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Spasticity Management: Physical and Botulinum toxins

Dr Stephen Ashford

Regional Hyper-acute Rehabilitation Unit
Northwick Park Hospital
King's College London, Palliative Care, Policy, Rehabilitation

Twitter: @StephenAshford3
E-mail: stephen.ashford@nhs.net

Disclosure Statement

Stephen Ashford has an interest in outcomes development, evaluation and psychometrics. He has published on the use of Goal Attainment Scaling in this context, as well as standardised measures, such as the Arm and Leg Activity measures. These tools are freely available, and he has no personal financial interest in these measures.

He has received honoraria from Ipsen, Allergan (Abbvie), Merz, Danone and research grants from Ipsen, National Institute for Health Research, Dunhill, London North West Health, the Multiple Sclerosis society and the Association of Chartered Physiotherapists In Neurological rehabilitation.

Questions to address

- What treatment options to manage spasticity are available?
- What are the relevant physical treatments and under what circumstances should they be considered?
- What is the relevance of botulinum toxin treatment and under what circumstances should it be considered?

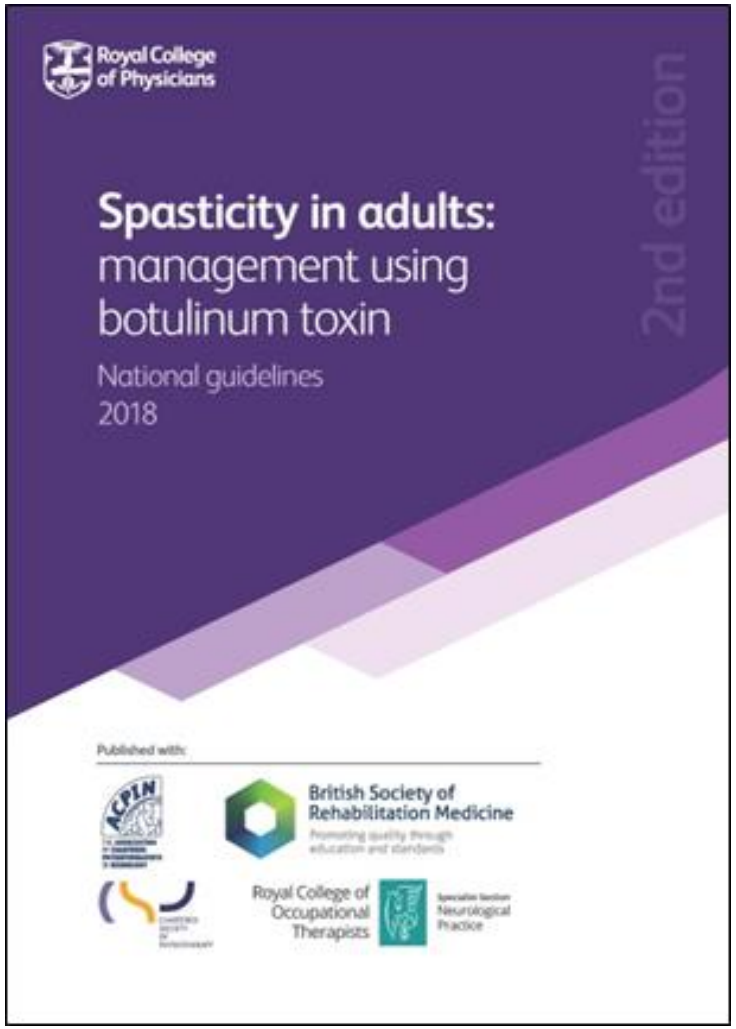
The topic is broad and the time short, so I am also happy to expand further on specific issues in questions or our panel discussion.

Spasticity in adults: management using botulinum toxin

Guideline Development Group:

Ashford S (Editor), Turner-Stokes L, Allison R, Duke L, Bavikatte G, Kirker S, Moore P, Ward A, Bilton D.

- Available at: http://shop.rcplondon.ac.uk/
- Free download at: www.rcplondon.ac.uk/spasticity-guidelines



Spasticity in adults: management using botulinum toxin. National guidelines. London: RCP, 2018.

