



Exercise for the Mobility Impaired

By Matt Hansen, DPT, MPT, BSPTS

No matter what physical limitations patients may have, some form of exercise can be performed. The key is to focus on what patients can do, rather than on what they can't.

Merriam-Webster medically defines mobility as “capable of moving or being moved about readily” (www.merriam-webster.com/medical/mobility). Its definition for exercise is “bodily exertion for the sake of developing and maintaining physical fitness” (www.merriam-webster.com/dictionary/exercise).

According to these definitions, anyone — mobile or not — can exercise, because exercise is not dependent upon mobility; it is only dependent upon exertion. Even so, most patients do not experience complete paralysis, and they possess at least some degree of mobility. Perhaps they walk with an assistive device such as a cane or walker. Maybe they use their arms and hands to push a manual wheelchair or drive a power chair. Assistive technology is amazing, and wheelchairs can even be adapted so that a patient can drive themselves from point A to point B by slightly moving their head or sipping and puffing on a straw-like tube. Although leg or arm movement may not be preserved in such cases, maintaining and strengthening the muscles that are involved in mobility (e.g., neck muscles, diaphragm and accessory muscles of respiration) are extremely important.

The key to exercise for the mobility impaired is for patients to capitalize on what movement they have while trying to improve areas of weakness. Think for a moment about the animal kingdom: Barnacles and other sea invertebrates don't ever move their entire bodies once they are anchored in place, but they certainly move what they need to when it's time to eat or reproduce; elephants can't jump, but they have a long reach. Several species of birds could get depressed about their inability to fly, but instead, they make the most of their strengths: penguins swim, ostriches run and turkeys ... well, turkeys taste good!

The point is: Patients should be helped to focus on what they can do or are beginning to do, and not on what abilities they have lost. Just about any exercise can be adapted to allow for someone with impaired mobility to participate. It may take some practice and a little bit of imagination to modify some activities; however, by learning and applying the following concepts, patients with impaired mobility will likely be surprised by how much they really can do.

Assistive Devices

No one would ever make the claim that Lance Armstrong isn't an athlete because he uses a bike, so why would anyone question whether someone who uses an assistive device can exercise? Unfortunately, many people,

including patients themselves, believe in the fallacy that someone who uses a cane, a walker, crutches or a wheelchair is disabled and incapable of exercising. The term “disabled” suggests that a person is not able to do anything; however, that's hardly ever the case.

The truth is a person typically uses much more energy to walk a given distance when they rely on an assistive device than someone who doesn't use one. A physically unimpaired person may have to run around the block to burn the same amount of calories or get their heart and respiratory rates up to the same level as someone using an assistive device could do by walking from the bedroom to the bathroom.

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If a patient uses an assistive device, they certainly shouldn't be discouraged and think that they are unable to exercise because they can't go very far or very fast; they simply may not need to! Assuming that a doctor or physical therapist hasn't limited the amount of walking (or pushing in a wheelchair) that a patient can do due to poor body mechanics, concerns for safety or overuse injury, or other complicating health conditions, the key is to do what they safely can do without exhausting themselves, and then try to do a little more the next time, always adhering to the same two rules: 1) safety first, and 2) avoid overexhaustion and/or debilitating pain. Maybe a patient starts out by walking 10 feet at a time, then 15, then 20, then 30, etc. That's all right. Remember Merriam-Webster's definition of exercise? If someone is performing “bodily exertion for the sake of developing and maintaining physical fitness,” they are exercising — whether that person is Lance Armstrong or the former First Lady Barbara Bush (now an 86-year-old woman with Graves' disease).

Gravity-Reduced or Partner-Assisted Exercise

Gravity has a considerable effect on movement. It keeps most people from being able to slam-dunk a basketball, but it also prevents us all from floating away. Whenever a

muscle shortens against gravity, it has to work harder to perform its action than when it is activated in some other plane. To illustrate this, think about — or try — using one of your legs to perform a one-sided snow angel or jumping jack motion (i.e., hip abduction) while lying on your back; alternatively, you can stand and hold onto the back of a chair or sofa with your hands and lift one leg out to the side. Now repeat the same motion while lying on your side and lifting your leg up into the air as if your body were imitating a pair of scissors (a la Jane Fonda). Do you notice a difference in difficulty? The same muscles are being targeted with each exercise; the variation is the position of the muscles' action in relation to gravity. Gravity has its

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greatest effect on movement when it is in direct opposition to it. The exercise performed while lying on your side was likely the most difficult of the three to perform, because the muscles are working to lift the leg straight up, while gravity is working to pull it straight down.

