
# What is spasticity?

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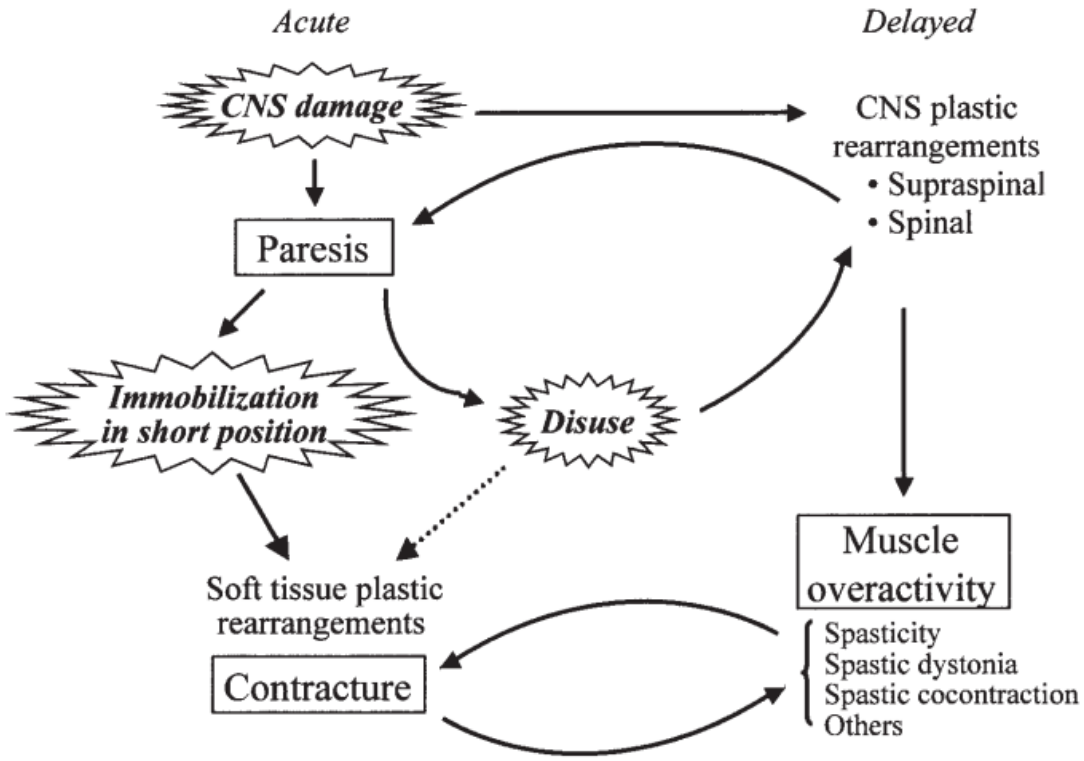
# Spasticity - definition

- A part (positive feature) of Upper Motor Neuron Syndrome (UMN)
- Muscle overactivity = involuntary muscle activity
- A poorly understood condition which causes stiff or rigid muscle
- Can range from mild stiffness to severe painful spasms
- „A motor disorder characterized by a velocity dependent increase in tonic stretch reflexes"




*Gracies JM. Muscle Nerw 2005; 31: 552-571*

# Spasticity

- Major disabling symptoms after cerebral and/or spinal injury
    - **Stroke**
    - Cerebral palsy
    - Traumatic brain injury
    - Spinal cord injury
    - Multiple sclerosis
    - Brain tumour
    - Spinal tumour
    - Familial spastic paraparesis (Hederitary spastic paraplegias = HSP)
    - Encephalopathy
    - Encephalitis

# Post-stroke spasticity (PSS) - epidemiology

- After a stroke, signals from the brain that normally allow muscles to relax can be blocked, causing the muscles on the stroke side to tighten and spasm
- Common symptom after stroke ~ 30% of patients
- 39,5% of stroke survivors with paresis – almost 10% of which developed severe or disabling spasticity
- Can affect any muscle, but primarily affects:

- the elbow (79%)

- the wrist (66%)

- the ankle (66%)

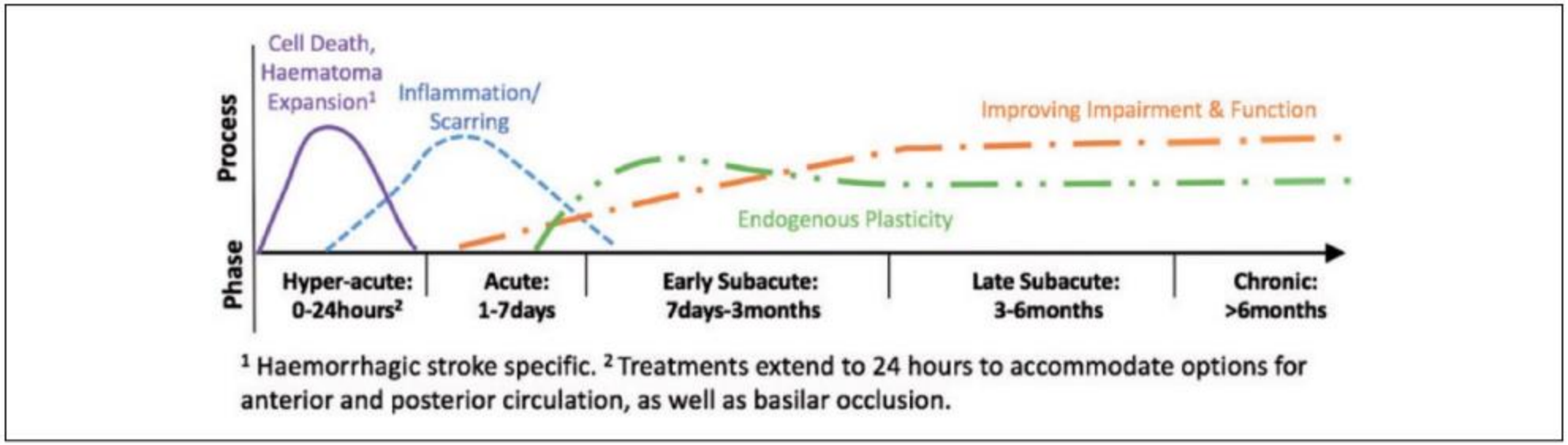
- Can change from day-to-day

*Wissel J et al. J Neurol 2010; 257: 1067-1072*

# Post stroke recovery – spasticity development

- Spasticity can appear in the first few days after a stroke or show up weeks, months or even years

Spasticity development




[1] Haemorrhagic stroke specific. [2] Treatments extend to 24 hours to accommodate options for anterior and posterior circulation, as well as basilar occlusion.

*Wissel et al. Neurology 2013; 80: S13–19*
*Wissel et al. PMR 2015; 7: 60–67*
*Bernhardt et al. Neurorehabil Neural Repair 2017; 31: 793–799*

# How common is spasticity?

- Incidence of PSS - about 25% to 43% of stroke survivors will have spasticity in the first year after their stroke
- It’s more common in younger stroke survivors

- Predictors for PSS:

- development of increased muscle tone
- sensory impairment
- haemorrhagic stroke
- stroke in younger age
- severe paresis
- lower Barthel Index