Harmful effects of spasticity: World Health Organisation Classification (ICF)

ICF Level	Problem	Effect
Impairment	Muscle spasms	Pain Difficulty with seating and posture Fatigue
	Abnormal trunk and limb posture	Contractures Limb deformity Pressure ulcers/other tissue viability problems
	Pain	Distress and low mood Poor sleep patterns
Activity	Loss of active function	Reduced mobility and dexterity Difficulty with sexual intercourse Difficulty with continence
	Loss of passive function	Difficulty with care and hygiene Increased carer burden Difficulty with wheelchair seating or bed positioning
Participation	Impact of any/all of the above	Poor self-esteem / self-image Reduced social interaction Impact on family relationships Impact on work

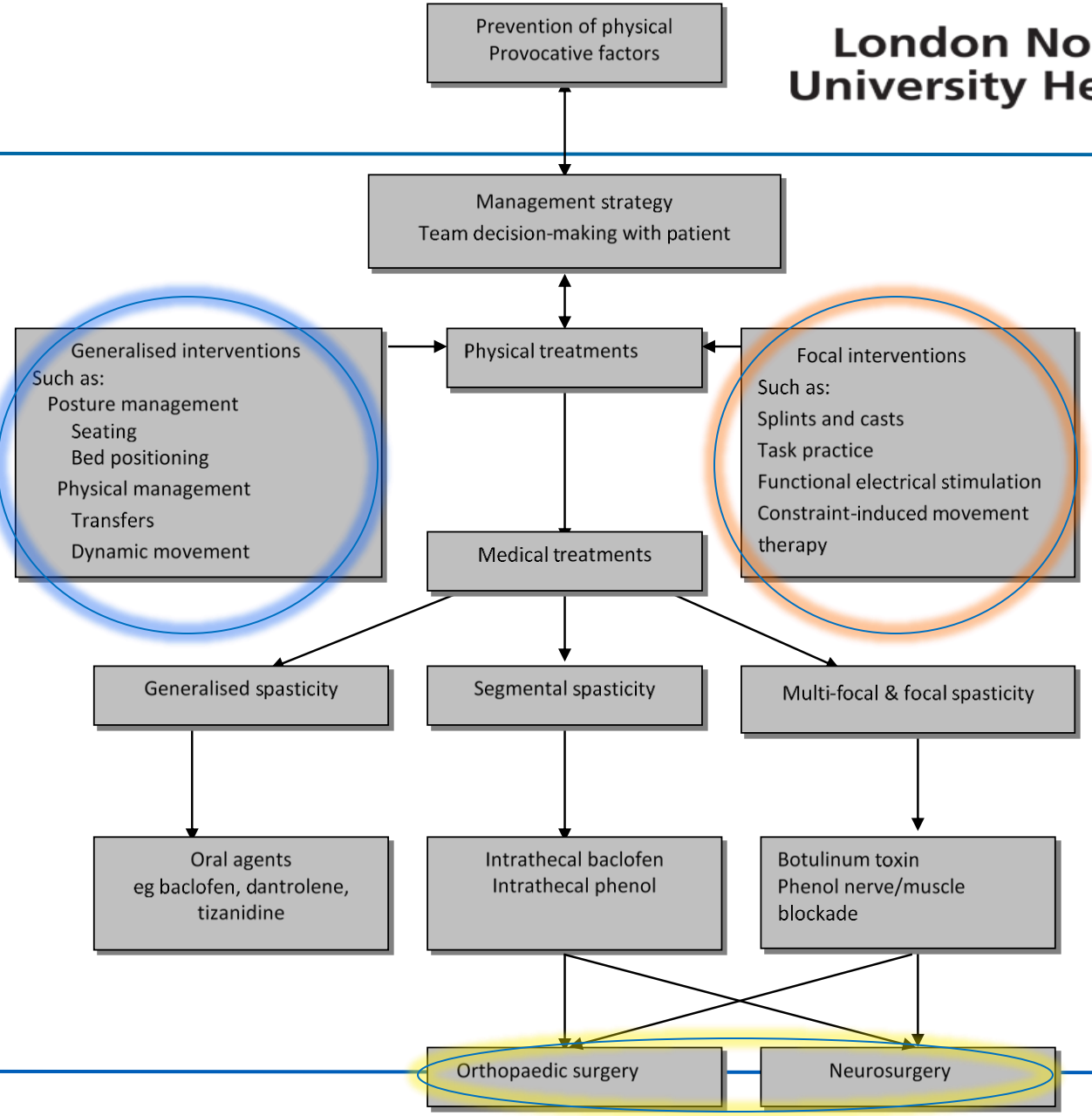
Spasticity in adults: management using botulinum toxin. National guidelines. London: RCP, 2018.

