Multiple Sclerosis Case - PT Grand Rounds

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3/27/25

Learning Objectives

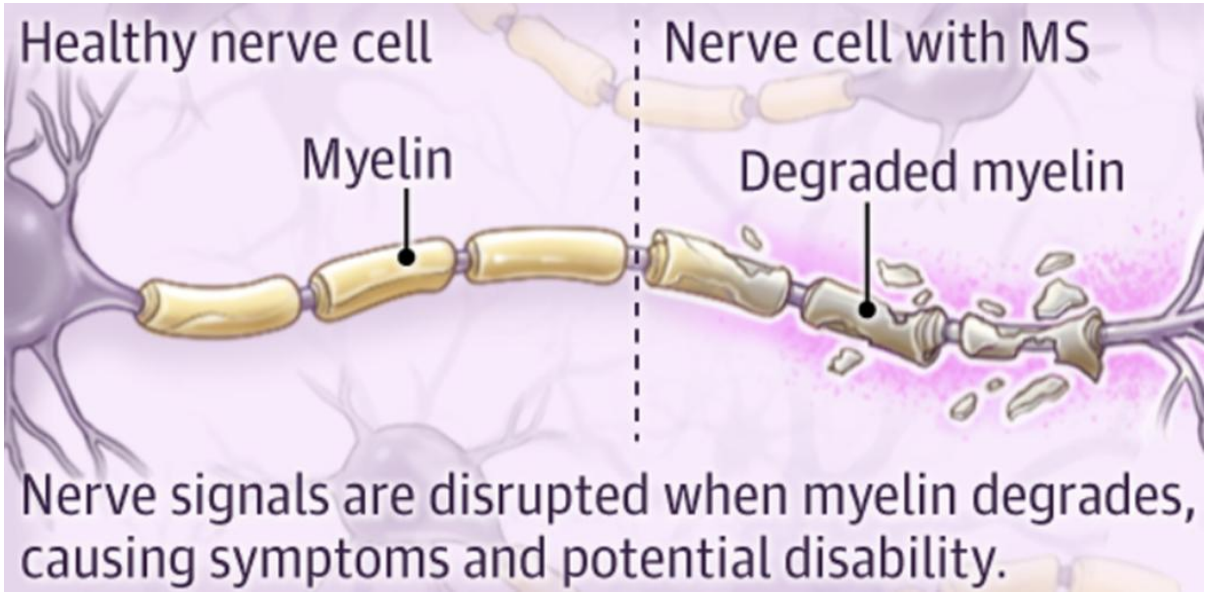
- Understand the background overview of Multiple Sclerosis (MS) including the neurodegenerative process, common symptoms, various types, etc.
- Identify components of the PT evaluation for MS
- Review PT intervention ideas related that align with the patient's deficits and goals for therapy

