




Welcome to today's Webinar:

Managing Spasticity

Your Presenter is Jackie Harris
Your Facilitator is Nicola Graham

1

Acknowledgement



We acknowledge and pay respect to the traditional custodians past and present on whose lands we meet today.

We acknowledge the deep feelings of attachment and the relationship of Aboriginal people to country and respect the cultural authority of the elders in each community

Multiple Sclerosis Limited

2

Introduction to Presenter

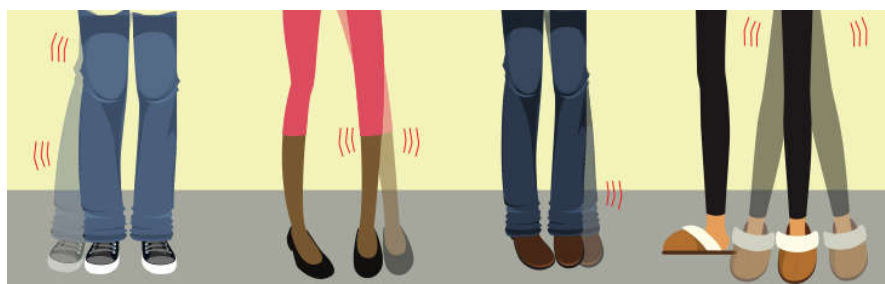


Jackie Harris has been a physiotherapist for 18 years, and previously worked at MS Australia for 10 years. Currently she has a mobile physiotherapy practice specialising in MS & other neurological conditions. She also works with children with Cerebral Palsy at Sydney Children's Hospital. Jackie has an interest in neurological physiotherapy, and in particular loves working with people with MS.

Jackie is passionate about exercise, in her own life outside of work, but also as a way for people with MS to improve their condition and reach their potential. Jackie loves sharing her knowledge with others.

Multiple Sclerosis Limited

3



PHYSIOTHERAPY MANAGEMENT OF SPASTICITY IN MS

JACKIE HARRIS
PHYSIOTHERAPIST – SYDNEY HOME PHYSIOTHERAPY
20TH AUGUST 2020

4



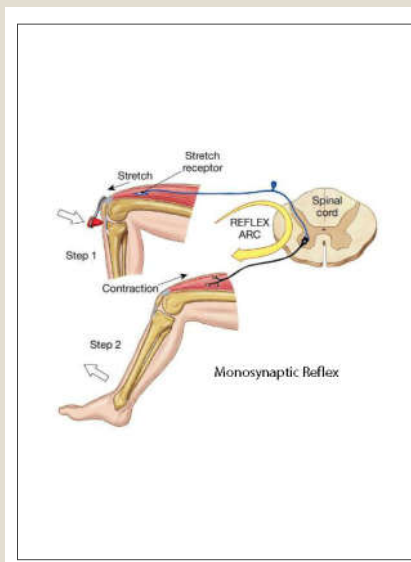
Learning Objectives

- Increased understanding of spasticity
- Greater confidence in managing spasticity
- Knowledge of evidence-based physiotherapy interventions for physical symptoms in MS

Seeing MS – Spasticity

Inspired by Tim Ferguson's invisible symptom

5



Definitions

Spasticity: Velocity-dependent increase in muscle tone with exaggerated tendon jerks, resulting from hyper-excitability of the stretch reflex

Lance 1980

- later elaborated by the addition of other features such as spasm and clonus

Hyperreflexia: A greater than normal reflex response (e.g. exaggerated tendon jerk)

Hypertonia: A greater than normal resistance felt when moving a limb passively through range

6

Impact of Spasticity in MS

Spasticity significantly affects at least 60% of people with MS and tends to increase in severity as the disease progresses

According to Etoom et al 2018; spasticity can worsen quality-of-life by:

- Increasing fatigue, pain, anxiety, disability, posture deficits
- Increase risk of falls
- Reduce mobility and usual daily activities
- Effect personal care
- Cause contracture, sleep disturbance, bladder/bowel dysfunction
- Add to weakness


The fluctuation and progressive courses in MS make spasticity management more different and challenging than static conditions such as stroke and spinal cord injury

7

How Does Spasticity Present?

- Muscle tone increases with rapid movement of an arm or leg or quick change of body position
- Uncontrollable spasms of the limbs – flexion or extension
- Abnormal posturing of the arms or legs
- Clonus - often more pronounced when muscle is fatigued
- Scissoring or crossing of the legs when attempting to stand, transfer or walk
- Difficulty initiating movements
- Difficulty relaxing muscles once a movement has ceased
- Sensation of muscle tightness or pain
- Exaggerated tendon jerk responses

