Does your spasticity . . .

- help or limit your walking?
- make it difficult to breathe or take a deep breath?
- help or hinder your ability to get in and out of bed?
- cause pain?
- Affect your posture in a good way or bad way?

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SPASTICITY:
THE GOOD, THE BAD, AND THE NOT SO UGLY

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Our Disclaimer

We report no commercial relationship with any of the mentioned products or equipment. We have posted links and mentioned brand names as a means of examples.
PROS AND CONS OF SPASTICITY

Pros
• Increases function
• Maintains tone/muscle bulk
• Increase in venous return

Cons
• Decreases function
• Poor positioning in wheelchair, in sitting, or in standing
• Impairs respiration
• Pain
• Difficulty with managing hygiene
• Impairs sleep
• Impairs skin
NON PHARMACOLOGIC INTERVENTIONS

- Stretching
- Strengthening
- Weightbearing/Standing
- Whole Body Vibration
- Splinting
- Thermal Modalities
- Electrical stimulation
Why it works

• Temporary reduction in muscle tone

• Mechanical changes at the muscles and tendons

• Last several hours
If you tend to flex when you spasm – stretch your front muscles

- Biceps
- Pectorals
- Abdominals
- Wrist flexors
- Hands
- Hip flexors
- Hamstrings
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STRETCHING – WHAT TO STRETCH

If you tend to extend when you spasm – stretch your back muscles

- Scapula/shoulder blades
- Low back
- Hands
- Quadraceps
- Calf
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STRETCHING - TYPES

- Passive versus active
- Low amplitude/longer duration versus higher amplitude/shorter duration
Why it may work

• Exercising the opposing muscle will inhibit the spastic muscles

• Exercising the “spastic” muscle may actually decrease the excitability

• Most of the studies are from stroke and brain injury research
American College of Sports Medicine Guidelines:

- 60-80% of 1 rep maximum
- 3 sets 12 reps maximum
- 3 times a week for a minimum of 6-12 weeks
- Incorporate functional positions

Why it may work

• Prolonged stretch to muscles that become tight primarily calf muscles, hip flexor muscles, and abdominal

• Possibly decreases the excitability of the over spastic muscles

May last until the next day – benefits are greater than stretching alone
WHOLE BODY VIBRATION
WHOLE BODY VIBRATION

Why it may work
- “Vibration paradox” – inhibitory and excitatory qualities
- Last 6-8 days in people with incomplete spinal cords injuries

Dosing
- 3 days per week for 4 weeks
- 45 second bouts with a 1 minute rest break x 4 reps (studies range from 30-60 second bouts)
- Vibration frequency varies (20-100 Hz).
- It is unclear how much (frequency) and how long (duration) may be therapeutic.
WHOLE BODY VIBRATION

http://powerplate.com/

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SPLINTING

Why it may work
- provides prolonged muscle stretch
- allows joint position that does not elicit spasm
- prevent contracture
DYNAMIC SPLINTING

http://www.dynasplint.com/

http://www.bristolneurophysio.co.uk/services/saeboflex

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Why it may work

• Cold
  • Causes slowing of nerve conduction
  • Decrease muscle spindle activity
  • Decrease CNS excitability
  • Dose ~20 min, duration <1 hour
  • Protect skin
Why it may work

- Heat
  - Increases blood flow which can increase O2 and nutrients to muscle
  - Dose 20 min
  - Protect skin
- Examples
  - hot packs, hot bath, paraffin
ELECTRICAL STIMULATION

Why it may work

- Stimulation to antagonist muscle
- Stimulate tetanic contraction to spastic muscle
- Alternating stimulation to agonist/antagonist

TENS

- Decrease excitatory impulse to spastic muscle

Leg and arm ergometry with electrical stimulation
EXAMPLES

http://www.bioness.com/Products/H200_for_Hand_Paralysis.php

http://www.nchpad.org/VirtualTour/MotomeDDemo3.html

http://www.restorative-therapies.com/rt300-legarm


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THE “OTHER” INTERVENTIONS

Hydrotherapy
Repetitive TMS
Massage
Acupuncture
Hippotherapy
Taping
Lycra garments
Ness and Field Fote. Effect of whole-body vibration on quadriceps spasticity in individuals with spastic hypertonia due to spinal cord injury Restorative Neurology and Neuroscience 2009