

What is orthostatic hypotension?

Orthostatic hypotension (OH) is defined as a decrease in systolic blood pressure (sBP) of at least 20mmHg, or a reduction in diastolic blood pressure (dBP) of at least 10mmHg, upon the change in body position from a supine (lying) to an upright position regardless of the presence of symptoms ([Ringer et al. 2025](#)). Normally, the nervous system automatically constricts or dilates the blood vessels to balance blood pressure. However, this ability may become compromised after a SCI, and OH may be experienced.

Several studies have documented the presence of OH following SCI, particularly during the acute period of injury, but it can persist for many years ([Chelvarajah et al. 2009](#); [Cariga et al. 2002](#); [Faghri et al. 2001](#); [Mathias, 1995](#); [Sidorov et al. 2008](#); [Claydon et al. 2006](#); [Frisbie & Steele 1997](#)). Sitting or standing in physiotherapy is reported to trigger blood pressure decreases that are diagnostic of OH in 74% of people with SCI, and cause symptoms of OH (such as light-headedness or dizziness) in 59% of people with SCI ([Illman et al. 2000](#)). Thus, this may discourage people with SCI from participating in rehabilitation, creating the need for management methods.

What are the risk factors of orthostatic hypotension?

Many factors can contribute to OH. The low level of efferent sympathetic nervous activity and the loss of the vasoconstriction reflex following SCI are two major causes of OH. Decreases in blood pressure (BP) following the change to an upright position in individuals with SCI may be related to excessive pooling of blood in the abdominal viscera and lower extremities ([Mathias, 1995](#); [Claydon et al. 2006](#); [Krassioukov & Claydon 2006](#)). Additionally, regular movement of muscles pushes against blood vessels which help guide blood back to the heart. Hence, loss of muscle function in the lower extremities can cause blood to accumulate there. These mechanisms lead to a reduction of blood flow back to the heart and the rest of the body and present as OH.

Other causes of OH include low blood volume, low sodium levels in the blood, and deconditioning of the heart and blood vessels from extended bedrest ([Mathias, 1995](#); [Claydon et al. 2006](#); [Illman et al. 2000](#)). Those with a traumatic SCI may also be at a greater risk than those with a non-traumatic SCI ([McKinley et al. 1999](#)). The prevalence of OH is greater in patients with higher spinal cord lesions, and thus it is more common in people with tetraplegia ([Claydon et al. 2006](#); [Frisbie & Steele 1997](#); [Mathias, 2006](#)). Some evidence show that people with SCI produce more nitric oxide, a chemical that widens the blood vessels, which can result in a further decrease in blood pressure ([Vaziri, 2003](#)).

What are the signs and symptoms of OH?

OH may occur with or without the presence of symptoms. Common signs and symptoms include:

- Light-headedness
- Dizziness
- Fatigue
- Blurry vision
- Muscle weakness
- Fainting/ temporary loss of consciousness

How do I manage my patients with OH?

Management of OH consists of pharmacological and non-pharmacological interventions. Although a wide array of physical and pharmacological measures are recommended for the general management of OH (Kaufmann et al. 2006), very few have been evaluated for use in SCI. The general approach to managing OH is to implement therapeutic interventions incrementally, depending on the severity of symptoms (Kaufman et al. 2006). Non-pharmacologic measures alone are often insufficient to prevent symptoms of OH. Thus, pharmacological interventions are needed, particularly in SCI patients with moderate to severe OH symptoms.

Pharmacological Options

Only Midodrine (a drug that constricts the blood vessels to increase blood pressure) has some evidence supporting its use. There is evidence that Midodrine can elevate blood pressure and improve exercise performance ([Nieshoff et al. 2004](#)). Even so, the use of Midodrine should be monitored carefully as 2 males reported urinary bladder dysreflexia with its use ([Vaidyanathan et al. 2007](#)).

Non-Pharmacological Options

Functional Electrical Stimulation (FES) is a non-pharmacological treatment option for individuals with SCI. During FES, electrical impulses are sent to weak or paralyzed muscles, usually within the legs, which causes muscles to contract and helps move blood back to the heart and around the body. FES has been shown to be effective and can be used to supplement other forms of therapy, often exercise ([Chi et al. 2008](#); [Davis et al. 1990](#); [Raymond et al. 2001](#)). Studies have demonstrated that leg muscle contraction by FES allowed people with tetraplegia and OH to stand more often and for longer periods of time ([Elokda et al. 2000](#); [Sampson et al. 2000](#)).

Non-pharmacological options also include fluid and salt intake, pressure binders or stockings, whole-body vibration, electrical stimulation, and physical activities. However, studies looking at non-pharmacological options in isolation remain limited ([Frisbie & Steele 1997](#)).