better traction on unpaved surfaces, but are harder on the hands of manual wheelchair riders.

Solid rubber tires make for a rougher ride. You will feel each bump of the pavement, but your tires will never go flat. You might value the security of knowing you will not get a flat, like this power wheelchair user:

Wheelchair Seat Angle

The angle of the seat controls stability - and safety - for the rider.

Your chair seat does not necessarily need to be parallel to the ground. Seats can slope down toward the back. The angle of the seat compared to the ground is known as "seat dump" or "rake."

Having some degree of seat dump means that more of your weight presses against the chair back making you feel more stable in your seat. People with higher level spinal disabilities gain security and safety with

the use of seat dump. Manual riders are able to exert more push with less effort through their arms and shoulders.

Many chairs have the ability to adjust seat dump. The advent of rigid frame designs for manual chairs, and the modularization of power designs made it easier to adjust the angle of the seat, since the seat support rails are no longer part of the chair's folding mechanism. On a folding chair these rails are fixed, so the seat angle is determined by the position of the wheel axles relative to the entire frame. Raising the rear axles to a higher position has the effect of lowering the rear of the chair and so increases the seat dump. It might also be possible to raise the caster height or use different size casters, achieving the same effect.

There are tradeoffs for the advantages of seat dump:

" When your knees are raised relative to your thighs, the pelvis rotates backwards with your legs, and the spine is flexed into a rounded shape, flattening out the lumbar curve which plays an important role in the health of your spine. Too much dump, therefore, can increase the risk of scoliosis or disk problems, so should not be used to an extreme. If you experience back pain after using more seat angle, you should adjust it toward a more level angle.

" You need to have sufficient hip flexibility to bend at the waist for added seat dump. Closing the hip angle too much can limit circulation to the legs, already at risk of circulation difficulties from not being used.

" Seat dump can add pressure and shear forces at your sacrum, increasing the risk of skin breakdown. The cushion or chair back can sometimes account for seat dump to minimize contact.

" Finally, a more pronounced seat dump might make it more difficult for you to transfer in and out of your chair.

Wheelchair Seat Depth

Too short - not enough support. Too deep - potential long term problems. Get the depth right.

It is critical to get the depth of the seat pan right when you specify the dimensions of your chair. The seat pan should be deep enough so that the seat is in contact with as much of the bottom of your thighs as possible.

When the seat pan is too shallow, your upper legs extend beyond the front edge and more pressure is placed on your ischial "sitting" bones. This additional pressure increases the risk of skin breakdown. You are also giving up greater stability. The chair can't "carry" you if it can't make full contact with your body. Without full seat support, your body might be prevented from being in its neutral position, risking spinal curvature or muscle and tendon strain.

A too shallow seat pan also means that your feet will not rest properly in the footrests. Picture a chair with footrests designed to allow the lower legs to be perpendicular to the ground. If the knees extend out beyond the front of the seat, the legs will have to bend back at the knees so that the feet can rest on the footplates. In order for the feet to be level, they would have to bend unnaturally.

On the other hand, when the seat pan is too deep, you will be unable to sit properly against the chair back. You will be kept from sliding back fully in the seat, stopped behind the knees. When the seat is too deep, the only way to make contact with the back of the chair is to rotate the pelvis backwards and round the spine. In other words, you will have to slump. Slumping is potentially dangerous for the spine as it can cause degeneration. This posture also makes it difficult for you to wheel efficiently in a manual chair.

A seat pan that is too deep could interfere with the position of your legs if you use calf supports with your footrests. Calf supports keep the legs in a more forward position. The seat pan might need to be shallower to compensate.

A deeper seat means you've chosen a longer frame, and so this means a heavier chair due to the added metal in the frame. When more of the chair is ahead of the axle, you will feel as though you are pushing even more weight. If you require extra depth in the seat pan, you will need to adjust the forward position of the main wheel axles so that the chair is not too front heavy, particularly if you rely on doing wheelies in your wheeling style.

Wheelchair Seat Width

Striking a balance between keeping the chair narrow, and being comfortable. And safe.

Your chair should be as narrow as possible for your body size without creating contact points that could cause pressure sores.

A seat that is too wide limits mobility. A quarter of an inch in the width of the chair can make the difference between being able to get down an aisle in a store or past a couch at the home of a friend. You don't want to squeeze yourself into the seat-if you wear a heavy coat in the winter, or typically work in a business suit with a jacket, the width of the seat should take this into account-but you also don't need the wasted space or mobility limitations of a chair that is too wide. A wider chair is also heavier, given the extra metal in the frame.

A seat that is too wide will promote poor posture. If you have extra space, you are more likely to slump to one side or the other. You might think that because you would have more room to shift your position, extra seat width would be helpful in the prevention of pressure sores, but this is not a good strategy for skin management. You don't want to protect your skin by damaging your spine with twisted sitting postures. Limit your skin management program to pushups while you are in the chair, proper cushioning, and diet. Put a high priority on good postural habits.

