



Mobility/Movement After BI

Brain injury (BI) can affect the ability to move or control muscles. It's possible to not be able to move at all, only move one side or a part of the body, or may move involuntarily. Movement problems can lead to other problems, such as poor balance, muscle and joint stiffness, and difficulty walking.

Movement problems after BI can take many forms, depending on which part of the brain is affected and the severity of the injury. Below are explanations of some common movement difficulties that people with BI may experience.

Strength

- **Atrophy** is a decrease in muscle bulk or size usually due to inactivity. An atrophied muscle has typically lost some or all of its strength.
- **Neuropathy** is injury to a nerve resulting in weakness, numbness, and/or pain. The cause can be direct damage to a nerve or pressure that develops over a nerve. Muscles anywhere in the body can be affected. With neuropathy, a muscle will eventually atrophy and become weaker. At times, the nerve pathways are able to reform which can take many months.
- **Paresis** means weakness and loss of muscle tone in a particular muscle or part of the body. Damage to a particular area of the brain can cause weakness or paresis. There are several terms that describe paresis more specifically:
 - **Monoparesis** is weakness of just one arm or one leg.
 - **Hemiparesis** is weakness on one whole side of the body.
 - **Paraparesis** means both legs are weak.
 - **Tetraparesis** or quadriplegia is weakness of both arms and both legs.

Joint and Bone Changes

- **Contractures** can occur when muscles tighten over time or as a result of brain injury. Eventually, these tighter muscles can shorten permanently. When the joint's ability to bend or straighten all the way becomes limited by permanently shortened muscles, there is a contracture.
- **Osteoporosis** results in weaker bones as people age or are unable to do enough weight-bearing exercises with arms or legs. Activities such as standing, even passively in a standing frame, or walking are excellent ways to help prevent osteoporosis.

What You Can Do

- Encourage physical activity.
- Discuss how to best support activity and muscle/joint recovery with the rehab team.
- Splints or casts may also help and will be recommended by the rehab team if needed.

Muscle Tone

Normal muscle tone refers to the amount of “stretchiness” a healthy muscle has, and how much the muscle resists when someone tries to move or stretch it. A muscle with normal tone is not floppy or squishy – but it also isn't too stiff. Muscle tone is hard to describe, so ask your therapist to let you feel muscles with normal tone, too much tone, and too little tone.

- **Rigidity** is extreme tone of the muscles, or in other words, a muscle with very little to no stretch. This makes it difficult for the person to move, or for someone else to move the person's body.
- **Spasticity (hypertonicity)** refers to increased tone, stiffness, or contractions of muscles at varying degrees. Often the muscle is stretchy through part of the motion and stiffer through the rest. This can cause stiff and awkward movements. Medications may be prescribed to lessen spasticity.
- **Flaccidity (hypotonicity)** refers to a lack of tone. Muscles may be floppy or limp. It is important to support the limb. Consult your OT or PT for recommendations.

What You Can Do

- Talk to the OT and PT to learn more about how you can help with changes in muscle tone. The wrong kind of movement can make muscle tone worse.
- Sometimes injections or even surgery are recommended to lessen the effects of muscle tone.

Coordination Changes

- **Ataxia** refers to uncoordinated muscle movements. When a person with ataxia moves an arm or leg, it may look like the person has trouble “finding the target.” Often ataxia causes balance problems and can impact swallowing. Ataxia is frequently the result of an injury in the cerebellum.
- **Apraxia** is the loss of ability to perform purposeful movements. There may be an inability to use objects, even though there is no paralysis or sensory impairment. Sometimes a person with apraxia can do an activity automatically, but is unable to do the same activity if asked. For example, if handed a toothbrush a person may be able to brush his or her teeth, but may not be able to do so if just asked.
- **Movement Disorder** is a general term for involuntary movements or movements that a person cannot control. This can be caused by the brain injury itself or by side effects from medications and should be monitored closely. These can include tremors or other unusual movements.

What You Can Do

- Ask the rehab team about specific suggestions they may have regarding movement disorders and changes in muscle coordination. You will want to work on activities that are specifically designed by the rehab team.