8



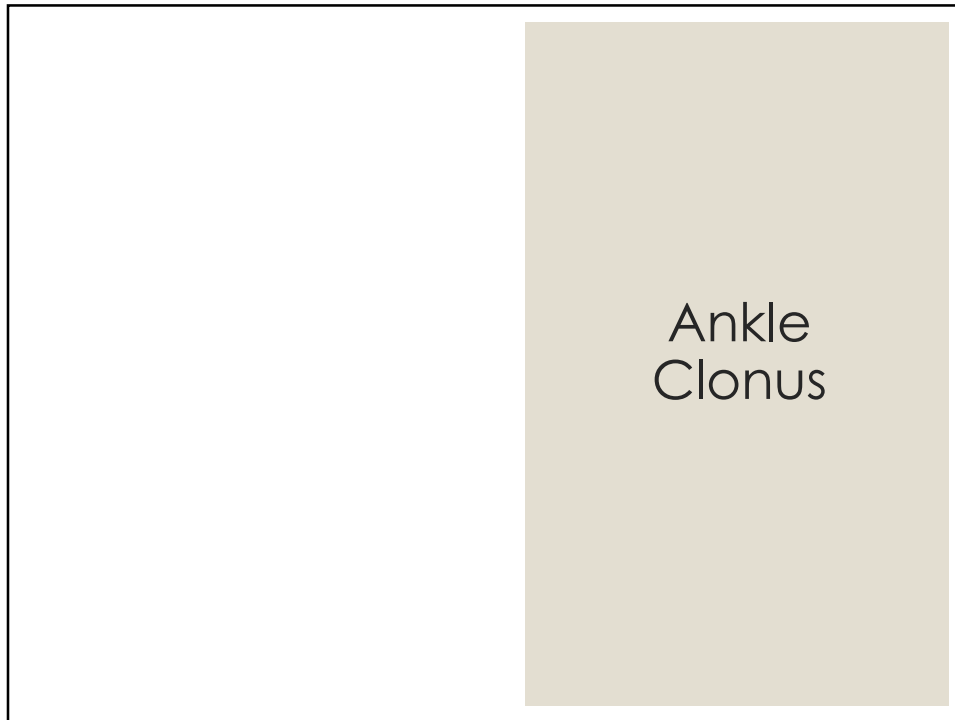
Spasticity in the Quadriceps

9

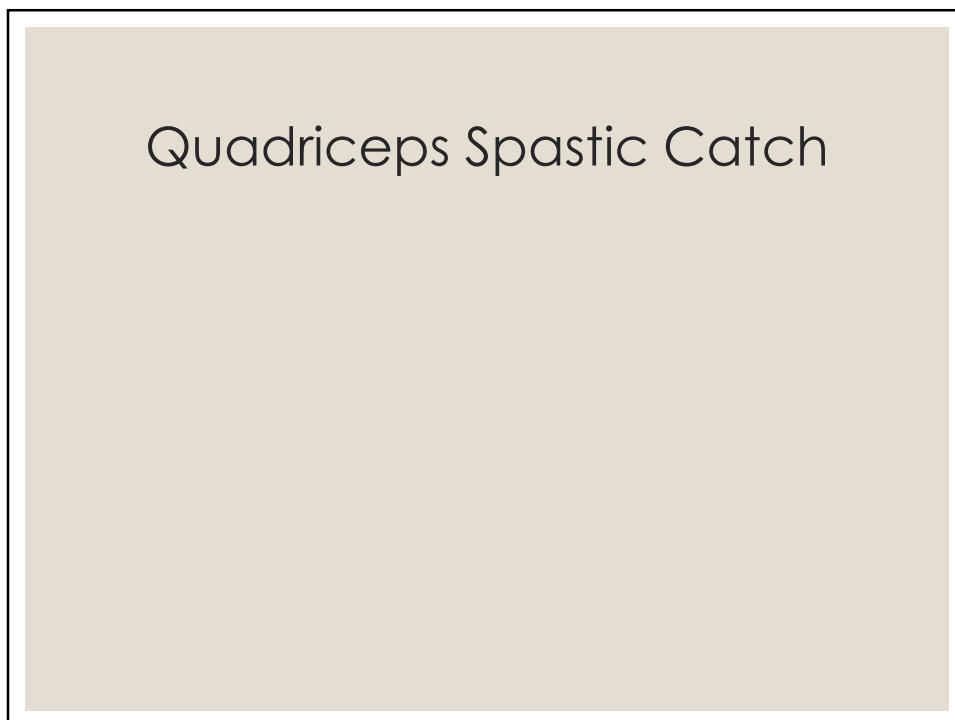


Ankle Spastic Catch

10



11

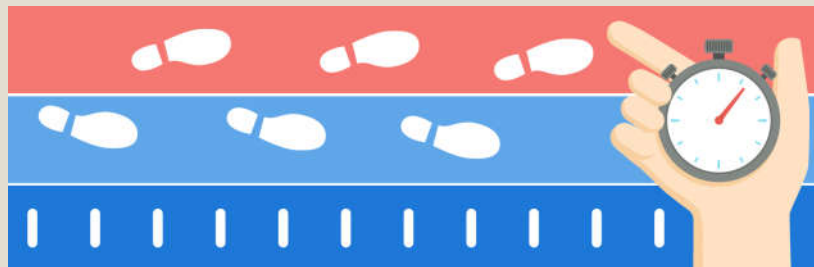


12

Spasticity Affecting Gait

13

Outcome Measures



14

Numeric Rating Scale

Circle how much tightness/spasticity you had today.



