Exercise for CIDP

Individuals with CIDP can improve function and mobility by engaging in appropriate exercises for the upper and lower extremities.

By Matthew David Hansen, DPT, MPT, BSPTS

Anyone who has experienced local anesthesia or has had an arm or leg "fall asleep" knows how frustrating loss of feeling and/or impaired control of a body part can be, even for a short while. Our brains have an inherent desire to know the status of our body parts at all times. When something is preventing — or interfering with — the signals that travel through our nervous system to and from our brain, it can have a dramatic effect on our behavior and our ability to function.

Think about the last time that you were given a shot of Novocain before having dental work performed. Can you remember what you probably began doing even before you left the office? You might have run your tongue along the side of your mouth that was numb; rubbed, pinched or tapped your face; or even gently bit your cheek to see how hard you could squeeze before feeling something. Why? The impulse comes from our brains as they try to figure out what's going on and to regain control of the situation. But, drawing a comparison between a trip to the dentist and the symptoms experienced by someone with chronic inflammatory demyelinating polyneuropathy (CIDP) is by no means a fair association. However, it may help those who have never suffered from a neuropathy to have some concept of what is experienced day after day by someone who has.

What Is CIDP?

CIDP, commonly considered the chronic equivalent of a similar condition named Guillain-Barré syndrome, is a disease of the peripheral nervous system that is caused by an abnormal immune response that mounts an attack on myelin (a fatty covering that protects nerve fibers and allows for a signal to be relayed quickly). As a result of the lost myelin, the affected nerves respond weakly or not at all to stimuli, resulting in progressive muscle weakness, fatigue, loss of deep tendon reflexes and atypical nerve sensations (tingling, burning, numbness and/or pain). Symptoms are usually symmetrical and frequently cause difficulties with walking and the coordination of other movements. The autonomic nervous system also may be

involved, leading to complaints of dizziness when changing positions, heart symptoms and trouble with bowel and bladder function.

In most patients, the course of CIDP is slowly progressive; however, it is not uncommon for periods of recovery, lasting weeks to months, to occur between relapses. Although there is currently no known cure for CIDP, symptoms can be treated via corticosteroids to reduce inflammation, plasmapherisis to remove harmful antibodies from the blood, intravenous immune globulin (IVIG), immunosuppressant drugs (in some severe cases) and exercise. Early medical treatment is important to confine nerve damage to the myelin sheath and to prevent harm to the axons (nerve fibers) themselves.

How Exercise Can Help

Appropriate exercise is a vital part of any CIDP intervention plan because of its potential to improve strength and endurance, thereby minimizing muscle shrinkage and improving function and mobility. Understanding some of the recommendations that have emerged from scientific research for those exercising with a peripheral neuropathy can help to establish a proper program.

First, patients should always visit with their medical doctor before beginning an exercise regimen. This is an important principle for any population; however, it is even more essential for those with a peripheral neuropathy, because the wrong exercise parameters can actually make a bad situation worse rather than better. The possibility of the autonomic nervous system being involved also means that the body may not respond to exercise in a typical manner.

Second, patients shouldn't overdo it! The damage caused by CIDP to myelin, and the possible damage to axons, results in the body's ability to recruit fewer muscle fibers to perform a task. Consequently, those muscle fibers that are engaged are at greater risk of being overworked. Some soreness after exercise may be expected, but it should dissipate within 12 to 48 hours. If pain persists, is exaggerated or is coupled by a loss in strength, the patient likely did too much.

Submaximal exercise is frequently recommended for peripheral neuropathies.[2] A doctor and/or a properly trained physical therapist can help patients find the exercise prescription (frequency, intensity, time and type of activity, known as the F.I.T.T. principle) that is currently right for them. Low-impact exercises like walking, swimming, riding a recumbent bike or performing "open-chain" arm and leg exercises (without bearing weight through the extremity) might also be good alternatives to high-impact activities like running or jumping.

Third, patients need to be aware of their physical limitations. Activities that put them at undue risk of falling or other physical injury should be avoided. And, they shouldn't hesitate to ask someone to help, or at least accompany, them during their workouts.