Spasticity treatment Algorithm

Postural management interventions

Focal physical interventions

Surgical interventions



Spasticity in adults: management using botulinum toxin. National guidelines. London: RCP, 2018

Physical Treatment and Management

Systematic review: Physical Treatment in Spasticity

Access to treatment challenging, people need knowledge e.g. Botulinum toxin and physical interventions

Evidence for task practice to improve motor control = reduced spasticity

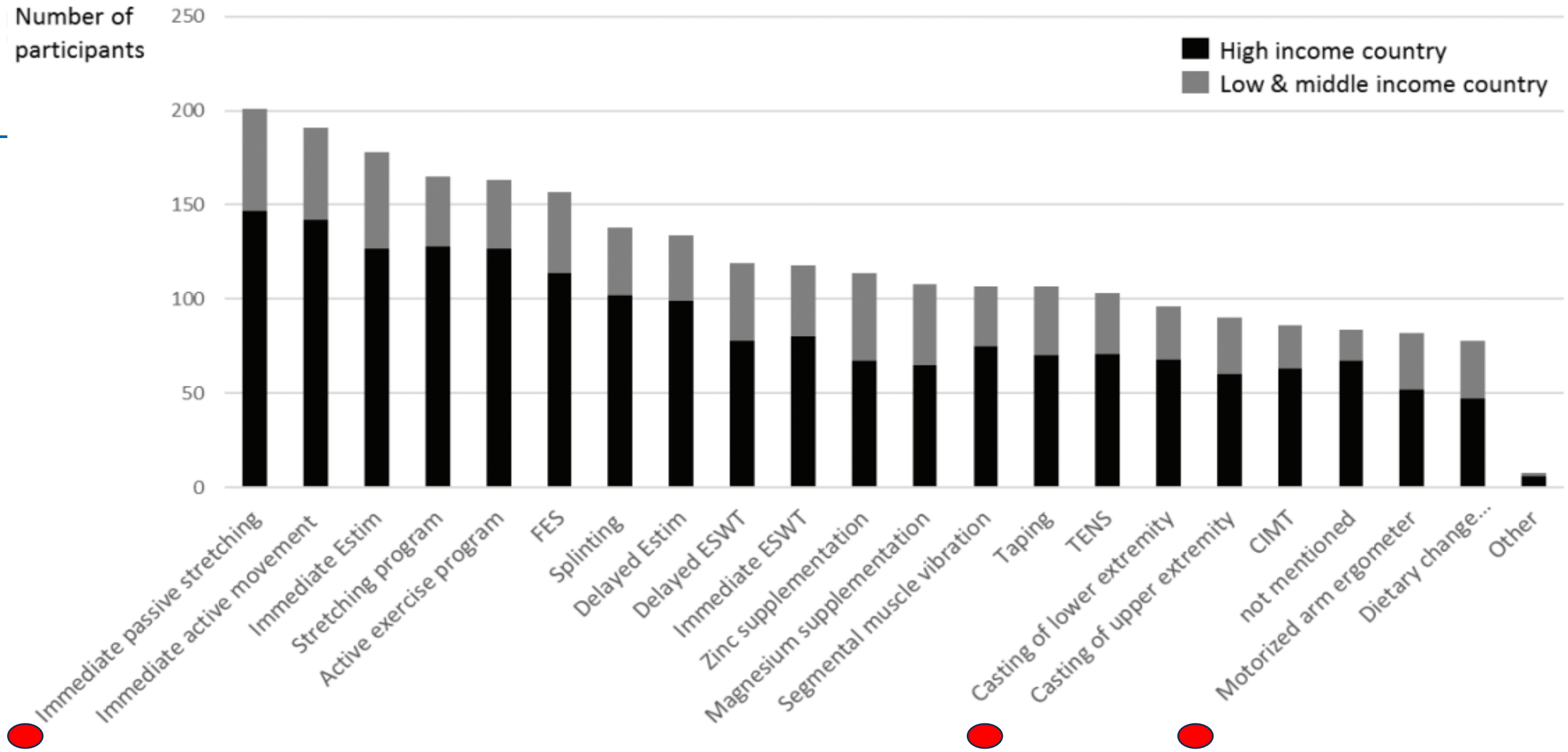
Evidence that strengthening does not increase spasticity

Stretch intervention to maintain muscle length. Limited evidence, but duration and method are key e.g. casting

	Adults
Education to patient, family and care-givers	
Treatment options	(3)
Benefits and risks	(4, 23)
Task practice	
Intensive task-specific training +/- CiMT	(3, 5, 31, 32)
Home-based - carer/family to provide over a prolonged period	(3, 31)
+/- orthosis	(20)
Strengthening	(3, 5, 18, 19, 31)[a]
Casting / splinting / orthosis	(3, 5, 20-23, 32)[a] (18) [NR]
Stretching	(3, 4, 31, 32)[a]
Electrical stimulation (post BoTN-A injection)	(3-5, 20, 31, 32)[a] (18)[NR]
Surgery	(4, 18, 21, 32)

NR: not recommended.
[a]Limited recommendation.