15

Modified Ashworth Scale

- 0 No increase in tone
- 1 Slight increase in tone, mild catch at end of ROM
- 1+ Slight increase in tone, catch halfway through ROM
- 2 More marked increase in tone throughout the whole ROM
- 3 Considerable increase in tone, passive movement difficult
- 4 Rigid, very difficult to move

16

Tardieu Scale

Measured at 3 speeds:

V1 as slow as possible

V2 speed of limb falling under gravity

V3 as fast as possible

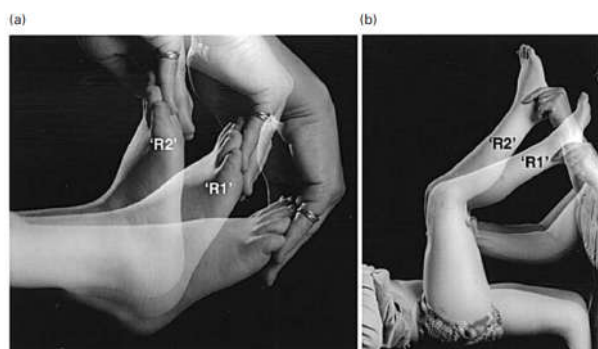
- 0** No resistance through passive ROM
- 1** Slight resistance through passive ROM, no catch
- 2** Clear catch at precise angle, followed by release
- 3** Fatigable clonus <10secs
- 4** Infatigable clonus >10secs

17

Modified Tardieu

R2 – full passive ROM at slow speed (V1)

R2 – “catch” during fast movement (V3)



18

MSSS-88 Scale

8 Sections:

- 1. Muscle stiffness
- 2. Pain & discomfort
- 3. Muscle spasms
- 4. Effect of daily activities
- 5. Effect on ability to walk
- 6. Effect on body movements
- 7. Effect on your feelings
- 8. Effect on your social functioning

19

As a result of your <i>spasticity</i> , how much in the past two weeks have you been bothered by:	Not at all bothered	A little bothered	Moderately bothered	Extremely bothered
01. Stiffness when walking?	1	2	3	4
02. Stiffness anywhere in your lower limbs?	1	2	3	4
03. Stiffness when you are in the same position for a long time?	1	2	3	4
04. Stiffness first thing in the morning?	1	2	3	4
05. Tightness anywhere in your lower limbs?	1	2	3	4
06. Your lower limbs feeling rigid?	1	2	3	4
07. Stiffness when standing up?	1	2	3	4
08. Tightness in your muscles?	1	2	3	4
09. Stiffness that is unpredictable?	1	2	3	4
10. Feeling that your muscles are pulling?	1	2	3	4
11. Stiffness in your whole body?	1	2	3	4
12. Your whole body feeling rigid?	1	2	3	4

Multiple Sclerosis Spasticity Scale (MSSS-88) © 2005 Peninsula Medical School, Devon, UK

MSSS-88
Scale

Section 1:
Stiffness

20

What does the latest research say about treatment for spasticity?



21

Effectiveness of Physiotherapy Interventions on Spasticity in People With Multiple Sclerosis: A Systematic Review and Meta-Analysis

Etoom et al 2018

- PT interventions in the studies were intended to maintain muscle length, prevent contracture & change mechanical proprieties of the musculoskeletal system and plasticity within the CNS
- 29 studies included, 16 RCTs & 13 non-RCTs, 799 participants
- Five categories of PT Intervention:
 - Exercise therapy
 - Electrical stimulation
 - Vibration
 - Standing therapy – **nil changes in spasticity measures**
 - Radial shock wave therapy

22

Effectiveness of Physiotherapy Interventions on Spasticity in People With Multiple Sclerosis A Systematic Review and Meta-Analysis

Etoom et al 2018

Exercise Therapy (more specific details of exercise interventions in paper)

1. One session to assess the acute effect of unloaded leg exercise & Bobath's exercises → **Both showed improvement in ankle MAS & H-reflex excitability**
2. Supervised outpatients training - Active and passive stretch, strength, stability, balance, coordination, aquatic, endurance, walking, and mobilization exercise → **Improvement in muscle tone and self-reported spasticity outcomes**
3. Inpatient (multidisciplinary rehab) and home based training (education, exercise instructions & home training) → **No effect on muscle tone and self-reported spasticity outcomes**
4. Robot-assisted and body weight-supported treadmill training → **Self-perceived spasticity & MAS improved**

23

Effectiveness of Physiotherapy Interventions on Spasticity in People With Multiple Sclerosis A Systematic Review and Meta-Analysis

Etoom et al 2018

Electrical Stimulation

- FES → **Acute improvement of FES in MAS & smoothness of pedalling**
- TENS → **8 hrs hours of TENS improved in Penn Spasm Frequency Score**
→ **TENS (1hr or >) improved ankle MAS**

Vibration

- Focal muscle vibration → **Additional of FMV to exercise program improved MAS**
- Whole-body vibration → **Improvement in one mm spasm item on MSSS-88**

Radial Shock Wave Therapy

- Four sessions of RSWT over calves improved ankle MAS

Reported adverse events, side effects, and withdrawals were minor and rarePT interventions seem a safe option for spasticity in PwMS

The best available evidences were for beneficial effects of exercise therapy especially robot gait training and outpatient exercise programs