Fourth, muscle strengthening and aerobic conditioning are important. Science has demonstrated that strength exercise programs can improve muscle force in patients with peripheral neuropathies.[1,3,4] However, it also has been shown that aerobic conditioning is important in combating fatigue and other impairments, particularly in the later stages of recovery.[1,3,4]

And last, patients should wait until a muscle can work against gravity before stressing it against additional resistance. Fortunately, under normal circumstances, myelin and peripheral nerve fibers can regenerate, with muscle control gradually returning as it does. However, with CIDP, residual damage is not uncommon and recoveries can take some time. Therefore, it is important to progress exercises in a systematic way in order to avoid overstressing muscles and joints.

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Choosing the Appropriate Level of Exercise

Those experiencing an immunological disease exacerbation probably find it difficult to imagine themselves exercising. The biggest hindrance may not be the weakness they are experiencing, but instead, the popular misconception that exercising means performing a workout à la Jane Fonda,

Billy Blanks or even Richard Simmons. The reality is that there are multiple levels of exercise difficulty, each as achievable and as genuine a workout for those to whom they are prescribed as a typical exercise video would be for a fully able-bodied recreational athlete. For CIDP patients, the following exercise progression levels can be used for particular exercises, but which level is appropriate will depend upon what the patient is ready for.

Passive exercise: Gentle movement of the body (usually the limbs) is performed by a properly trained individual, without effort on the patient's part. Passive movement can be beneficial for maintaining or improving blood circulation and range of motion. Thinking about the movement and trying to assist may also help to re-establish nerve connections in cases where actual damage has occurred to the nerve and regeneration is under way.

Active-assisted exercise: Assistance is still required from another person, but the patient is able to participate in movement to some degree. Actual activation of the muscle(s) is occurring; however, it is still not strong enough to move the limb independently.

Active exercise (gravity eliminated): Independent movement is possible in a gravity "eliminated" position, but not against gravity. For example, a patient may be able to lift their knee toward their chest (hip flexion) while lying on their side in bed (gravity eliminated position), but not while standing (against gravity).

Active exercise (gravity reduced): Movement is possible against some gravity, but not against its full pull. To use the same example of hip flexion, a patient may be able to bring a knee toward their chest while lying on their back (gravity reduced), but not while standing (against gravity).

Active exercise (against gravity): Movement is possible in all planes (including standing for hip flexion), but without additional resistance.

Resistive exercise: The highest level of progression, but also the most variable level, limited only by the potential of the conditioned human body to produce force. Resistance may take the form of weights, resistive bands, household items, one's own body weight, etc.

Lower- and Upper-Extremity Exercises

There are several upper- and lower-extremity exercises for some of the most important gross motor (large muscle) actions performed by the body. The figures in this article provide one example of the progression levels for each exercise. These exercises also can be performed while patients are lying on their back, stomach, sides, sitting and standing.

Lower-extremity exercises. The lower-extremity exercises predominantly involve the hip, knee and ankle. Hip flexion (Figures 1-4) is the action performed when lifting the leg to walk forward or step up onto something. In addition to hip flexion, two other hip actions — extension and abduction — are fundamental to an individual's ability to walk and maintain balance.