Gavin Williams, Barby J. Singer, Stephen Ashford et al (2020): A synthesis and appraisal of clinical practice guidelines, management of focal spasticity in adults and children, Disability and Rehabilitation, DOI: 10.1080/09638288.2020.1769207



Schillebeeckx, F., Mills, P. B. ., Ip, A. ., Schinwelski, M. ., Teixeira, J. E. M. ., Ashford, S. ., Bayle, N. . ., Chemello, E. ., Jacinto , J., Nayar, M. ., Suzigan, E. ., & Deltombe, T. . (2022). Worldwide Survey of Clinician Practice on use of Adjunctive Therapies Following Botulinum Toxin Injection for Spasticity. Journal of Rehabilitation Medicine, 54, jrm00320. https://doi.org/10.2340/jrm.v54.334

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Severity of ankle contracture

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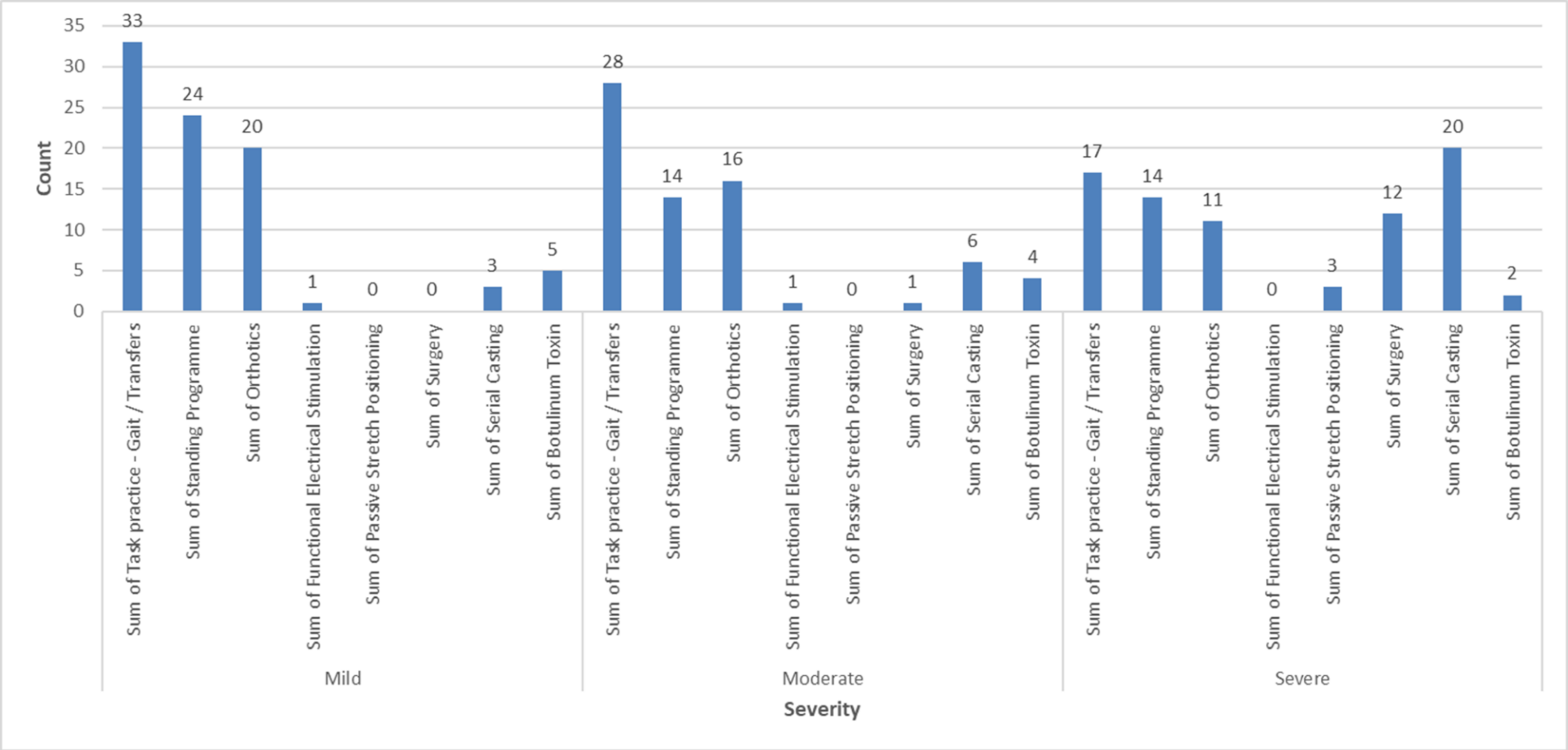
Based on range of movement