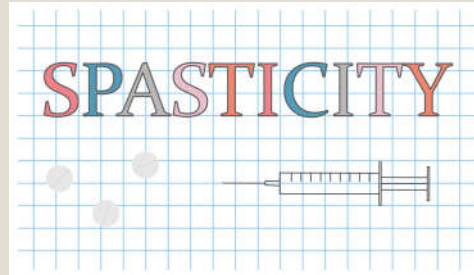
24

Botox Combined with Physio

Giovannelli et al 2007 compared BTX-A injections with BTX-A injections and manual stretches

Paoloni et al 2013 investigated different combinations of BTX-A injections, manual stretches, and segmental muscle vibration

- Each group experienced improvements in spasticity compared with those who only received BTX-A injections
- Interventions incorporating segmental muscle injections had longer term improvements in spasticity compared with just manual stretches



25

Early physiotherapy after injection of botulinum toxin increases the beneficial effects on spasticity in patients with multiple sclerosis

Giovannelli et al 2006

- 38 patients, 18–65 yrs, secondary progressive, antispastic/anti-epileptic treatment stable, MAS at least 3
- Single-blind RCT: Physiotherapy programme + BTX-A vs BTX-A only
- BTX-A - flexor digitorum superficialis, flexor carpi radialis, flexor carpi ulnaris, tibialis posterior, gastrocnemius & soleus
- 40 mins physio daily for 15 consecutive days after botox injection
 - specific and regular activity
 - stretching regimen on injected area
 - soft movements of joints with short pauses at the final position
 - reciprocal movements to prevent contractures and shortening of muscles
 - strengthening exercises

Results: Botox + physio - reduction of spasticity (MAS) at week 2, 4 & 12. Botox alone – reduction of spasticity at week 2 only.

26

Botulinum Toxin A and physiotherapy in multiple sclerosis spasticity: Patient-tailored goal setting and the measurement of its achievement Butera et al 2018

- Evaluating the achievement of the predefined goals - longitudinal prospective study
- 11 patients with progressive MS, mean EDSS 6.5 & focal spasticity
- Individualized rehabilitative program and BTX-A depending on spasticity pattern
- Evaluation of adequate achievement of target at week 4 using Goal Attainment Scale (GAS). Goals included :
 - gait improvement (8 pts)
 - postural changes/ improving (3 pts)
- 9 out of 11 reached goal, 6 of them with gait improvement as goal

Integrated, multidisciplinary approach in treating focal spasticity is effective for reaching the individualized objective targeted on actual needs of single patient

27

The Influence of physiotherapy intervention on patients with MS-related spasticity treated with nabiximols (THC:CBD oromucosal spray) Grimaldi et al 2019

- 210 MS pts, mean age 53, mean disease duration 18 years, RRMS 22%, SPMS 63%, PPMS 15%, mean EDSS 6.3

Physio Sessions were 45-50mins, 1-3 times per week:

- At least 4 weeks before & during nabiximols treatment
- Improve physical capabilities thus enhancing functional and daily activities
- Goal directed and personalised according to person's needs
- Assisted passive & active mobilisation of UL & LL, strategic stretching, stand/sit routines, coordination/ambulation training with and without rehabilitative aids
- Aimed at improving balance, gait, spasticity

Outcome Measure: Patient rated Numerical Rating Scale (NRS) 0-10 at baseline, 4 weeks & 12 weeks

Patients having physio were more likely to have a clinically relevant response, and less likely to discontinue the medication further down the track

28

Hippotherapy for patients with multiple sclerosis: A multicenter randomized controlled trial (MS-HIPPO) Vermöhlen et al 2017

- Hippotherapy: one-patient-one-horse physiotherapy treatment with and on the horse
- Goals: Regulating muscle tone (reduction in spasticity) & breathing, strengthening core, improving balance control, coordination & gait
- Also promotes social communication strengthens their self-esteem
- Prospective, randomized, examiner-blinded, multicenter, comparative trial: hippotherapy plus standard care compared to standard care alone - intervention lasted for 12 weeks (once a week)
- 70 adult stable MS patients with spasticity in LLs, EDSS 4-6.5, <90kg, at least some sitting balance. Average age 51, 66% EDSS > 5, median duration on MS 17yrs
- Ax & pt questionnaires completed at baseline, 6-7 weeks, & after 12 weeks

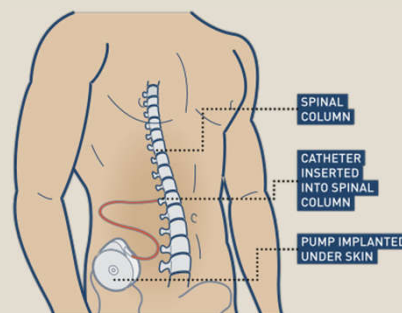
In the intervention group, fatigue (FSS) and spasticity (NRS – small change 1 point) improved from baseline to week 12, did not change in control group BSS & QoL improved too