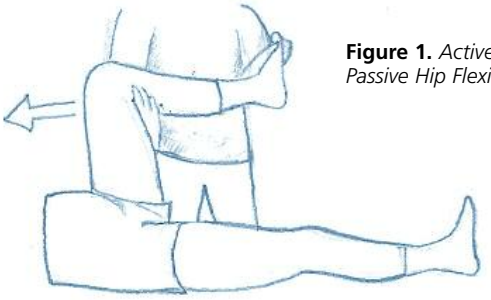


Figure 1. *Active-Assisted or Passive Hip Flexion*

Figure 2. *Active Hip Flexion while lying on your side (Gravity Eliminated)*

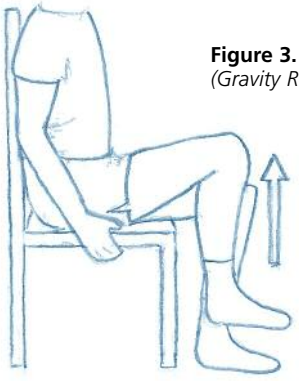


Figure 3. *Active Hip Flexion (Gravity Reduced)*

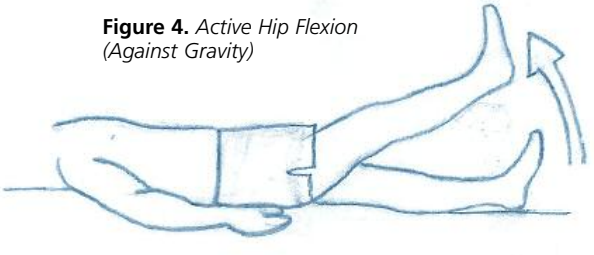


Figure 4. *Active Hip Flexion (Against Gravity)*

Hip extension (Figure 5) is the motion that helps to pull the leg back and propel the body forward after taking a step. Hip and knee extension also are needed to stand up from a chair, the floor or a squatting position, to jump or to climb stairs. For instance, an individual lifts their foot to the next step via hip flexion, but they progress, or pull, themselves up to the step via hip extension.

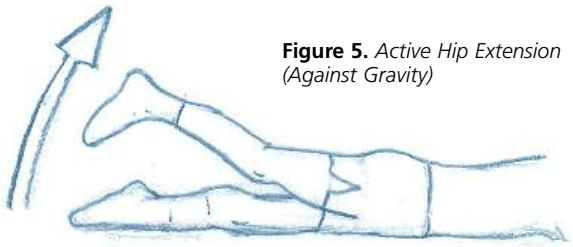
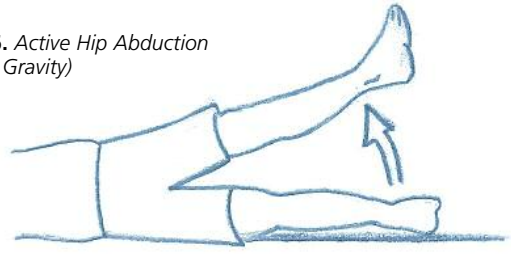


Figure 5. *Active Hip Extension (Against Gravity)*

Hip abduction (Figure 6) is most easily visualized as an open-chain exercise. However, the prime muscle of hip abduction, the gluteus medius, performs most of its work in a weight-bearing mode as a "closed chain" exercise when the leg may not even be moving. To experience this phenomenon, place an open hand over your hip; not the boney area at your waist line (that's part of your pelvis), but the area just below it. Now, if you are able to, lift the opposite leg (while stabilizing yourself against something with your free hand) so that you are standing on one foot. Did you feel anything happen under the hand that is placed over the hip? That's the gluteus medius contracting. If it didn't, your body would fall to the side of the leg that is being held up off of the floor.

Figure 6. *Active Hip Abduction (Against Gravity)*



Besides its use in standing, jumping and climbing, knee extension (Figure 7) also is the motion of kicking — perhaps not something that individuals still do every day, but it was probably more important to people at some time during their lives!

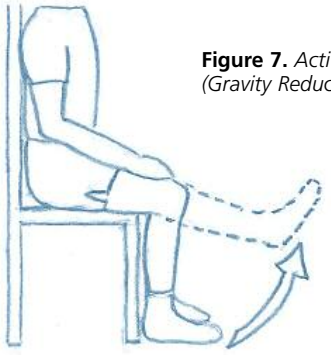


Figure 7. *Active Knee Extension (Gravity Reduced)*

The inability to dorsiflex the ankle/foot (Figure 8) is a frequent complication of peripheral neuropathies. The condition becomes especially troublesome when the toe drags or catches the floor when walking, causing a patient to stumble or making it impossible to advance the limb forward without using an assistive device and/or dramatically changing the way that they walk.

