# Symptom Management: Physical Impairment

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## Disclosures

Dr. Cameron has received:

Consulting fees and honoraria from Acorda Therapeutics, Genzyme Corporation, Adamas Corporation, MSAA

Research support from Acorda Therapeutics, Collins Medical Trust, VA RR&D Service, National MS Society

## Learning objective

- The learner will be better able to plan a course of therapy aimed at addressing physical impairment.

## Outline

- What is physical impairment?
- Common physical impairments in progressive MS
- Management of physical impairment in MS
  - Reversal and compensation
  - Rehabilitation and medications

# Physical Impairment

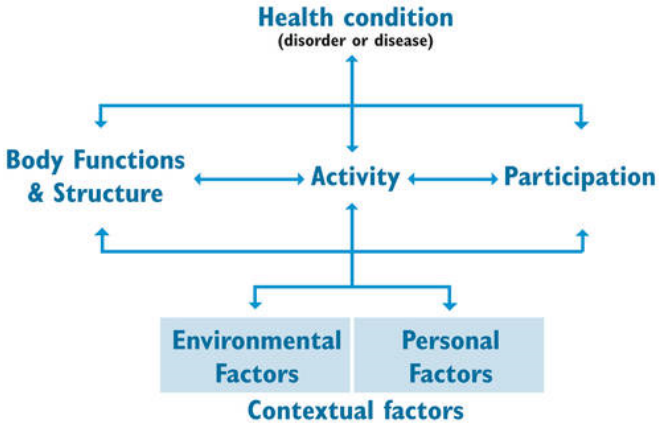
Impairment, disability and handicap are *consequences* of disease.

**Impairment**: any loss or abnormality of psychological, physiological, or anatomical structure or function.

**Disability:** any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

**Handicap**: a disadvantage, resulting from an impairment or disability, that limits or prevents the fulfilment of a role that is normal for that individual.

WHO, 1976




WHO, 2002

## Rehabilitation

- "the act of restoring something to its original state"
- Comes from the Latin prefix *re-*, meaning "again" and *habitare*, meaning "make fit."
- Rehabilitate: To restore to good health or useful life, as through therapy and education

## Rehabilitation goals in progressive MS

- Progressive MS is a lifelong progressive disorder – rehab needs to match
- Rehabilitation helps to "make fit again"

**Recovery and/or compensation**

- People with MS can gain strength with exercise
- People with MS can improve function

## Rehabilitation to promote functional recovery by *reversal of impairment*

Physical impairments in progressive MS and their reversal through rehab

- Weakness and fatigue
  - Strengthening exercise
  - Endurance exercise
- Spasticity
  - Stretching, positioning, bracing
- Dual task limitations
  - Dual task practice

## Rehabilitation to promote functional recovery *by compensation*

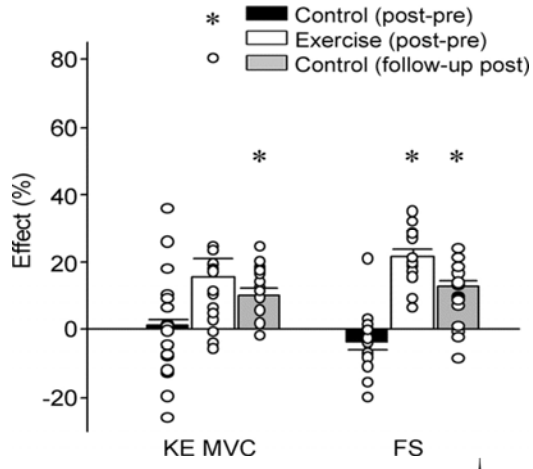
Compensation to promote functional recovery

- Weakness
  - Bracing
  - FES
  - Assistive devices
  - Wheeled or powered mobility
  - Home/workplace redesign
- Fatigue
  - Energy budget, Cognitive dysfunction
  - Activity modification,
- Dual task limitations
  - Dual task avoidance

# Exercise to improve strength and endurance in MS

- Is safe!
- Is effective!
  - 12 weeks of progressive resistance training of the lower extremities improves strength and functional capacity (chair stand, stair climbing, 10 mWT, 6 MWT) at 12 and 24 weeks. Daglas et al. *Neurology 73(18):1478-1484,* 2009
  - 6 months of strength and aerobic training improves walking distance/endurance and speed and upper extremity endurance (repetitions of arm weight lifting). Romberg et al; Neurology, *63(11):2034-2038,* 2004
  - 12 month endurance exercise program increased VO2 peak and reduced fatigue. Schmidt S, Wonneberger M. J Neurol Scie 336(1-2):29-35, 2014.

**Effects of progressive resistance training on muscle strength and functional capacity**
**Effects of 12 weeks of resistance training on changes in maximum voluntary contraction of the knee extensors (KE MVC) and functional capacity score (FS) during the trial in the exercise group (white bar) and during the poststudy exercise period in the control group (gray bar) compared with the change in the control group during the trial (black bar). *p < 0.05.**