29

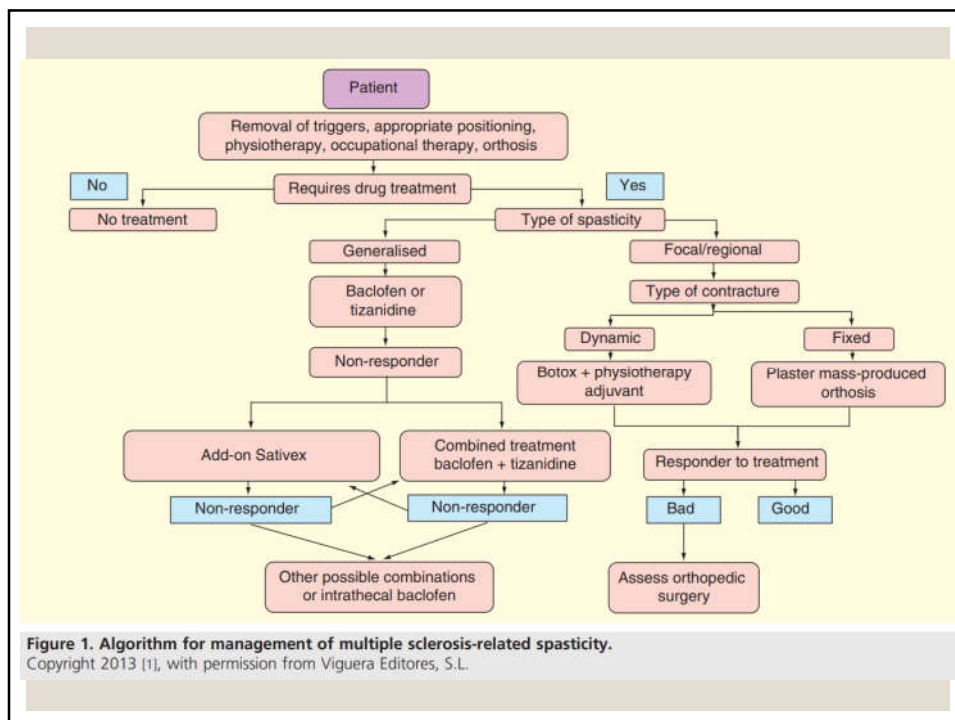
Medical Management

- Baclofen or tizanidine
 - Consider side effects such as sleepiness and muscle weakness
 - Dose should be timed to address problems caused by spasticity
- Sativex oromucosal spray
- Intrathecal baclofen
- Botulinum toxin
- Gabapentin for painful spasms
- Phenol block or neurosurgery

Always combine with physiotherapy ☺



30



31

Physiotherapy Management of Spasticity



32

Advances in the Management of MS Spasticity: MS Spasticity Guidelines

Ralf Gold & Celia Oreja-Guevara Nov 2013

According the German Guidelines, Aims of Spasticity Treatment are:

- Improve mobility & dexterity
- Achieve physiological movement patterns
- Reduce pain
- Facilitate nursing measures
- Avoid complications such as contractures

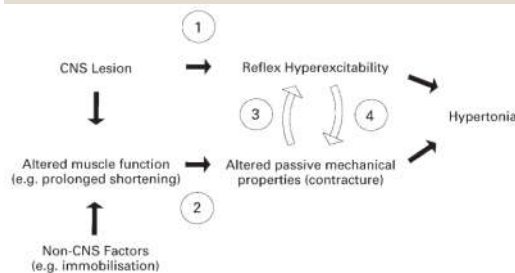


Figure 4.1. Two possible mechanisms of hypertonia following an upper motor neurone lesion. The solid arrows indicate well-established mechanisms, while the open arrows indicate more hypothetical mechanisms. (With permission from O'Dwyer & Ada 1996.)

33

Advances in the Management of MS Spasticity: MS Spasticity Guidelines

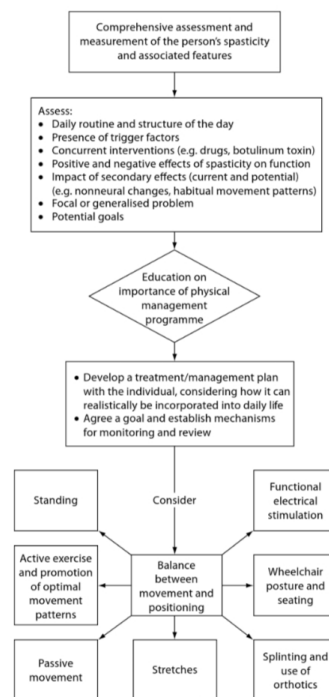
Ralf Gold & Celia Oreja-Guevara Nov 2013

SPANISH GUIDELINES:

- Individualized therapeutic plan that considers patients' and carers' conditions and needs
- Multidisciplinary approach
- Be alert to factors that may trigger or worsen spasticity such as infections or fever
- Before starting an antispasticity medication, consider other signs and symptoms such as weakness, ataxia and fatigue that could be worsened by the new treatment
- Consider spasticity can be affected by medications for comorbidities; for example, corticosteroid treatment may benefit spasticity transiently; some immunomodulatory treatments (e.g., interferons) may worsen spasticity
- Establish tailored therapeutic aims for each patient's spasticity
 - improvements in functionality (posture, gait, mobility)
 - relief of associated symptoms (e.g., rigidity, walking disability, sleep disorders, bladder disorders, spasms)
 - improvement in activities of daily life (e.g., hygiene, getting dressed, feeding)
 - reduction of pain and prevention of possible complications (e.g., pressure ulcers, contractures, subluxations)

34

Spasticity
Management: A
Practical
Multidisciplinary
Guide
Chapter 4: Physical
& Postural
Management of
Spasticity



35

Physiotherapy Management of Spasticity

Individualised Assessment

- What impact does the spasticity have on the patient's function?
 - Bench examination doesn't always equate to function
 - A person with very weak legs may find spasticity useful for standing & transfers
 - A person may have spasticity in their calf muscle causing them to trip on their toes when they get tired
 - Is the spasticity causing pain or affecting sleep?
 - 24 hour pattern of spasticity
- ROM & MM strength
- Tardieu / MAS
- GAIT & balance
- Posture - at rest and when moving
- Medications?