Figure 8. *Active Ankle Dorsiflexion (Against Gravity)*

Upper-extremity exercises. The upper-extremity exercises predominantly involve the shoulder, elbow and wrist.

Shoulder flexion (Figure 9) is the chief shoulder action used by individuals to reach for something in front of their body or over their head (such as shaking someone's hand or getting something down from a shelf).

Figure 9. *Active Shoulder Flexion (Against Gravity)*

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- **Administer IGIV products at the minimum concentration available and the minimum infusion rate practicable.**

INDICATIONS AND USAGE

GAMUNEX is an immune globulin intravenous (human), 10% liquid indicated for treatment of:

- Primary Humoral Immunodeficiency (PI)
- Idiopathic Thrombocytopenic Purpura (ITP)
- Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)

CONTRAINDICATIONS

- Anaphylactic or severe systemic reactions to human immunoglobulin
- IgA deficient patients with antibodies against IgA and a history of hypersensitivity

WARNINGS AND PRECAUTIONS

- IgA deficient patients with antibodies against IgA are at greater risk of developing severe hypersensitivity and anaphylactic reactions. Epinephrine should be available immediately to treat any acute severe hypersensitivity reactions.
- Monitor renal function, including blood urea nitrogen, serum creatinine, and urine output in patients at risk of developing acute renal failure.
- Hyperproteinemia, increased serum viscosity and hyponatremia occur in patients receiving IGIV therapy.
- Thrombotic events have occurred in patients receiving IGIV therapy. Monitor patients with known risk factors for thrombotic events; consider baseline assessment of blood viscosity for those at risk of hyperviscosity.
- Aseptic Meningitis Syndrome has been reported with GAMUNEX and other IGIV treatments, especially with high doses or rapid infusion.
- Hemolytic anemia can develop subsequent to IGIV therapy due to enhanced RBC sequestration.
- IGIV recipients should be monitored for pulmonary adverse reactions (TRALI).
- The product is made from human plasma and may contain infectious agents, e.g., viruses and, theoretically, the Creutzfeldt-Jakob disease agent.

ADVERSE REACTIONS

- **PI** – Most common drug related adverse reactions during clinical trials were headache and cough.
- **ITP** – Most common drug related adverse reactions during clinical trials were headache, vomiting, fever, and nausea.
- **CIDP** – Most common drug related adverse reactions during clinical trials were headache and fever.

To report SUSPECTED ADVERSE REACTIONS, contact Talecris Biotherapeutics, Inc. at 1-800-520-2807 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

DRUG INTERACTIONS

- The passive transfer of antibodies may interfere with the response to live viral vaccines.
- The passive transfer of antibodies may confound the results of serological testing.

USE IN SPECIFIC POPULATIONS

- In patients over age 65 or in any patient at risk of developing renal insufficiency, do not exceed the recommended dose, and infuse GAMUNEX at the minimum infusion rate practicable.
- Pregnancy: no human or animal data. Use only if clearly needed.

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Important Safety Information for GAMUNEX

Gamunex, Immune Globulin Intravenous (Human), 10% Caprylate/Chromatography Purified, is indicated for the treatment of primary humoral immunodeficiency disease (PI), idiopathic thrombocytopenic purpura (ITP), and chronic inflammatory demyelinating polyneuropathy (CIDP).

Immune Globulin Intravenous (Human) products have been reported to be associated with renal dysfunction, acute renal failure, osmotic nephrosis and death. Patients predisposed to acute renal failure include patients with any degree of pre-existing renal insufficiency, diabetes mellitus, age greater than 65, volume depletion, sepsis, paraproteinemia, or patients receiving known nephrotoxic drugs. Especially in such patients, IGIV products should be administered at the minimum concentration available and the minimum rate of infusion practicable. While these reports of renal dysfunction and acute renal failure have been associated with the use of many of the licensed IGIV products, those containing sucrose as a stabilizer accounted for a disproportionate share of the total number. Gamunex does not contain sucrose. Glycine, a natural amino acid, is used as a stabilizer.