Case Information

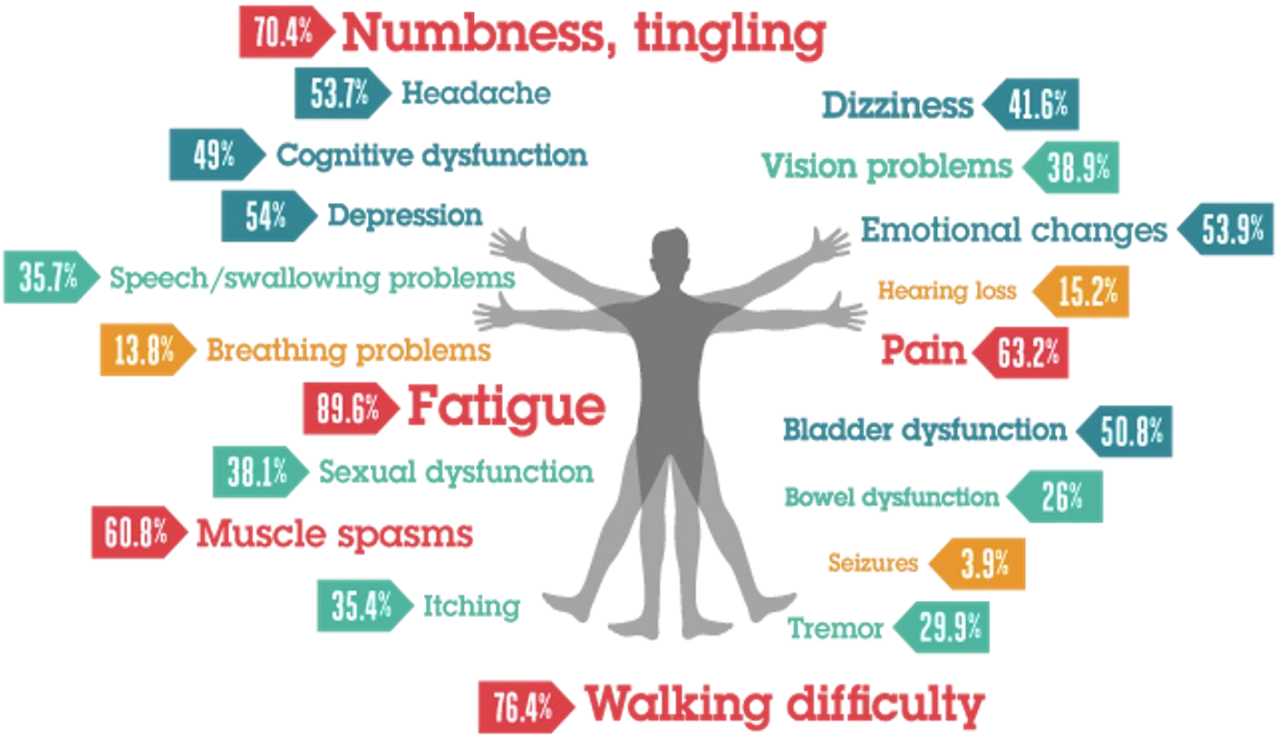
- Pt is a **25 year old male** that has been recently diagnosed with **Relapsing Remitting Multiple Sclerosis (RRMS)** from neurologist at UNC
- Referred to physical therapy d/t c/o **light sensitivity** and **knee buckling** while walking
- Currently lives with his wife and his parents
- Expanded Disability Status Scale (EDSS) level: 4

What is Multiple Sclerosis?[1]

- Chronic, inflammatory, neurodegenerative condition involving demyelination of the CNS

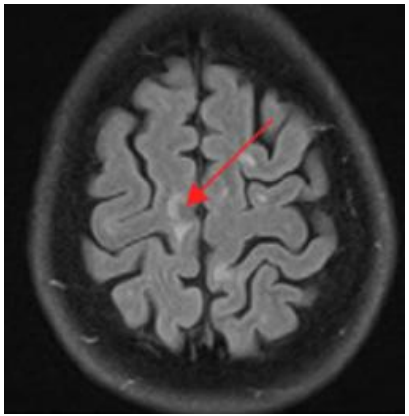


Common Symptoms of MS[1]

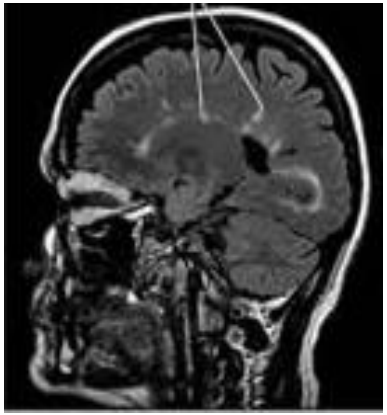


McDonald Criteria for diagnosing MS[2]

