

Spasticity in TBI

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Fact Sheet

Background Information:

Spasticity is a common finding in persons with upper motor neuron syndrome (UMNS) following moderate to severe traumatic brain injury (TBI). Strictly defined, spasticity is an abnormal velocity-dependent resistance to passive stretch due to altered neural control of the stretch reflex.¹ The term spasticity is often used more generally to refer to phenomenon of involuntary muscle over-activity in UMNS. Other elements of muscle over-activity in UMNS include muscular co-contraction, clonus, hyper-reflexia, dystonia, and flexor or extensor spasms.¹ This Fact Sheet addresses spasticity and muscle over-activity in people with TBI.

Spasticity can contribute to general stiffness, muscle and/or joint contractures, and pain which can negatively impact overall function and quality of life. It can result in adverse secondary health outcomes including falls, joint degeneration, and skin breakdown. In addition to its negative effects, spasticity can have benefits for people living with brain injury, including improved circulation, and substitution for muscle weakness to assist functionally with transfers and walking. Depending on the nature and location of the brain injury, spasticity can present focally in specific muscle groups, or globally. Early medical management of spasticity in acute TBI is often complicated due to sedating effects of common medications and more acute medical concerns (sympathetic storming, disorders of consciousness, etc).

There is a lack of sufficient data on the neurobiology of TBI-related spasticity, while spasticity in SCI and CVA is more studied and well-understood. Studies in animal models and humans suggest that the nature of the injury and underlying disease process can impact presentation and responsiveness to spasticity treatment. Therefore, treatment strategies may not be generalizable across various central nervous system disorders.²

Persons with TBI can experience fluctuation in spasticity depending on level of activity, time of day, A sudden increase in spasticity in a patient can be a symptom of a new noxious stimulus (full bladder, infection, pressure sore).³

Epidemiology/Statistics:

In 2014, there were approximately 2.53 million TBI related ED visits, and 56,800 TBI related deaths in the United States. In 2014, the leading cause of TBI was falls, accounting for 48% of all TBI-related ED visits. Falls disproportionately affect young children and older adults.⁴ It is estimated that 50%-80% of patients with moderate to severe TBI will develop spasticity following injury.²

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