A wider chair also means that the wheels will be wider apart, making it necessary for a manual chair wheeler to reach farther, extending arms out to the side. Wheeling with arms extended is a less efficient way to wheel and will be more fatiguing. If the chair has armrests, they might further interfere with the process of wheeling if the chair is too wide for you, or rub against your arms as you wheel.

A wider chair does provide better lateral stability, which will help prevent a manual chair from tipping over sideways, but stability can be similarly achieved by properly placing the adjustable axles and plates that are typical on most chairs today. The wheels can be moved out and camber added for stability without having to incur the disadvantages and risks of a wider frame.

If weight management is difficult for you, you will want to take the possibility of weight gain into consideration when determining the seat width. You don't want to find yourself ultimately squeezed into a chair purchased when you were lighter. If you become heavy and truly need a new chair, you might have to fight with your funding source for approval, or be forced to dip into your own savings or credit limit to buy new wheels. But do you want to purchase a wider chair on the assumption that you will gain weight? Is that risking a self-fulfilling prophesy, inviting weight gain? The best solution is to reach a stable weight, whatever is normal for you, and then specify a chair that will remain appropriate to your needs while you practice the best weight control habits you can.

Preparing for Your Choice

Issues to consider, information to have at the ready when you are choosing a wheelchair.

It is very important to get as close as you can to the optimal chair for you when you make your selection. You could wait years before your financial source is willing to buy another. Funders often won't pay even for minor

changes like different tires or additional accessories like a knapsack or crutch holder once you accept delivery of your chair.

No matter how skilled and knowledgeable your therapist or other advisor is, you are the expert on you. It is in your best interest to take an active role in the selection of your wheelchair, to learn as much as you can, and to take your time before making the final choice.

Chances are you know other chair users, possibly from your rehab experience, support groups, participation in athletics, or your local independent living center. Chair users tend to be very opinionated about their choices. Remember that every person is different. You can learn much from what others say, but what works best for them might not work for you. What counts is to get your own education.

My experience with purchasing the best chair for me came primarily from my own research which included talking with other wheelchair users. I got a couple of names from the retailer, but the best information I got was from the Internet.

Learn as much as possible about chairs and what is available on the market. You can request product information from all companies that appear to have something you think might work for you.

Consider The Issues

Your wheelchair choice depends on many things about where you live and work. Investigate your home and workplace. You need to be equipped with answers to questions such as these:

" How wide are your doors-main entry, kitchen, bedrooms, bathrooms, etc.?

" Are there tight angles to negotiate, such as a hallway that turns sharply at the bedroom door?

" How large is the bathroom? Will it be possible to wheel your chair alongside the bathtub, or must you face it directly? Is the door smaller than the others in your house? Will you be able to close the door once inside with your wheelchair?

" What is the knee clearance of tables and desks?

" How high are cabinets and shelves that you might need to reach?

" Is the terrain around your home paved? If not, what kind of surface is it? Is it level?

" What are the surfaces where you will do most of your wheeling?
Carpet, tile, concrete, packed soil?

You must also consider the vehicles which will carry you:

" If you drive, do you have a car, or a van? Two or four doors?

" What is the size of the trunk in the family car?

" What kind of public transportation might you use?

Failure to consider any one of these points can mean having to live with a constant irritant or insurmountable obstacle, facing the stress of unnecessary restriction of your mobility every day-just because you got the wrong chair. You might even be risking your safety if, for instance, you are forced to make a long transfer to the bath or shower because you chose those fixed footrests which prevent you from getting close enough.

It's A Lifestyle Choice

You will also want to consider your lifestyle and the kinds of activities you plan to participate in. If you like to be on the go-visiting friends, attending entertainment and sporting events, taking classes-or travel a lot either for pleasure or business, you might need a different chair than if you prefer a more quiet life and enjoy being home most of the time. Along with the previous lists, make one that includes:

" Hobbies and activities for which your chair will be a consideration.

" Relevant information about any "homes away from home." If you like to hang out at your best friend's place, you want to make sure you can fit through those doors, too.

" The importance of the appearance of your chair to you. Do you see yourself in something sporty? Eye-catching? Or do looks not matter much to you?

" Your preferred level of physical activity. Do you like to get lots of exercise, or as little as you can get away with?

Manual Wheelchair Maintenance

Maintaining your wheelchair is just as important as maintaining your car. Learning how to care for your chair can give you peace of mind.

Wheelchairs are a little like cars -- if they have tune-ups at regular intervals, you can extend the life of your wheelchair while reducing overall

repair costs. Oftentimes, you will be the first to notice any problems or changes in the functionality of your wheelchair.

That's why you should be responsible for the maintenance of your wheelchair.

Fortunately, it is not complicated for you to service many parts on your manual wheelchair. To help yourself in the long run, develop a regular preventative maintenance routine, which involves cleaning, inspecting and adjusting all critical components of your wheelchair and seating system. Start by wiping down your wheelchair with a clean, damp rag on a regular basis. Applying car wax to the wheelchair frame can make it easier to perform routine cleanings.

If you are a child or young adult, you can learn to do some things such as clean the wheelchair and make sure that your bolts are tight. A rider who has limited upper arm strength should ask for help from a family member or other caregiver.