Goal setting with patient – GAS or COPM. And goals around medical treatment such as botox – comfort, cares, positioning, function?

36

Physiotherapy Management of Spasticity

- Attention to posture & positioning
 - Sleep systems
 - Correct seating and support
- Strengthening
 - opposing mms
 - lengthening position)
- Gait training and transfers & re-education of movement patterns
- Cardiorespiratory exercise to improve fitness, reduce pain, stress & fatigue

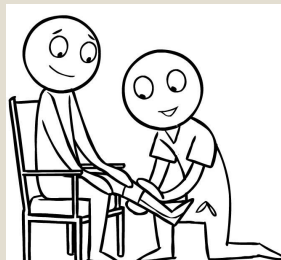
37

Physiotherapy Management of Spasticity

- Backwards walking on treadmill, backwards cycling
- Pre-cooling before exercise
- Trunk & pelvic control
- Stretching may help
 - before standing up or getting out of bed (to temporarily reduce stiffness)
 - to prevent contracture
 - PNF
 - Splinting / Positioning / Standing

38

Splinting to prevent contracture



A good custom AFO:

Controls calf spasticity
Improves knee control
Controls foot posturing

39

Positioning in bed and in wheelchair



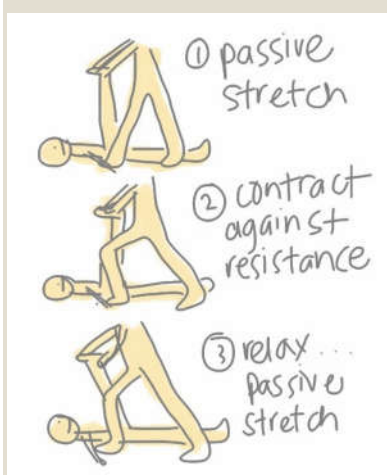
40

Proprioceptive Neuro-Facilitation (PNF) Stretching

- Aims to maintain or IMPROVE muscle length and flexibility
- Contract-relax (hold contraction for 5-10 seconds) – push gentle against the stretch
- There is some evidence to suggest that LONG TERM stretching may change the sensitivity of the stretch reflex

41

PNF Stretching



42



Strengthening in a
lengthened
position

43



Elevated Hip
Abduction

44

Addressing and Minimising Triggering Factors

- Constipation or urinary tract infections, or other infections such as the flu
- Over-heating
- Pressure injuries
- Pain
- Stress / anxiety
 - Progressive muscle relaxation (Ghafari et al 2009)
 - Mindfulness meditation
- Fatigue
- Certain positions or exercises

45

Standing Hip
Flexion

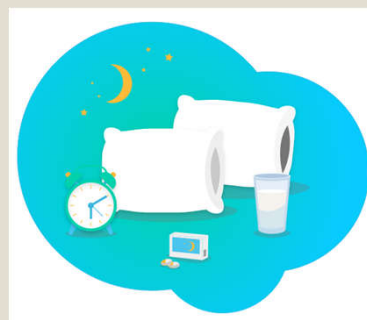
46

Seated Hip Flexion


47

Fatigue Management

- Occupational therapy
- MS webinars
- Good sleep hygiene practises
- Monitor fatigue levels before, during and after physio/exercise
- Rest between exercises
- Schedule, prioritise and pace tasks – schedule in rest breaks!
- Stay cool



48



Mindfulness Meditation

- Stress may play a role in the MS disease course
- Stress has a strong association with frequency of disease relapses
- Strategies that reduce and manage stress may play a role in improving quality of life (QOL)
- Kabat-Zinn's research shows that meditation can help in managing chronic pain
- Meditation has been associated with stress reduction, decreased rate of maladaptive coping strategies, and increased resilience for those with MS

Levin et al 2014

49

Online meditation training for people with multiple sclerosis: A randomized controlled trial

Cavalera et al 2018

- 139 participants were randomly assigned to an MS-specific online mindfulness meditation intervention or to a psychoeducational (active control) group
- Participants were assessed for QOL, depression, anxiety, sleep problems, and fatigue, at recruitment, after 2 months, and after 6 months
- In comparison to the control group, the experimental subjects reported higher QoL and lower depression, anxiety, and sleep problems at the end of intervention

50

- Mindfulness-based stress reduction program
- After mindfulness-oriented meditation training, participants in this group (n = 15) showed an increase in character traits reflecting the maturity of the self at the intrapersonal (self-directedness) and interpersonal (cooperativeness) levels.
- Increased mindfulness and conscientiousness and decreased trait anxiety were observed in participants after the training.

