Therapeutic Interventions for Spasticity Management

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Financial Disclosures

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Objectives

By the end of this presentation, listeners should be able to:

1. Define spasticity
2. Understand therapeutic treatment options available for spasticity management
3. Confidently seek out the appropriate interventions/resources for spasticity management in a clinic near you
Spasticity Definition

Review

Spasticity is a motor disorder characterized by a velocity dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks, resulting from hyperexcitability of the stretch reflex, as one component of the upper motor neuron syndrome” (Lance, 1980).

Up to 50% of individuals with a BI will develop spasticity
Spasticity Presentations

- Hypertonicity (increased muscle tone, stiffness)
- Clonus (series of rapid muscle contractions)
- Reduced range of motion
- Spastic dystonia
- Hyperreflexia
- Muscle spasms
- Scissoring
- Clasp-knife phenomenon
Problems with Spasticity

Signs you should reach out to therapy

• Pain or discomfort
• Stiffness / reduced range of motion
• Abnormal limb posture
• Loss of dexterity
• Difficulty with dressing and hygiene
• Contracture formation
• Functional mobility becomes limited
• Increased loss of balance
• Fluctuations in tone
• Increased risk of heterotopic ossification
Spasticity isn't always a bad thing!

How spasticity can be of benefit

• Maintains muscle bulk
• Maintains venous return
• May assist in preventing DVT or osteoporosis
• Decrease of pressure ulcer formation
• Can provide stability with functional mobility
  • Standing
  • Sitting
  • Transfers
Therapeutic Interventions for Spasticity Management

What can rehab truly do to help?
Therapy Strategies

What can rehab professionals do in the clinic to help you?

• Continuous muscle stretch
  • Positioning
  • Stretching
  • Splinting
  • Casting
• Modalities – FES and NMES
• Activity based therapies
  • Locomotor training
• Weight bearing / standing frames
• Aquatic exercise
• Dry needling?
Continuous Muscle Stretch
Positioning & Weightbearing

• Standing
  • Standing Frames
  • Improves extension of leg and trunks muscles

• Prone (lying face down)
  • Improves extension of leg muscles
Continuous Muscle Stretch
Positioning & Weightbearing: Standing frame devices

Benefits
• Improve/maintain range of motion
• Decrease joint/muscle contractures
• Manage atrophy of trunk and leg muscles
• Improve strength of trunk and lower extremities
• Decrease muscle spasms
• Promote proper muscle and skeletal development
• Improve/maintain bone integrity
• Manage pressure by changing positions
• Improve bowel function and regularity
• Aid bladder function
• Strengthen cardiovascular system and build endurance
• Improve circulation
Continuous Muscle Stretch

Stretching

Goal:
1. **Prevent** loss of sarcomeres (the part of the muscle that causes contraction)
2. **Reduce** buildup of connective tissue, minimize changes in length-tension relationships
3. **Reduce** muscle atrophy

Common parameters: stretching
**5-7 days/week for 30-120 minutes per day**
Continuous Muscle Stretch Splinting

- Resting hand and ankle splints
- Leonard boots
- Benik anti-Spasticity splint
- Kinesiotape to digits
Continuous Muscle Stretch
Serial Casting

Rationale: reduces excitatory input of muscle spindles by holding them in a fixed position, thus preventing changes in muscle length or contracture formation

• Allows for gradual increase in angle of stretch and development of more sarcomeres

• Traditionally applied following Botox injection to enhance the effects of Botox
  • Most common parameters: casting 1-3x/week for 4-6 weeks
  • Wear cast for 1-2 weeks at a time, followed by therapist assessing and re-casting to further the stretch
Modalities/Activity-Based Therapy

Functional Electrical Stimulation (FES)

**Functional Electrical Stimulation**

**Rationale:** Combines neuromuscular electrical stimulation with repetitive, passive rhythmic movement

- **Recommended use:** *3-4 days per week for 45 minutes-2 hours*
  - Upper and lower limb cycling (FES Cycle)
  - Bioness
    - ankle, thigh, and forearm cuff
    - Allows arm or leg to move appropriately during a specific functional activity (walking on different surfaces, reaching, grasping, pinching, cycling)
Neuromuscular Electrical Stimulation

**Rationale:** Surface NMES delivers a train of interrupted pulses that stimulate axonal terminals and results in muscle contraction for the purpose of muscle re-education or strengthening

- Can stimulate up to 6 muscles on each side of body at once
- **Stimulation works with pre-programmed activities**
  - Gravity-eliminated strengthening
  - Transfers
  - Walking
Activity-Based Therapy

Locomotor Training

**Rationale:** repetitive motion activates afferent (sensory) inputs to activate inhibitory mechanisms in the spinal cord in a repetitive, cyclic fashion

**Activity dependent plasticity:** repetitive practice of walking can induce neuroplastic changes in the neurologic system, thus, improving the act of walking
Community Resources

Spasticity Clinic

Through the Physical Medicine & Rehab clinic at OSU there are 4 providers that provide spasticity management. A referral from neurology or PCP is needed to schedule with this clinic.

The number to call for scheduling: 614-366-9211

• Sheital Bavishi, MD
• William Pease, MD
• Sarah Grove, DO
• Albert Clairmont, MD
Neurologic-specific therapists at OSU are trained in the assessment and treatment of spasticity. A referral from your physician (typically neurologist or PCP) is needed to schedule with our clinic.

The physical and/or occupational therapist(s) will
- Evaluate your spasticity
- Assist in determining the most appropriate management strategy
- Assist in obtaining equipment (standing frames, FES cycle, braces/orthotics, etc.)
- Teach you how to manage your spasticity independently
Thank you!
Any Questions?