

AN UPDATE ON SPASTICITY MANAGEMENT

ADULT POST-STROKE SPASTICITY

Presented by: Paul J. Stacey Hons MBBS, MSc, FRCP
Physical Medicine & Rehabilitation



COMPLICATIONS FOR THE COMPLEX STROKE PATIENT

DISCLOSURE

- I have no financial relationship with any commercial interest related to the content of this activity
- No conflicts of interest to disclose

LEARNING OBJECTIVES

- **Recognize** the various patterns of spasticity and the common conditions that cause it
- **Acquire** the knowledge to identify and differentiate spasticity from other causes of increased muscle tone and joint rigidity
- **Assist** the learner with recognizing key points of spasticity management pertinent to their respective field(s) of practice
- **Identify** the health care providers/services that can help manage spasticity and how best to work with them

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POST-STROKE SPASTICITY PREVALENCE

ESTIMATES RANGE: 17% – 43%

- Watkins et al. (2002)¹ reported a **39% prevalence** of PSS at 12 months after a first-ever stroke (n=106)
- Sommerfeld et al. (2004)² reported a **19% prevalence** at 3 months post-stroke (n=95)
- Urban et al. (2010)³ reported **42.6% prevalence** at 6 months after a first-ever ischemic stroke (n=301)

1. Watkins, et al. (2002). Prevalence of spasticity post stroke. *Clinical Rehabilitation*, 16(5), 515-522.
2. Sommerfeld, et al. (2004). Spasticity After Stroke Its Occurrence and Association With Motor Impairments and Activity Limitations. *Stroke*, 35(1), 134-139.
3. Urban et al. (2010). Occurrence and Clinical Predictors of Spasticity after Ischemic Stroke. *Stroke*, 41(9), 2016-2020.

TIMING AND PREVALENCE OF POST-STROKE SPASTICITY

Study	N	Time After Stroke	Evaluation Method	Prevalence of Spasticity	Disabling spasticity
Lundström et al 2010	49	Up to 6 months	MAS (spasticity: MAS ≥ 1)	Spasticity: At 1 mo: 24% At 3 mo: 27% At 6 mo: 23%	At 1 mo: 2% At 6 mo: 13%
Sommerfeld et al 2004	95	Up to 3 months	MAS (spasticity: MAS ≥ 0)	Spasticity: 19%	
Wissel et al 2010	94	Up to 4 months	MAS (spasticity: MAS ≥ 0)	Spasticity: At 2 wks: 24.5% At 6 wks: 26.7% At 4 mo: 21.7%	Severe spasticity: 9.6% (MAS ≥ 3)
Urban et al 2004	211	Up to 6 months	MAS (spasticity: MAS ≥ 1)	Spasticity: 42.6%	Severe spasticity: 15.6% (MAS ≥ 3)
Watkins et al 2002	106	Up to 12 months	MAS ≥ 0 and TASS ≥ 0	Spasticity: 27% (single measure)	Combined MAS and TASS: 39%
Leisinger et al 2004	106	Up to 12 months	TAS (spasticity: TAS ≥ 0)	Spasticity: 36%	Severe spasticity: 30%
Lundström et al 2008	140	Up to 12 months	MAS (spasticity: MAS ≥ 1); mRS, BI	Spasticity: 17%	Disabling spasticity: 4%

MAS = Modified Ashworth Scale score; TAS = Tardif Assessment Scale score; BI = Barthel Index; mRS = modified Rankin Scale