Effect of Mindfulness Meditation on Personality and Psychological Well-being in Patients with Multiple Sclerosis

Crescentini et al 2018

51

Can Meditation Influence Quality of Life, Depression, and Disease Outcome in Multiple Sclerosis? Findings from a Large International Web-Based Study

Levin et al 2014

Participants were asked to complete an online survey on SurveyMonkey:

- The Multiple Sclerosis Quality of Life-54 survey (MSQOL-54)
- Disability was assessed using the Patient Determined Disease Steps (PDDS)
- Relapse rate
- Depression
- Fatigue
- Fatigue Severity Scale (FSS)
- Average weekly frequency of meditation in the last 12 months

52

- HRQOL: Physical & Mental Health Composite & Mental scores were significantly higher in those who meditated once a week or more
- Overall QoL, energy, health distress, emotional well-being, health perception & cognitive function HRQOL scales were all significantly higher in those who meditated
- Markedly lower depression risk in those who meditated

Interestingly, those who meditated regularly had a higher level of disability (PDDS) – suggesting that those with greater disability feel a greater need to meditate as a result of their condition

Previous studies have shown a decrease in cortisol after sustained meditation. Such a decrease in cortisol, which is often elevated in people with MS, may contribute to improved HRQOL

Results

53

Summary

Many factors impact on spasticity and interact with each other: Stress, fatigue, heat, sleep etc

Individualised approach

Multidisciplinary approach – combining therapy with medical management

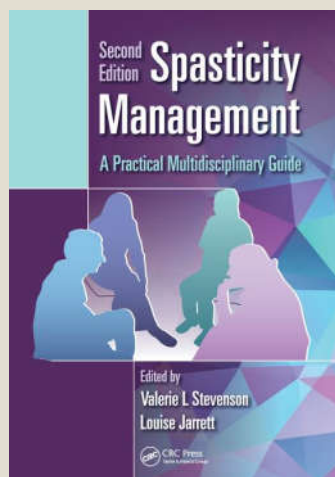
Goal setting and outcome measures

May take a while to work out the right “prescription” for your patient

54

More Information

www.msaustralia.org.au/sites/default/files/spasticity.pdf



55

References

- Giovannelli M, Borriello G, Castri P, Prosperini L, Pozzilli C. Early physiotherapy after injection of botulinum toxin increases the beneficial effects on spasticity in patients with multiple sclerosis. *Clin Rehabil* 2007;21:331-7.
- Paoloni M, Giovannelli M, Mangone M, et al. Does giving segmental muscle vibration alter the response to botulinum toxin injections in the treatment of spasticity in people with multiple sclerosis? A single blind randomized controlled trial. *Clin Rehabil* 2013;27:803-12.
- Advances in the Management of MS Spasticity: MS Spasticity Guidelines Ralf Gold & Celia Oreja-Guevara Nov 2013
- Spasticity Mx: A Practical & Multi-D Guide 2016
- Impact of pre-cooling therapy on the physical performance and functional capacity of multiple sclerosis patients: A systematic review Antonia Kaltsatou, Andreas D. Flouris *Multiple Sclerosis and Related Disorders* 27 (2019) 419-423
- Non pharmacological interventions for spasticity in MS Amatya et al 2013 Cochrane
- Effectiveness of Physiotherapy Interventions on Spasticity in People With Multiple Sclerosis A Systematic Review and Meta-Analysis Etloom et al 2018
- Early physiotherapy after injection of botulinum toxin increases the beneficial effects on spasticity in patients with multiple sclerosis Giovannelli et al 2006
- Botulinum Toxin A and physiotherapy in multiple sclerosis spasticity: Patient-tailored goal setting and the measurement of its achievement Butera et al 2018
- The Influence of physiotherapy intervention on patients with MS-related spasticity treated with nabiximols (THC:CBD oromucosal spray) Grimaldi et al 2019
- Hippotherapy for patients with multiple sclerosis: A multicenter randomized controlled trial (MS-HIPPO) Vermöhlen et al 2017

56

References

- Impact of pre-cooling therapy on the physical performance & functional capacity of MS patients Kaltsatou & Flouris 2018
- Non phrsmiological intervetions for spasticity in MS Amatya et al 2013 Cochrane
- **Stretching versus strength training in lengthened position in subjects with tight hamstring muscles: a randomized controlled trial**
- [Cecília F Aquino](#) 2010
- MS Practice: Spasticity
- Rehabilitation Database: www.sralab.org/rehabilitation-measures