Mild, Moderate, Severe

Outcome:
All improved, the severe group improved most in:

A. Range of movement
B. Function – walking and transferring



Ashford, Stephen; Elsmore, Charlotte; Steed, Aideen; Diggins, Alexia; Walden-Smith, Alicec; Williams, Heather. Ankle contracture in people with acquired brain injury (ABI), intervention, and outcome following inpatient neurorehabilitation categorized by severity. Journal of the International Society of Physical and Rehabilitation Medicine:10.1097/ph9.0000000000000004, March 31, 2023. | DOI: 10.1097/ph9.0000000000000004

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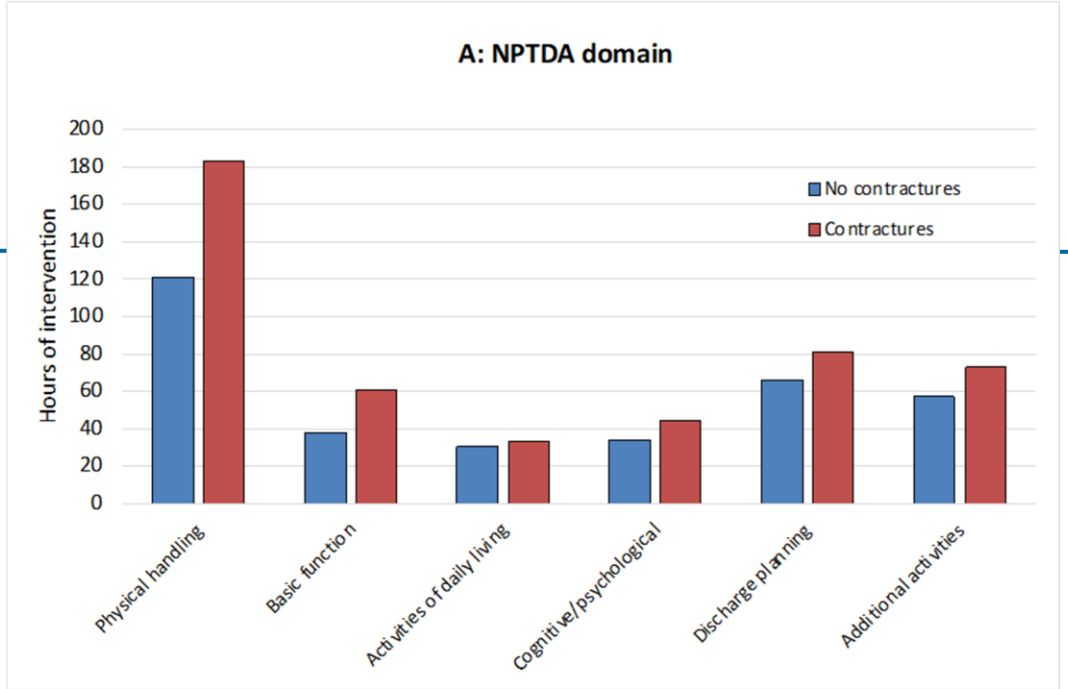
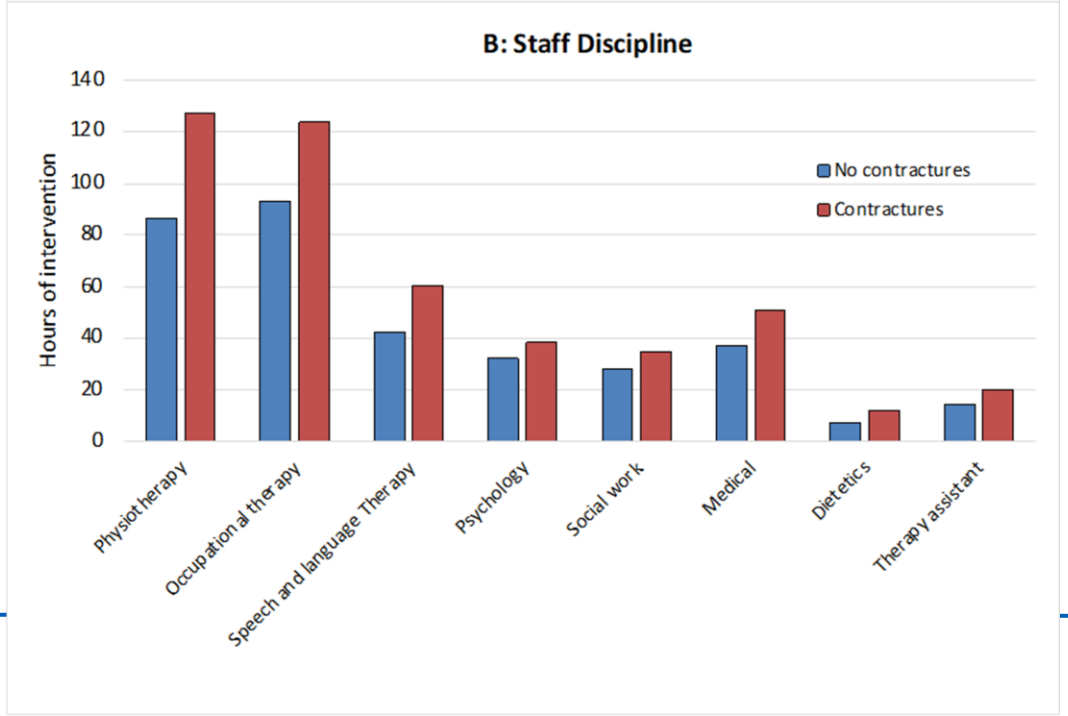
Spasticity and contractures