Sommerfeld KS. *Curr Phys Med Rehabil Rep*. 2016; 4:182-185

PSS IN PATIENTS ADMITTED TO A STROKE UNIT

Table 1 Poststroke spasticity in patients admitted to a stroke unit

Study	N	Time after stroke	Evaluation method	Predictors of spasticity	Prevalence of spasticity
Opheim A et al. (2014)	117	Up to 12 months	MAS	Reduced sensorimotor function Reduced sensation	Spasticity at 3 and 10 days and 4 weeks, 24, 43, and 46 % of. At 12 months, 46 %
Wissel J et al. (2010)	94	Up to 4 months	Modified ashworth scale (Spasticity: MAS ≥ 0)	Moderate increase in muscle tone at baseline and/or first follow-up (MAS = 2), low Barthel Index at baseline, hemiparesis, involvement of more than two joints at first follow-up, and paresis at any assessment point	Spasticity: At 2 weeks: 24.5 % At 6 weeks: 26.7 % At 4 months: 21.7 % Severe spasticity: 9.6 % (MAS ≥ 3)
Urban PP et al. (2010)	211	Up to 6 months	Modified ashworth scale (Spasticity: MAS ≥ 0)	More severe paresis in the proximal and distal limb muscles had a higher risk for developing spasticity	42.6 % had developed spasticity at 6 months. A more severe degree of spasticity (Modified Ashworth Scale ≥ 3) was observed in 15.6 % of all patients

Sunnerhagen KS. *Curr Phys Med Rehabil Rep*. 2016; 4: 182-185.

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RISK FACTORS SIGNIFICANTLY PREDICTIVE OF PSS

Table 2 Risk factors significantly predictive of permanent poststroke spasticity [6*]

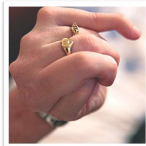
Risk factor	P value
Any paresis in affected limb	<0.001
MAS ≥ 3 in ≥ 1 joint within median 6 weeks poststroke	0.01
>2 joints affected by increased muscle tone	0.002
Hemispasticity within median 6 weeks poststroke	0.01
Lower Barthel Index score at baseline	0.002
More severe paresis at median 16 weeks poststroke	0.02

Additional Risk Factors:

- Increased tone MAS ≥ 1
- Hemibody Sensory Loss
- Younger Age
- Smoking
- Hemispasticity \rightarrow Permanent Spasticity

Wissel J, Schelosky LD, Scott J, Christie W, Faiss JH, Mueller J. Early development of spasticity following stroke: a prospective, observational trial. *J Neurol*. 2010;257(7):1067-72.

What Does Spasticity Look Like?



Presentation of Spasticity

Focal



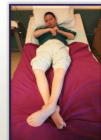
Multi-focal



Regional



Generalized



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PSS – FOCAL AND MULTI-FOCAL SPASTICITY



Examples of Focal Spasticity

Adducted/Internally Rotated Shoulder

- Shoulder stiffness and painful passive range of motion¹
- Severe adduction posturing and the resultant restricted and resisted motion hinder bathing, washing, deodorant application, and upper body dressing¹



Flexed Elbow

- May lead to skin maceration and breakdown¹
- Inability to reach and grasp objects¹
- Difficulty with dressing



Examples of Focal Spasticity

Clenched Fist/Thumb-in-Palm

- Fingers clasped into palm¹
- Inability to wash palm¹
- May lead to skin maceration and breakdown¹



Flexed Knee

- Overactive hamstrings can flex the knees or act posterior to the hip joints, causing the trunk to extend. As a result, seated patients with flexed knee tend to slide forward in their wheelchairs



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Examples of Focal Spasticity

Adducted Thighs

- Interferes with hygiene, dressing, and sexual intimacy^{1,2}



Equinus Foot Deformity

- Difficulty or pain wearing shoes¹
- May lead to skin breakdown and pain in fifth metatarsal head^{1,2}



Spasticity

- May be seen in:
 - Stroke
 - Cerebral palsy
 - Traumatic brain injury
 - Multiple sclerosis
 - Spinal cord injury
 - Acquired brain injury



Spasticity: Definition

A motor disorder characterized by a velocity-dependent increase in *muscle tone with exaggerated tendon jerks, resulting from the hyperexcitability of the stretch reflex* and is one component of the upper motor neuron syndrome.

Lance 1980

'Disordered sensory-motor control, resulting from an upper motor neuron lesion, presenting as intermittent or sustained involuntary activation of muscles'

Burridge 2005