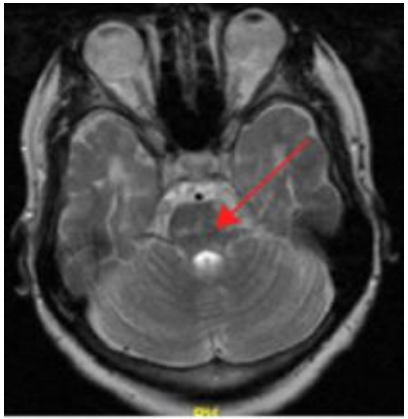
1. **Dissemination of Space**



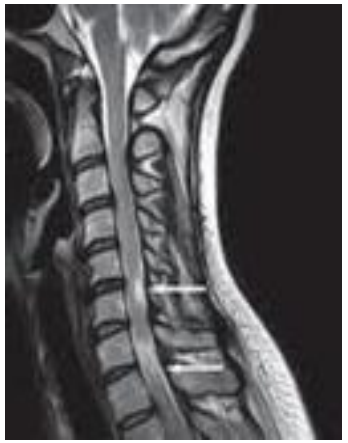
Juxta/Intracortical



Periventricular



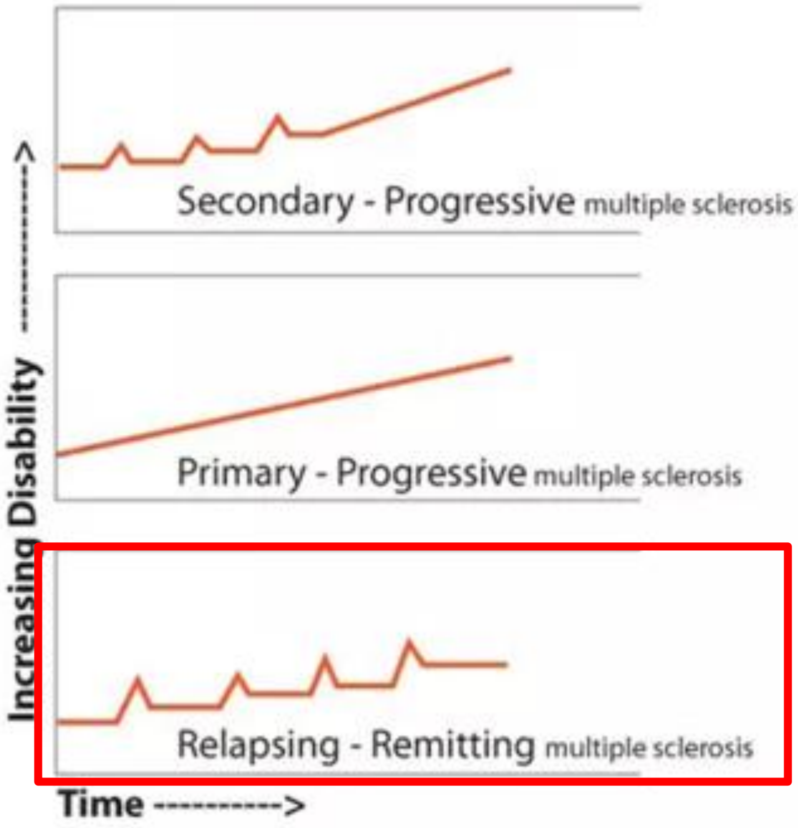
Infratentorial



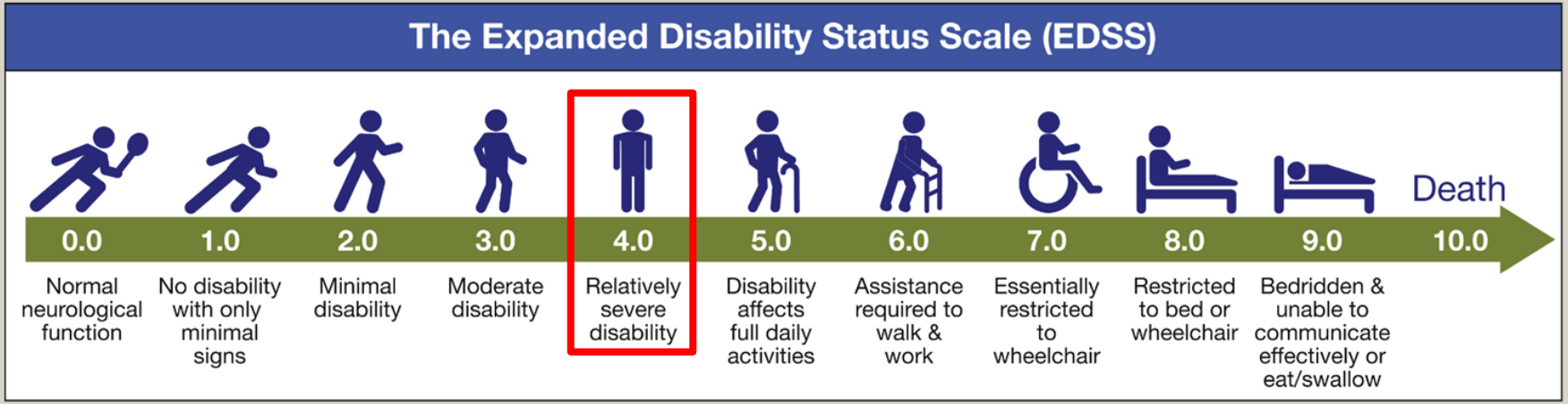
Spinal cord

2. **Dissemination of Time**
   - New lesion on follow-up MRI with reference to baseline scan

Types of MS[3,4]



Expanded Disability Status Scale (EDSS)[5]



Role of PT in outpatient neuro setting

- Evaluation
  - Strength, balance, tone/spasticity, sensation, coordination
  - Safety/level of independence and function in terms of gait, transfers, and mobility
- Treatment
  - Rehabilitation, adaptation, compensation
  - Focus on participation: household/community ambulation, transfers, work, other relevant/meaningful activities
  - Assistive devices and bracing
  - Strength, balance, endurance
  - Education

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What subjective information do we want to gather from the patient?

Evaluation: Subjective

- **PLOF**:
  - Worked outside using construction/machinery
  - Primary income for his family
- **CLOF**:
  - Unable to work → plans to file for disability
  - Recent relapsing → incr frequency of knee buckling and R hand resting tremor
  - Ambulates independently w/o a/d
  - Family doing majority of chores and "not letting him do much"
- **Home set up**: single story home, 3STE R handrail
- **Symptoms**:
  - Unable to be outside >30 minutes
  - Very fatigued
  - Concerned about knee buckling interfering with daily life