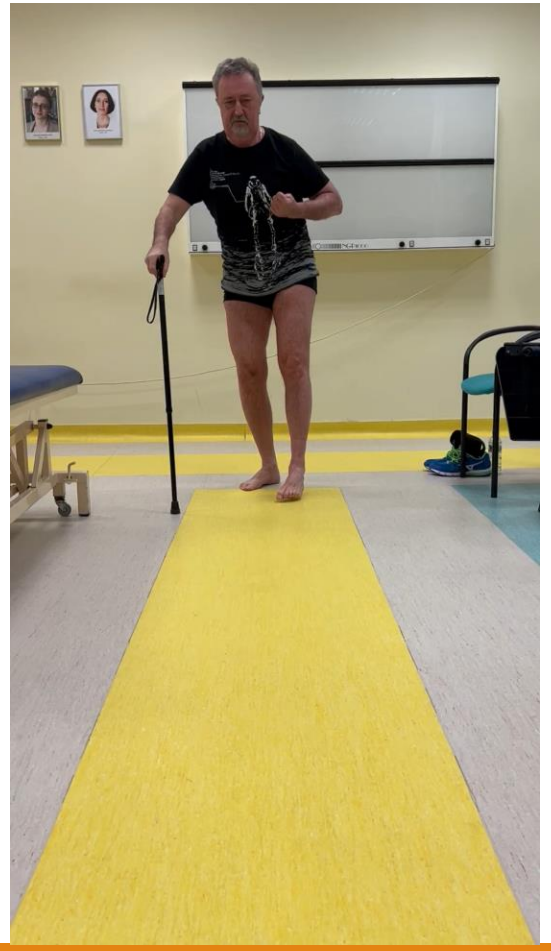
# Spasticity – signs and symptoms

- Increased reflexes
- Increased muscle tone / stretch induced muscle activity
- Muscle spasm
- Clonus – repeated muscle contractions
- Limited range of motion of joints
- Impaired voluntary movement
- Abnormal movement patterns and co-contractions

# Spasticity – clonus

# Spasticity – impaired voluntary movement

# Spasticity – abnormal movement patterns and co-contractions

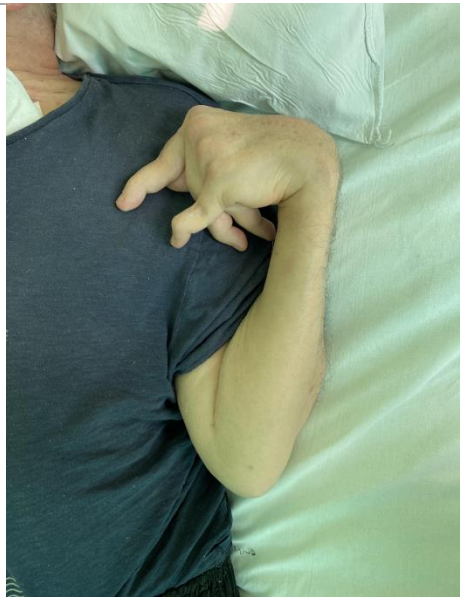


# Abnormal posture – common patterns for UL

- **Adduction and internal arm rotation** (arm in a folded position pressed against the chest)
- **Elbow flexion** (bent elbow)
- **Forearm pronation**
- Wrist flexion
- **Clenched fist** (tight fist)
- Finger flexion (curled fingers)
- Thumb in palm
- Intrinsic plus hand