U. Dalgas et al. Neurology 2009;73:1478-1484

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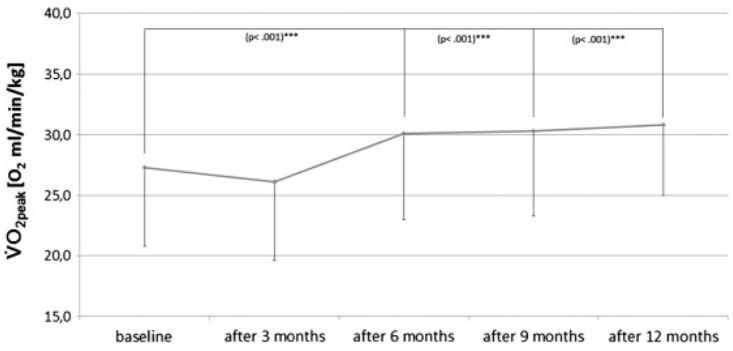
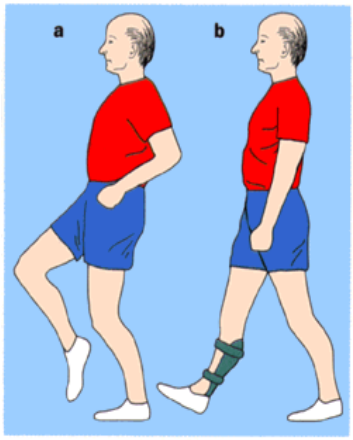



$VO_2$ peak improved significantly over the entire study period.
Values are expressed as mean ± standard deviation. ***p < .001, $\eta_p^2 = 0.34$.

## Strength and endurance exercise in MS

- Recommendations:
  - Start small and progress slowly
  - It takes time
  - Address:
    - Motivation
    - Fear
    - Fatigue
    - Heat
    - Habits

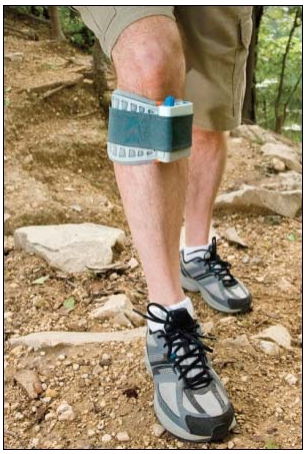
## Bracing *to compensate for* weakness




## Functional Electrical Stimulation

– Stimulates intact peripheral nerves to produce functional muscle contractions

# Functional Electrical Stimulation



# Assistive devices

# Assistive devices

- Selection
  - Comfort
  - Safety
  - Try out lots of different ones
  - Have a range available for different circumstances
- Fitting & training
  - Height
  - Practice
- Goal
  - Increased functional mobility
    - Easier
    - Safer
    - Longer

# Wheeled/powered mobility

# Home/workplace redesign

- Organize work areas
  - Store task objects and materials close together
  - Store frequently used items where they can be accessed without reaching or bending
  - Use staging areas to reduce transport distance

# Key Strategies

- Use tools and materials that reduce the amount of work
  - Lightweight objects and tools
  - Pre-cut vegetables, frozen foods
  - Microwave
  - Utility cart to transport items
  - Sit instead of standing

# Key Strategies

- Assistive devices:
  - Decrease reaching and bending (long-handled reacher)
  - Decrease strength requirement
    - Power tools and appliances (can opener, mixer)
    - Increase leverage and/or friction (jar openers)
  - Reduce need to grip tightly (large handled tools)
  - Avoid prolonged holding

# Energy Budget

- Budgeting and Banking, Saving and Spending
- PLAN
- How much energy do you have?
- What do you want to do most? What must you do?
- How much energy you will need?
- Manage activities to get the most out of your day
- Do and then rest

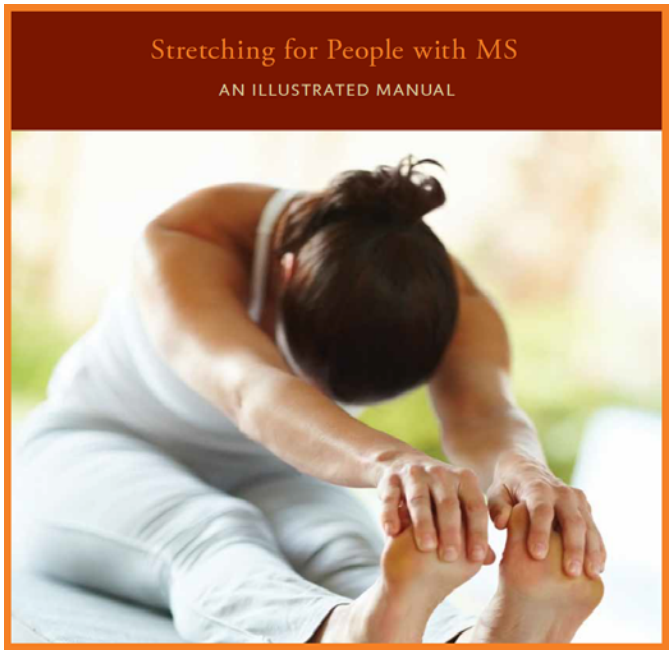
# Spasticity management in MS

Combine medications and physical interventions

- Medications:
  - Baclofen
  - Benzodiazepines
  - Tizanidine
  - Botulinum
- Physical interventions
  - Stretching
  - Bracing
  - Positioning

# Medications for spasticity in MS

- All oral/systemic medications are sedating, limiting use and dose
- Intramuscular botulinum toxin
  - Effective locally
  - Reversible
  - Associated with weakness




## Dual task performance

- Patients often walk more slowly or fall when they are “distracted”



# Dual task practice

- Combined motor and cognitive task
  - Walk and.. Talk, head turn, avoid obstacles, change speeds

# Dual task avoidance

- Don't!
  - Walk and… chew gum, talk on the phone
  - Drive and…
- Avoid
  - Crowds
  - Distractions

# Summary

- Many people with progressive MS have physical impairments
- Function can be improved by a combination of medications and rehabilitation to promote reversal of impairments and/or compensation for impairments