

Spasticity in TBI

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Fact Sheet

The Role of Physical Therapy:

Physical therapists should assess the impact of patient's spasticity across ICF domains (body structure function impairments, activity limitations, and participation restrictions) and develop patient-centered goals to address each patient's specific needs. PT assessment of spasticity includes instruments such as the Modified Ashworth and Modified Tardieu scales. There is ongoing debate on the reliability and validity of these measures and how a patient's score may or may not accurately reflect a patient's walking ability.⁵ We recommend consulting ANPT [Core Outcomes CPG](#) and [TBI EDGE](#) documents for highly recommended outcomes measures.

Therapists should consider internal and external factors impacting each patient's rehab journey, including patient's mobility status, lived experience and perception of their spasticity, cognitive function, and social factors when developing treatment plans and goals.

Brain injury presents unique challenges for spasticity and tone management. A patient's cognition, behavior, memory, and caregiver support will impact the therapist's clinical decision making in choosing appropriate interventions. Optimal management of spasticity will likely be a multi-modal approach, involving various providers and interventions. As much as possible, physical therapists should work closely with the patient's medical provider of interventions such as oral or intrathecal baclofen, muscle relaxers, botulinum toxin injections, dorsal rhizotomies, tendon transfers, etc in order to maximize treatment outcomes.⁶

Common PT interventions for spasticity include low-load, long duration stretching, splinting, serial casting, electrostimulation, weight-bearing, functional activity training, and caregiver education. Other interventions under investigation include whole body vibration, focal muscle vibration, transcranial neuro-modulation, and extracorporeal shockwave therapy. These emerging interventions have been studied more extensively in other populations (SCI, MS, CVA), thus the generalizability to TBI is not well known.

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Research Updates:

1. 2 recent systematic reviews (Synnot et al 2017, Khan et al 2019) found low quality, limited evidence regarding management of spasticity in people with TBI. Neither review could make recommendations on effectiveness or harms of non-drug interventions with any certainty. Identified need for well-designed and adequately powered studies using functional outcomes measures to assess effectiveness of techniques used in clinical practice.^{7,8}
2. Recent experimental trial by Leung and colleagues found a contracture management program consisting of serial casting, botulinum toxin, motor training and splinting can be useful in improving ankle dorsiflexion range of motion; no functional outcomes were assessed as only 1 subject was ambulatory.⁹
3. Ambrose and colleagues emphasizes patient-centered, multimodal approach, focusing on spasticity's impact on function, and clear goal setting with patients and caregivers.⁶
4. Emerging interventions for spasticity include whole body and focal muscle vibration, extracorporeal shock wave therapy, and transcranial neuro-modulation. Most of these studies have focused on stroke, MS, or SCI populations; research is mixed on effectiveness.¹⁰⁻¹³

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