Fatigue

**Defined**
- “A subjective lack of physical and/or mental energy that is perceived by the individual or caregiver to interfere with the usual and desired activities.”
  
  (MS Council for Clinical Practice Guidelines)

**Epidemiology**
- 75-95% of patients with MS experience fatigue.
- 50-60% of patients with MS report fatigue as one of their most troubling symptoms
  - Effects physical functioning, role performance, perceived health status, etc.
  
  (Mollaoglu, Ustun)

- Fatigue is one of the two major causes for unemployment in patients with MS.
- Fatigue in MS may result from primary factors, related to the disease itself, or may be due to secondary factors.
  - Primary Factors: Due to demyelination of the CNS
  - Secondary Factors: Sleep disturbance, Pain, Medication Use, Heat, Depression, Mental/Physical Activities, Long Incactivity, Food Ingestion, Infection, etc.
  
  (Stroud, Minahan)

**Effects of fatigue:** (Mills & Young)
- Motor (reversible)
  - Use dependent weakness, bulbar dysfunction, incoordination, tremor, loss of access to prelearned skills.
  - Can lead to symptom exacerbations. These often subside with rest periods.
- Cognitive (reversible)
  - Error-making, poor attention, nominal dysphasia, problems with memory and recall.
- Motivation & rest
  - Decreased motivation and initiation of activities, desires to rest frequently, avoids activities.
- Behavioral response
  - Rests/sleeps during the day and avoids stimulating activities that may interfere with rest.

**Interventions** (Hartley)
- Improvements in cardiovascular capacity in MS can lead to better QoL, increased physical function, and decreased depression, anger and fatigue.
- This will differ from patient to patient and should be adjusted accordingly.
- See people early to give them the support and confidence needed for success in the long term. Emphasis on minimizing the deconditioning process.

Since **common impairments** found in patients with MS include: Muscle shortening, poor balance, decreased core stability, poor posture/alignment, and disturbances in gait patterns, a comprehensive PT program will include:
- Stretching program
- Cardiovascular exercises
- Core stability exercises
- Balance work
- Strengthening
- Relaxation.

**Pharmacological Treatment:** (Pozzilli, et al.)

- Amantadine – a tricyclic amine known as an antiviral agent. Mechanism of action for fatigue is unknown, but is speculated that it has an indirect dopaminomimetic effect.
- Aminopyridines – potassium channel blockers that enhance synaptic transmission and increase muscle twitch tension.
- Aspirin – could modulate hypothalamic output affecting neuroendocrine and autonomic responses, both important in fatigue perception.
- Acetyl L-carnitine (ALCAR) – increases levels of stimulating neurotransmitters in CNS or through its cholinomimetic effect on striatum and prefrontal areas.
- Pemoline – a CNS stimulant.
- Modafinil – acts in brain areas involved in wakefulness & increasing cortical activity in the frontal lobe.
- Natalizumab- reduces leukocyte migration across the blood brain barrier, treatment resulted in a substantial reduction of both clinical and MRI signs of central inflammatory activity. Side effects may include liver damage. (Putzki, et. al.)

**Examination/Tests & Measures:** (Romani, et al.)

- **Modified Fatigue Impact Scale (MFIS)** – a self-reported 21-item questionnaire, assessing affect of fatigue on cognitive, physical & psychosocial function using a 5 point scale (0-never, 5-always) 0-84 total score. Re-evaluate patient using scale each 4-6 weeks.
- **Fatigue Severity Scale** – the patient attributes a score of 1-7 to each of nine items related to their subjective perception or fatigue and its consequences on everyday activities.
- **Fatigue Descriptive Scale** – distinguishes ‘asthenia’ (fatigue at rest), ‘fatigability’ (fatigue after exercise) and ‘worsening of symptoms with exercise.’
- **Activity Diary** – patient is asked to record quality of sleep the night before, daily activities by the hour, energy cost of each. Individuals are asked to rate level of fatigue, the importance/value of that activity (1-10), and satisfaction. Aggravating factors are also recorded.
- **6-minute walk test** – gauge walking endurance.

**Stages of MS development (based on Dal Ballo-Haas) and the impact of Fatigue**

“Severity of disease does not seem to be related to fatigue severity; that is individuals mildly affected by disease report disabling fatigue as often as more severely disabled patients.” (O’Sullivan & Schmitz)

**Early Stage:**

- Focus on education to improve adherence to an exercise program: exercisers have decreased levels of fatigue and increased energy compared to non exercisers with MS.
- Begin exercises above to prevent as much impairment as possible.
- Perform physical activity during periods of NO exacerbation.

Ex:

- **Activity Diary** – review diary weekly
- **Stress management** – in order to prevent exacerbations.
- **Vocational rehab** – Discuss about how to modify workplace or job. Make patient aware of state laws that they may benefit from.
Thermal Regulation – consume cool beverages, exercise in pool or air conditioned room, cooling vests.

Middle Stage:
- Implement adaptive equipment and energy conservation techniques.
- Begin exercise program during periods of remission.
- Continue education

Ex:
- **Energy conservation** – decrease energy costs and overall fatigue by modifying the task or the environment (ex. Scooter, wheelchair to maintain independence and save energy, improved transfer training, meal cooking preparation, efficient at cleaning & dressing, etc.)
- **Activity pacing** – balance activity & rest throughout the day. Set priorities for activities (ex. Do important and high-cost energy activities in the morning.)
- **Home Evaluation** – environmental considerations for reduced energy expenditure, safety.

Late Stage: (Mollaoglu and Ustun)
- Multi-disciplinary approach, coping with stress, and patient education about factors that increase fatigue and ways to decrease it.
- Increased emphasis on assistive devices and energy management.
- Caregiver training

Ex:
- **Family Education** – becomes more important as patient progresses into later stage.

References


Romani, A., Bergamaschi, R., Candeloro, E., Alfonsi, E., Callieco, R. & Cosi, V. Fatigue in multiple