57

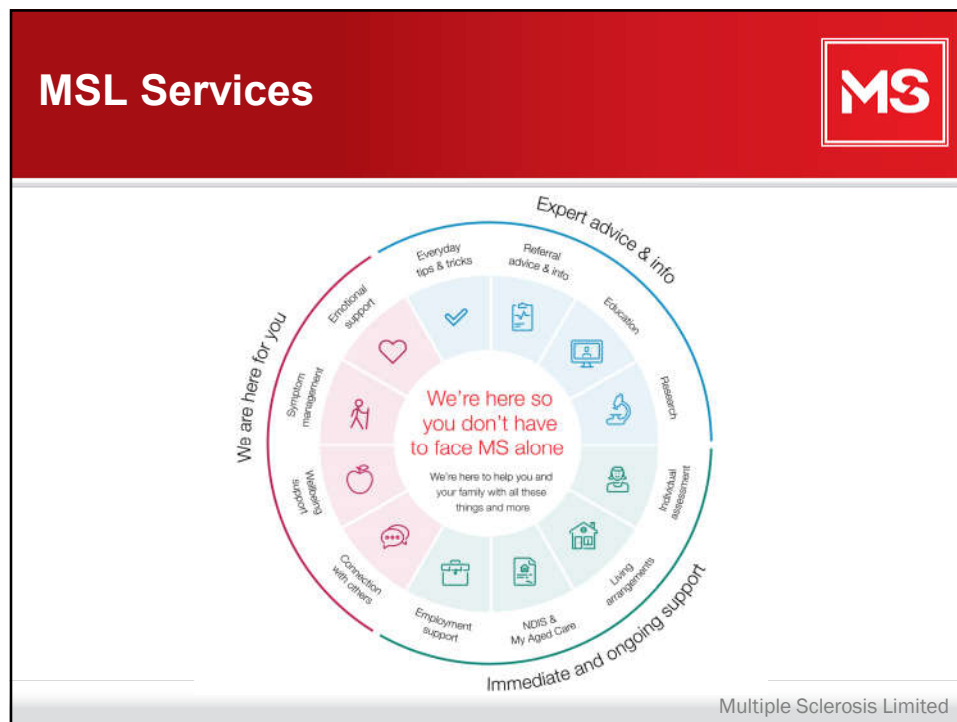
Questions



MS Connect
1800 042 138
msconnect@ms.org.au

Multiple Sclerosis Limited

58



59

MSL Services - MS Practice




MS Practice is a free, online education series designed to support allied health professionals in the symptom management of people with MS.

<https://www.msaustralia.org.au/about-ms/ms-practice>

Multiple Sclerosis Limited

60

Registered NDIS Provider



MS is a registered NDIS provider in NSW, ACT, Vic and Tas and is approved to provide:
(Pls note: Face to face services/programs have been either converted to online programs or postponed)

- Assistance with 'Access Request Forms', Access rejections and pre-planning
- Support Coordination – assistance to help make your plan active
- Plan Management
- Short term accommodation (Vic)
- Group Activities – yoga, dance for health, exercise (NSW)
- Exercise physiology (NSW)
- Specialist Continence Assessment (Vic)
- Occupational Therapy (NSW and Vic)
- Physiotherapy (NSW)

Want to learn more?
Please call
MS Connect
1800 042 138

Multiple Sclerosis Limited

61

Podcasts for Clients




PODCASTS


<https://www.ms.org.au/support-services/education/podcasts.aspx>

Multiple Sclerosis Limited

62

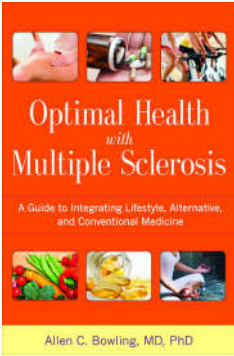
Free E-books



 **EBSCO** eBooks & Audiobooks

<http://search.ebscohost.com/login.aspx?authtype=ip,uid&profile=eBooks>

Username: msguest
Password: Education2020%




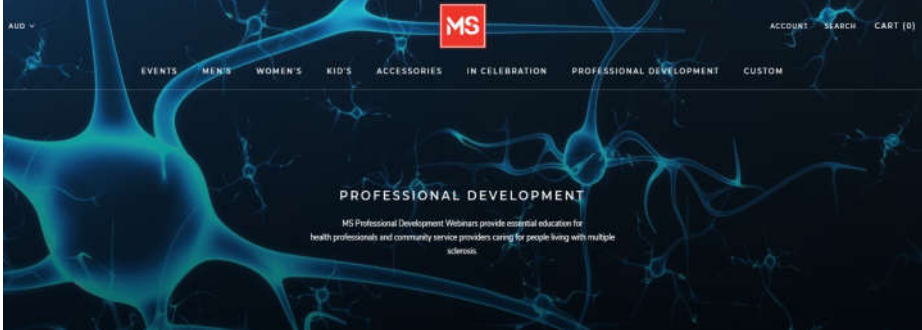
Optimal Health
with
Multiple Sclerosis
A Guide to Integrating Lifestyle, Alternative,
and Conventional Medicine
Allen C. Bowling, MD, PhD

Multiple Sclerosis Limited

63

MS Shop





PROFESSIONAL DEVELOPMENT


MS Professional Development Webinars provide essential education for health professionals and community service providers caring for people living with multiple sclerosis.



<https://shop.ms.org.au/collections/professional-development>

Multiple Sclerosis Limited






64

In Form





Stay Connected



www.ms.org.au

FORWARD

PRINT

SUBSCRIBE

[Having trouble reading this email? Click here to view Web Version](#)

MS Education for Health Professionals

Monthly Health Professional newsletter detailing upcoming CPD webinars and research links


Subscribe by calling MS Connect 1800 042 138

Or via our website:
<https://www.ms.org.au/support-services/education/publications-resources/inform-enewsletter.aspx>

Multiple Sclerosis Limited

65

Thank you



MS Connect
1800 042 138
msconnect@ms.org.au

Please stay on after this webinar to complete a short survey.

Multiple Sclerosis Limited

66