Check no less than once a month for loose nuts and bolts

The owner's manual is a critical resource that holds important information regarding which parts of your wheelchair are warranted and for how long, how to take care of your wheelchair, and which tools are necessary to maintain your the wheelchair. When you receive your new chair, make sure you keep your owner's manual in a safe place for future reference!

Tools are a worthwhile investment that can save a lot of money in the long run. A few must haves include: Allen wrench set (English and/or metric if your wheelchair contains European components), adjustable wrench, flat and Phillips head screwdrivers, spoke wrench, and a tire repair kit. Along with the tools, a pouch, bag or container should be purchased that can be used to carry them on the wheelchair in case of an emergency.

Performing routine wheelchair maintenance may give you a sense of confidence in its performance, safety and reliability. Here are suggested maintenance tasks that every wheelchair owner should follow:

" **Nuts & Bolts:** Check no less than once a month for loose nuts and bolts. Do not substitute damaged nuts and bolts with those of alternative grades and configurations. For example, a number label on the head of the bolt signifies how strong it is - the higher the number the stronger the bolt. Only replace bolts with those of the same grade or strength rating. Also, do not replace a lag bolt (partly solid/partly threaded) with an all-threaded bolt (screw).

" Check that legrests, footrests, armrests, and backrests can be released (if originally designed to do so!) and put back into place with ease.

" If you have a folding wheelchair, ensure that it opens and folds easily. The folding mechanism requires lubrication (consult with the owner's manual for the type of lubricant to use) at least one a year -- more if you live in a humid or wet climate.

" All pivot points on the chair need to be lubricated, such as where the front casters turn.

" Ball bearings will also need lubrication. However, most manual wheelchairs have sealed bearings or wipers to discourage water and dirt from damaging them. Bearings require special care and should be serviced by a trained specialist. Contact your wheelchair manufacturer for the closest specialist in your area.

" The wheelchair frame should be inspected for cracks, especially in areas that sustain significant stress, such as the cross-brace of a folding wheelchair and the caster housing. A crack can be a serious threat to safety and should be tended to immediately. The degree of repair depends on the location of the crack. A crack occurring at a junction point in the frame may be repaired via a simple welding procedure. On the other hand, the entire frame may need to be replaced. Consult with the owner's manual to find out which parts of the wheelchair are covered by the manufacturer, how long the warranty is good for, and about the service policy.

" Purchase a tube of "touch-up" paint from the manufacturer to cover up scratches and chipped paint.

Axles, Wheels and Tires

What you roll on is just as important as rest of your chair. Carefully check your axles, wheels, casters and tires.

" Quick-release axles allow quick removal of your wheels. These axles should slide through the axle housing smoothly and "click" into place, or if threaded (like a screw), should thread easily and latch properly. No squeaking, binding or excessive side-to-side motion should be present when rolling.

" Keeping the axle housing clean of debris can help ensure that it functions properly. This area is highly susceptible to dirt and mud build-up and should be cleaned once a week for the active user or on a monthly basis otherwise. Remove wheels and wipe off the axles with a clean cloth that contains just a few drops of oil on it. Also, try and clean the axle housings and around the bearings.

" Check your wheel alignment monthly. If your wheelchair tends to veer to one side while coasting, it could very well be that your wheels are out of alignment or that your spokes have become loose or damaged.

" Inspect your wheels weekly to ensure that spokes from the axle to the rim are intact, that rims are not bent and that your wheels are parallel to one another. A properly adjusted wheel may require the equipment and expertise of a specialist. A bike shop should be able to assist in repairing and making adjustment to your wheels.

" The front casters should be inspected and repaired in the same manner as the rear wheels. There should be no wobbling of the caster wheel, no excessive play in the caster spindle, and the caster housing should be aligned vertically.

" A common mechanical problem encountered with manual wheelchairs is the flat tire. Tires with pneumatic rubber tubes -- as opposed to airless foam or solid inserts -- require more maintenance. That's why you should learn how to change or repair a tube.

" If you are an active person who has frequent flats, patch it using a "patch kit" purchased from any local bike shop. This is an economical alternative to buying a new tube all the time. The kits include several rubber circular patches that are either glued over the hole or are self-adhering (the easiest ones to use).

" Be sure you have the right pressure in your tube as indicated on the side of the tire. Inflate the tube using a hand-pump (can be useful if away from home) or electric or regular bicycle pump.

" Check tire pressure once a week. A quick check method is to pinch the outer walls of the tire. It should be firm. Under-inflated tires can make it more difficult to push and maneuver the chair, cause the tires to wear faster, and prevent the wheel locks from seating properly against the wheel.

" Replace tires when the tread becomes worn, cracked, loose or when the side walls begin to bulge out when pumped with air. Check that wheel locks (brakes) are secured tightly to the frame and that they hold tires firmly in place and are easily activated. Make adjustments if they interfere with the tire while rolling as this can cause undue wear and tear.

Depending on how much you demand of your wheelchair will determine how often your maintenance routine should be performed. Climate, environment, and wheelchair type will also dictate how often a wheelchair needs serviced.