Mean total hours of intervention in a rehabilitation admission

a) per Northwick Park Therapy Dependency Assessment domain
b) per staff discipline.

Contractures have a significant impact on need for therapy time (spasticity did not in this cohort).





Ashford S, Singer B, Rose H, Turner-Stokes L. The impact of spasticity and contractures on dependency and outcomes from rehabilitation. J Int Soc Phys Rehabil Med 2022 5:97-104. Available from: https://www.jisprm.org/text.asp?2022/5/3/97/356220

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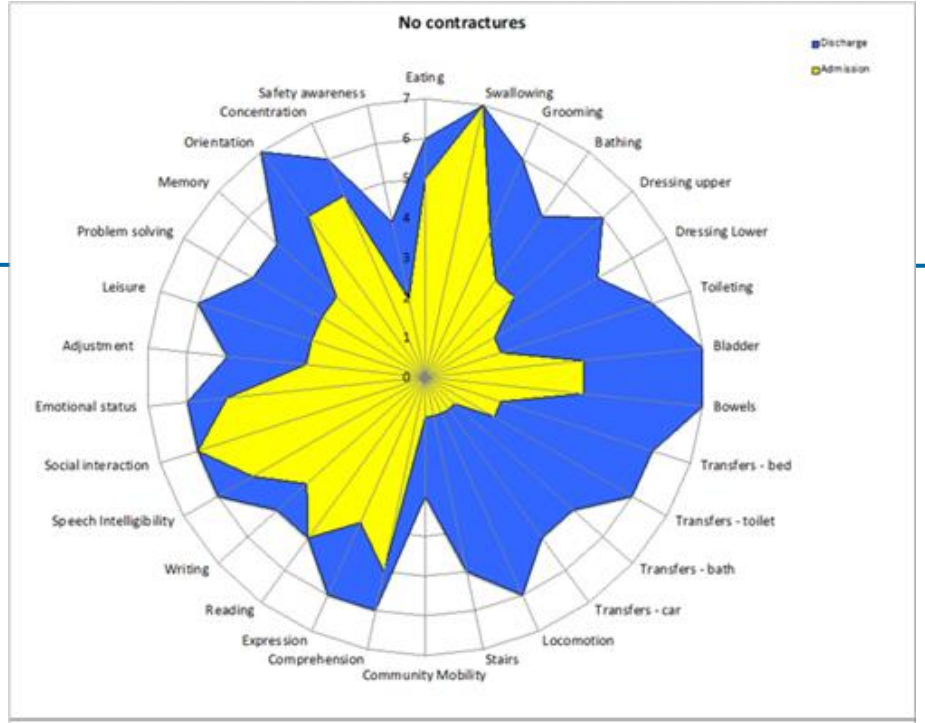
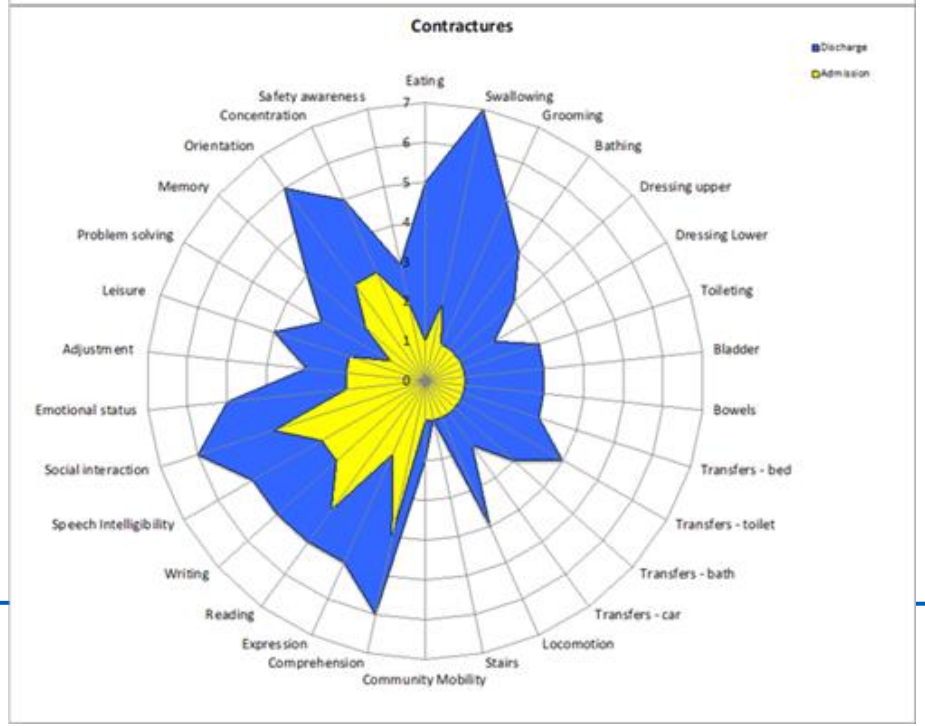
Median item scores for the FIM+FAM, for patients with and without contractures