Gamunex is contraindicated in individuals with acute severe hypersensitivity reactions to Immune Globulin (Human). It is contraindicated in IgA deficient patients with antibodies against IgA and history of hypersensitivity.

There have been reports of noncardiogenic pulmonary edema [Transfusion-Related Lung Injury (TRALI)], hemolytic anemia, and aseptic meningitis in patients administered with IGIV.

Thrombotic events have been reported in association with IGIV. Patients at risk for thrombotic events may include those with a history of atherosclerosis, multiple cardiovascular risk factors, advanced age, impaired cardiac output, and/or known or suspected hyperviscosity. Hyperproteinemia, increased serum viscosity, and hyponatremia may occur in patients receiving IGIV therapy.

Gamunex is made from human plasma. Because this product is made from human plasma, it may carry a risk of transmitting infectious agents, e.g., viruses, and, theoretically, the Creutzfeldt-Jakob disease (CJD) agent.

In clinical studies, the most common adverse reactions with Gamunex were headache, fever, chills, hypertension, rash, nausea, and asthenia (in CIDP); headache, cough, injection site reaction, nausea, pharyngitis, and urticaria (in PI); and headache, vomiting, fever, nausea, back pain, and rash (in ITP). The most serious adverse reactions were pulmonary embolism (PE) in one subject with a history of PE (in CIDP), an exacerbation of autoimmune pure red cell aplasia in one subject (in PI), and myocarditis in one subject that occurred 50 days post-study drug infusion and was not considered drug related (in ITP).

*CIDP=chronic inflammatory demyelinating polyneuropathy; PI=primary immunodeficiency; ITP=idiopathic thrombocytopenic purpura.

Reference: 1. Data on file. Talecris Biotherapeutics, Inc.

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Elbow flexion (Figure 10) is used to lift and carry (such as carrying a box) and to bring objects that are grasped closer to the body. It also is used to simply lift something to one's mouth to eat or drink.

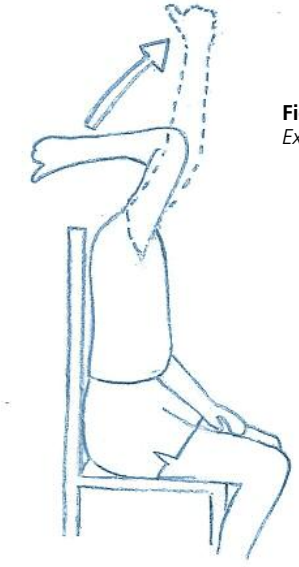

Figure 10. *Active Elbow Extension (Gravity Reduced)*

Elbow extension (Figure 11) straightens the elbow and gives individuals additional length to reach an object when shoulder flexion alone isn't enough. When functioning as a closed-chain exercise, elbow extension also is fundamental in helping individuals to push themselves up to a sitting or standing position. This exercise is especially helpful when trying to get out of bed without using the arms.

Figure 11. *Active Elbow Flexion (Resistive Exercise)*

There are also many fine motor (small hand muscle) exercises that can be performed to increase grip strength and improve precision handling of objects. For instance, the wrist extension (Figure 12) is a functional position used while eating, handwriting, keyboarding, driving, grasping objects and performing a number of other tasks.

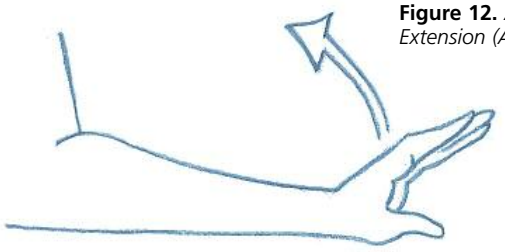

Figure 12. *Active Wrist Extension (Against Gravity)*

Tailoring the Program to Each Individual

The muscles targeted by the exercises presented in this article are just a few of the 640 skeletal muscles found in the body, but they are some of the most important to everyday function. While it's true that CIDP and other immunological diseases certainly can be disabling, appropriate exercise to improve strength and endurance can lead to better daily function. Individuals with CIDP are capable of doing a lot, and there is a level of exercise that's right for everyone! ◪

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