Any exercise that proves to be too difficult to perform against gravity should be able to be adapted so that gravity's effect is reduced. (The effects of gravity can never be eliminated except in a gravity-free environment like outer space.) The point is that if a patient is unable to perform a given exercise, they should try it in a different position (making sure to still maintain proper form) before determining that they "can't do it." Even when the exercise is still too difficult, there is another option: asking for help from a partner.

If I can't lift a piece of rehabilitation equipment from my van, I ask for help. If my wife can't carry our toddler and a bag of groceries at the same time, she asks for help. When people are unable to perform their exercises on their own, they should ask for help. My wife and I are still exerting ourselves even though we have asked for assistance; but we're also protecting ourselves from injury as we perform a task that is simply too much for us to do on our own.

Some patients aren't able to move the weight of their own limbs, regardless of the position, but again, that doesn't mean that they aren't able to exercise. The great thing about assisted exercise is that the person providing the support can adjust their involvement so that it's just enough for the patient to perform the task.

If a partner isn't available on a given day, a patient can perform isometric exercises (i.e., contracting the muscle without moving the body part). Most people have probably done this at some time or another — maybe as a teenager posing in front of the bathroom mirror and "flexing" your muscles like Arnold Schwarzenegger (I hope that I'm not the only one!). Those exercises can actually be beneficial. Choose a muscle to target, take a deep breath and contract the muscle for seven seconds as you slowly exhale through pursed lips. Rest for seven seconds and repeat three to five times.

Exercise in the Pool

Swimming is frequently recommended as an exercise for those who have difficulty moving on land, or at least moving pain-free, because of the physical properties of water. As you stand or float in a pool, your body weight presses down on the water and the water presses back, pushing you up. This characteristic is known as buoyancy. Buoyancy decreases the effects of gravity and can reduce perceived body weight by as much as 90 percent when immersed up to the neck in water. It challenges a patient to maintain body position and can also be used to assist or resist exercise. Actions that move toward the surface of the water (e.g., lifting the knee to walk or march in place) are made easier by buoyancy, while actions that move away from the surface of the water (e.g., extending the elbow) are made more difficult. Buoyancy can be increased further by using a life jacket, pool "noodle," kickboard or other tool.

Water also creates resistance. Water molecules are attracted to each other (a property known as cohesion) and form weak bonds that can easily be broken and re-formed again. Cohesion contributes to water's viscosity (i.e., resistance to flow), so that the body experiences opposition as it moves through it. The faster a body part moves through water and the greater the surface area of the body part in contact with the water, the more resistance is experienced. You can feel this the next time you are in the pool by submerging your arm and moving it slowly through the water, and then repeating the action while moving it quickly. Now move the arm through the

water again with the fingers together and the hand held parallel to the surface of the water; then do it at the same speed with the hand held perpendicular to the water's surface. You'll feel more resistance during the instances when the arm is being moved quickly through the water and when the hand is perpendicular to the water surface. These characteristics of water can be used to make an exercise pool session just about as difficult or as easy as you like.

Bicycling

Bicycling is another great aerobic and strengthening exercise that reduces strain on joints and connective tissue. If a patient isn't able to ride a bike on the road, there is no need to worry — there are plenty of stationary options to choose from to meet various needs. For example, a patient may choose to ride a standard stationary exercise bike, a spinning cycle, a reclined bike (which is generally considered to be less



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stressful on the back and positions the legs out in front of the patient instead of underneath them), an elliptical bike (which works the arms and the legs at the same time), an upper-extremity ergometer (i.e., hand bike), or even a motor-assisted bike.

Form a Plan

Physical exercise, particularly for someone with impaired mobility, is not just an exercise of the body, but

of the mind and the spirit as well. Exercise has been proved to be beneficial to a person's holistic health time and time again through abundant studies. However, everyone has to find their personal answer to the question: "Why is exercise important for me?" It's easy for patients to say "I can't," because they aren't currently able to physically perform at the same level as a close friend or family member. But if they can smile when thinking about the blessing that those people are in their lives, then they already can exercise one of the most important muscles in the body, the zygomaticus major ... you couldn't smile without it!

Just think how much more fulfilling and productive our lives can be when we focus on what we can do every day instead of what we can't — or at least imagine that we can't — do. Nobody has to go about it alone. Patients can form a plan with their doctor and/or physical therapist, ask their personal support network to get on board with them and get moving! 🗨

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