People with and without contractures make significant changes with rehabilitation

People without contracture make greater gains, but also start with less disability

(Overall severity is a confounder in this analysis)





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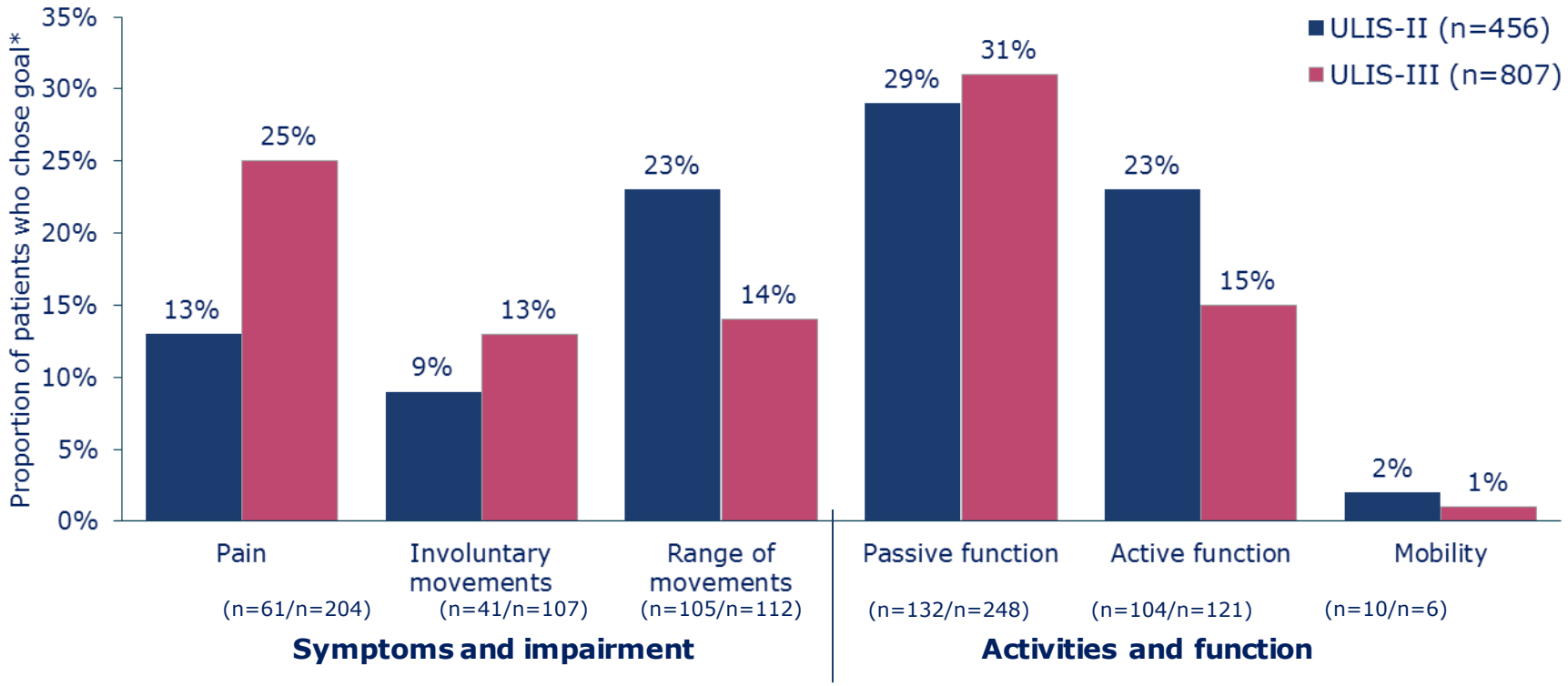
Botulinum Toxin Management

