Multiple Sclerosis: Physical Therapy

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Objectives

1. Choose appropriate assessments, functional outcome measures, and evaluation components for a patient with MS and devise an appropriate treatment plan.

2. Provide appropriate exercise parameters for someone with MS and discuss appropriate education for modifying an exercise plan when needed.
• Subjective examination
  • Self-report measures
  • Objective examination
  • Outcome measures
  • Training techniques and interventions
  • Special exercise considerations
  • Participation and community resources
  • Complimentary and alternative medicine
Subjective examination

- **Patient Goals** - What brings you in today? What do you want out of therapy?
  - Walking, foot drop/tripping, falls, balance, pain, indirectly related to MS, not related to MS, 1x visit for HEP

- **Disease history**
  - When were you diagnosed with MS? History of neurologic symptoms prior to MS diagnosis. History of MS symptoms and how they impact function. General history and overall health. History of falls & injuries.

- **Symptom Management**
  - Prior physical therapy/interventions. Use of assistive equipment. Medication for symptoms.

- **Daily Activities and Exercise**
  - What is your typical day like? Do you exercise/use other therapies? What do you want to be able to do that you can’t do now or can’t do as well as you’d like?
Subjective examination

- **Fatigue**
  - Do you experience fatigue related to MS? What contributes to your fatigue?
  - How long can you walk/stand/work prior to increased fatigue?

- **Thermosensitivity**
  - Heat, cold, humidity

- **Personality/Emotional Status, Cognitive dysfunction**
  - Motivation, Coping strategies, self-efficacy in disease management

- **Caregiver/Family Support & Resources**
  - Who do you live with? Does anyone help you with your daily activities?

- **Medications**
  - Disease modifying drugs, Symptom management, Non-MS meds

- **Speech/Swallowing**
Subjective examination: comorbidities

- Common modifiable comorbidities:
  - Depression (50%)
  - Hypertension (30%)
  - Alcohol abuse (14-18%)
Navigator

Subjective examination
  • Self-report measures
  • Objective examination
  • Outcome measures
  • Training techniques and interventions
  • Special exercise considerations
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  • Complimentary and alternative medicine
Self-report measures

Highly recommended by MS Edge Task Force:
- MS Walking Scale (MSWS-12)
- Dizziness Handicap Inventory (DHI)
- MS Impact Scale (MSIS-29)
- MS Quality of Life (MS Qol-54)

Recommended
- Activities-Specific Balance Confidence Scale (ABC)
- Modified Fatigue Impact Scale
- SF-36

Refer to outcome measure recommendations by the MS Edge Task Force on http://www.neuropt.org/
Navigator

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Objective examination: neurological screen

- Observation, Posture
- Muscle Strength
- Flexibility/Spasticity
  - Common spasticity/contractures: quads, hip flexors, adductors, plantarflexors
- Fatigue
  - VAS 0-10
  - Fatigue with exam activities
- Coordination
Objective examination: neurological screen

- Somatosensation
- Visual/Vestibular
  - Pts with MS have been shown to demonstrate VOR impairments
- Corticospinal Signs
- Skin Integrity
- Cerebellar Signs
- Cardiovascular/Pulmonary
  - inspiration/expiration especially with advanced MS
Objective examination: functional mobility

- Bed Mobility
- Transfers
- Static Balance
- Wheelchair mobility
- Postural Control
- Endurance
- Gait & Dynamic Balance
Objective examination: upper extremity function

- Grip Strength/Pinch strength
- UE/wrist/hand ROM. Hand closing and hand opening
- Coordination tests
- 9 hole peg test
  - Part of the MS Functional Composite
    - T25FWT
    - 9 Hole Peg Test
    - Paced Auditory Serial Addition Test (PASAT)
- Box & blocks test
- Functional tasks
Subjective examination
Self-report measures
Objective examination
  • Outcome measures
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Functional assessment of mobility

Recommendations from Consortium of Multiple Sclerosis Centers Conference in 2016:

- TUG
- 25 foot walk test
- 5x STS
- BERG
- Subjective examination
- Self-report measures
- Objective examination
- Outcome measures

- Training techniques and interventions
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Strength Training
Training techniques: strength

- Decreased muscle strength
  - Primary
    - Altered central motor drive/activation failure
    - Delayed neural transmission
    - Impaired skeletal muscle metabolism
    - Alterations in cross-bridge mechanics
  - Secondary
    - disuse
- Associated with
  - Increased falls
  - Decreased gait speed
  - Decreased activity tolerance
  - Decreased postural control
- Predictor of ambulatory function
Training techniques: intermittent strength training

- Rest at first sign of fatigue
  - Subjective fatigue
  - Change in movement quality

- Aim for sets and reps that allow for the greatest total number of reps
  - 10 sets of 3 is better than 2 sets of 10
  - Use trial and error to determine the minimum amount of rest time needed
  - Rest time may be as little at 10 seconds

- Minimum 2-3 days/week
Training techniques: strength progression & modifications

- Progress weight normally
- Strength asymmetry
  - May need different exercises for each side.
- Concentric & eccentric
  - With control
  - Try at a high speed – uses coordination that may be impaired
- If unable to perform a concentric contraction
  - Eccentric
  - Isometric (5-10 sec)
Training techniques: functional strengthening