PM R 9 (2017) 136-148

# Abnormal posture – common patterns for UL



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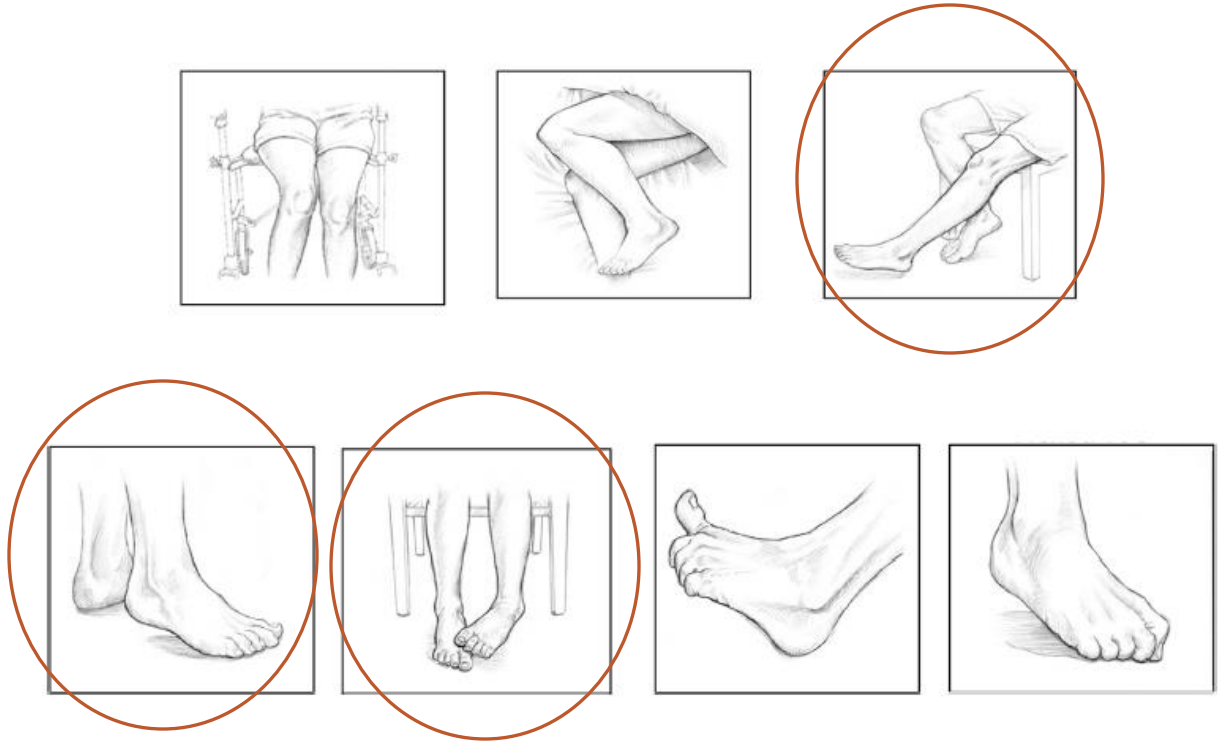
# Abnormal posture – common patterns for LL

- Flexed hip
- Adducted thigh
- Flexed knee
- **Stiff knee**
- **Equinovarus foot**
- **Pointed foot**
- Striatal toe
- Hammer toes (curled toes)



PM R 9 (2017) 960-968

# Abnormal posture – common patterns for LL

# Problems with spasticity

- Functional limitations
- Pain
- Fatigue
- Inconvenient involuntary motion
- Contractures (fixed joints, in which muscles shrink and shorten, and joints can be stuck in one position and hard to move)
- Skin macerations
- Poor self-image

# Problems with spasticity

- When spasticity limits activity, it often can cause other problems
- Social isolation
- Depression
- Bed/pressure sores
- Infections: pneumoniae
- It can make difficult to: clean, dress, move around, interfere with sleep
- Stiff joints can seriously impact daily living

# Community effects of post-stroke spasticity

- One of the top three bothersome post-stroke condition:

- Paralysis

**- Spasticity**

- Fatique

- Untreated – increases healthcare costs by as much as 400%

- Severe spasticity increases the likelihood of living in an institution because of the difficulty of attending to the activities of daily living

# Spasticity and QoL

- Decreased range of motion -> contractures -> functional disability
- Decreased mobility
- Participation restriction
- Increased pain
- Painful spasms and clonuses
- Depression
- Sleep disturbances
- Difficulties in basic nursing care (eg. dressing, cleaning, bedside transfer)
- Difficulties in rehabilitation
- Sexual dysfunctions

# Complications of spasticity

- Pressure ulcers (skin breakdown for those who are immobile or experience post-stroke incontinence)
- Skin irritation due to spasms
- Carpal tunnel syndrome
- Permanent soft tissue contractures
- Flexed deformities of limbs
- Osteoporosis -> increased risk of bone fracures
- Progression of disability
- Infections

# Soft tissue contracture


# Take home message…

- Severe spasticity can lead to progression of disability
- should be treated – always when spasticity is harmful
- The best results of treatment and care when teamwork/good cooperation of:

- patient
- caregiver
- doctor
- therapist

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*Fot. gdlugosz.com*