Botulinum toxin goal selection

Between Upper Limb International Spasticity study II and III



Turner-Stokes, L., Jacinto, J., Fheodoroff, K., Brashear, A., Maisonobe, P., Lysandropoulos, A. & Ashford, S., (2021). Assessing the effectiveness of upper-limb spasticity management using a structured approach to goal-setting and outcome measurement: Upper Limb International Spasticity-III study. Journal of Rehabilitation Medicine. DOI: 10.2340/16501977-2770.

Botulinum Toxin (BoNT)

- Produced by Clostridium botulinum
  - Serotypes A – G
  - Clinical preparations A or B used in practice
- Effects
  - Blocks pre-synaptic transmission to the muscle from the nerve
    - Neuromuscular junction
  - Causes paralysis of the muscle
  - Used to enable the physical interventions
    - Active function = Task practice, **incorporate into function and self-management**
    - Passive function = Maintenance and prevention of contracture and **incorporate into care plan**
    - Can also help in management of pain (physical intervention less important in this context)*

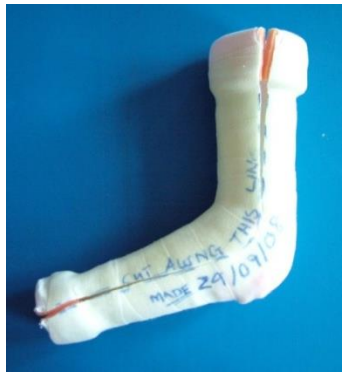
*Turner-Stokes L, Jacinto J, Fheodoroff K, Brashear A, Maisonobe P, Lysandropoulos A, Ashford S; Upper Limb International Spasticity (ULIS-III) study group. Longitudinal goal attainment with integrated upper limb spasticity management including repeat injections of botulinum toxin A: Findings from the prospective, observational Upper Limb International Spasticity (ULIS-III) cohort study. J Rehabil Med. 2021 Feb 24;53(2):jrm00157. doi: 10.2340/16501977-2801. PMID: 33616192; PMCID: PMC8814868.

Serial casting programme following BoNT

Baseline

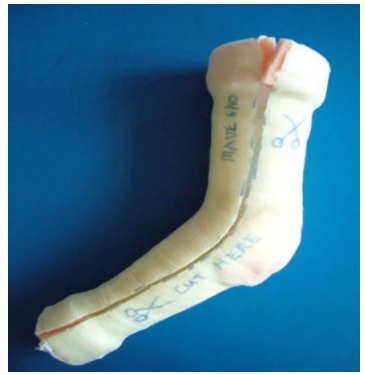
-95°

Week 1



-50°

Week 2



-30°

Key messages

- People need to know the options available
  - Physical interventions, Botulinum Toxin & other anti-spasticity drugs
- Physical and anti-spasticity drug treatment need to be based on:
  - Clear goal (aim) selection and a **clear plan for treatment**
  - Treatment needs to include a physical management programme
- Physical treatments
  - Passive function goals (care & prevention of contracture)
    - Stretch interventions, well designed for the individual and of **sufficient duration/ dose**
  - Active function goals (improved motor control and activity performance)
    - Retaining and **practice of functional tasks** with **sufficient duration/ dose**

Resources

- https://www.kcl.ac.uk/people/stephen-andrew-ashford
- https://www.kcl.ac.uk/cicelysaunders/resources

Twitter: @StephenAshford3
E-mail: stephen.ashford@nhs