- When possible, **do functional exercise**
  - Standing squat vs leg press
  - Utilizes strength and balance
- More **specific** to daily activities
- Consider a **combination of exercise types**
  - Specific to the persons deficits
  - Can be executed correctly, safely, and independently
  - In line with their interests
Aerobic/Endurance Training
Training techniques: aerobic endurance

- Aerobic deconditioning may occur from decreased activity or primary impairments
- 30 min moderate intensity aerobic exercise is recommended at least 2x/wk
- Intermittent rest breaks may result in greater volume of exercise
- Dual task performance - cognitive activity paired with walking is linked to increased falls as well as decreased cognitive performance
Training techniques: aerobic exercise

- Bicycle
- Aquatic exercise
- Treadmill training
- Running
- Rowing
- Circuit training
- Body-weight support treadmill training

Walking Program
- Aim for at least 3 intervals of the same duration
- Minimum 2-3x/week
- Progression:
  - Increase walking duration
  - Decrease rest time
- Trekking poles
  - Increase cardiovascular and core effort
  - Foldable and retractable poles
  - More socially acceptable than a cane
Balance Training
Balance Dysfunction in Early MS

- Postural instability in quiet stance in 50% of patients
- Assessed within 3 months of symptom onset
- EDSS $1.7 \pm 0.2$ (0-5)

Kalron 2011
Training techniques:
education on balance

- STOP, SCAN, PLAN
- Energy conservation
- Pacing strategies
- Assistive devices and orthotics
- Home safety assessment
Training techniques: balance

Tai Chi

Wii Fit

Kick-Boxing

VOR Ex.
Spasticity Management
Managing spasticity

- Experienced by 40-60% of people with MS (more common in the lower extremities)

- Management strategies:
  - Stretching
  - Strengthening
  - Relaxation
  - Positioning
  - Gait training
  - Biofeedback modalities
  - Aquatic therapy
  - Endurance training
  - Splinting
  - Patient & caregiver education

- Some spasticity is useful to counteract weakness

Prolonged stretches: 2, 10 or 30 minutes
Other Methods for Spasticity Management

- Aquatic Therapy (Ai Chi)
- Leg Cycle Ergometry
- FES Bike
- Therapeutic Standing
Patient Education

General Education
Patient Education

- Keep exercising beyond PT (thermosensitivity management)
- Environmental factors (smoking, vitamin D)
- Overall healthy lifestyle
  - Appropriate intake of salt, antioxidants (optic nerve damage), gut bacteria
  - Obesity
- Importance of follow-up
- Side effects of medication
- **Resources and social support** (i.e. MS Society, Nutritionist, Psychologist, Cognitive Rehab, etc.)
Gait Devices
Gait Devices

Dorsi-Strap
- Connects through shoe lace holes
- $42
- Sold by X-strap systems

Dorsi-Lite
- Flexible: some DF/PF
- Can be worn with & without shoes
- $50
- Sold by X-strap systems
Gait devices: Foot-Up
Gait devices: Toe Off
Subjective examination
Self-report measures
Objective examination
Outcome measures
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2 primary considerations

Thermosensitivity

Fatigue
Neurogenic Fatigue

**Primary Fatigue**
- Lassitude – “generalized feeling of exhaustion”
- Motor fatigability – “fatigue that occurs with repeated muscle contractions or motor activity”
- Damaged neurons works less efficiently (if at all)
- When core body temperature increases, nerve function further decreases

**Secondary causes of fatigue**
- Movement compensation
- Depression, stress, pain, medications, poor sleep
- Disuse/Inactivity**
  - Limited mobility
  - Misconceptions – belief that they can’t be active or exercise
  - Avoidance – I can’t do it like I could before
Symptom Exacerbation

- **Pseudoexacerbation**: Increased body temperature/fatigue can cause an increase in MS symptoms
  - Symptoms that they have had in the past
  - Symptoms will resolve with return to normal body temp
  - May have increased fatigue for 1-2 days following
  - There is NO risk of permanent damage or MS exacerbation
How to minimize symptoms

- Avoid increasing body temperature
  - Use cooling products and cooling strategies

- Allow frequent rest breaks
  - At first report of fatigue or reduced function
  - May only need to be a few seconds or minutes

- Energy Conservation
  - Simplify tasks, use assistive devices, prioritization of tasks

- 1 hour rule:
  - If after an hour you haven’t recovered, modify your exercise program next time.
Cooling Vests and Products
Navigator

“What do you mean by we don’t go now?”

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  - Complimentary and alternative medicine
Consider what is important for individual patients in their daily life!
Community resources

- National MS Society
  - Encourage patients to register with NMSS
  - Lending library of education resources – books, DVDs
  - MS navigator – pairs people with MS to share resources and offer support
  - Teleconferences
  - Self-help groups
  - Educational classes and conferences

http://www.nationalmssociety.org
MS App for Clinicians!
Navigator

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Complementary & Alternative Medicine (CAM)

- Vitamin D
- Nutrition
- Acupuncture
- Massage
- Stress Management
- Exercise
- Chiropractic
- Cannabis

National MS Society Article