- **Falls**: denies
- **Medications**:
  - Starting disease-modifying therapy
- **No previous experience with PT or exercise**
- **Goals for PT:**
  - To get better and return to work

What would you like to evaluate for this patient?

Evaluation: Objective

- **ROM**: WFL
- **Sensation**: grossly intact
- **Spasticity**: clonus in RLE
- **Vision/Vestibular:**
  - Oculomotor ROM/smooth pursuits: normal
  - CN III: intact
  - Saccades: over/under shooting

MMT:

	LLE	**RLE**
Hip Flex	5/5	3+/5
Hip Ext	5/5	4+/5
Hip Abd	5/5	4/5
Knee Ext	5/5	3/5
Knee Flex	5/5	4/5
Ankle DF	5/5	2+/5

Evaluation: Objective

Outcome measures:

- **6MWT = 289 m** w/ 4 rest breaks
  - Norm for age/sex: 696 m[6]
- **5xSTS = 11.6 sec**
  - Norm for age: 6 sec[7]
- **10MWT = 0.72 m/s**
  - Norm for age/sex: 1.358 m/s[8]
- **FGA = 22/30**
  - Cutoff Score: ≤22/30 = risk of falls[9]
- **MFIS***

Assessment of Impairments

Fatigue: pt fatigued quickly, exacerbated by heat intolerance

- Unable to be outside > 30 minutes before “unable to walk”
- Poor endurance, required rest time between sets

Independent with bed mobility/transfers, but…

- Unable to drive
- ADLs: pt feels he could do more around the house but his family will not let him
- Gait: short step lengths B, stance time decreased on R, R knee buckling, decreased gait speed
- Balance: falls risks (FGA = 22/30) → consider fatigue

Assessment and Plan

- **Medical diagnosis:** RRMS
- **PT diagnosis:** impaired balance, decreased strength on RLE, decreased functional mobility, decreased exercise tolerance, decreased endurance
- **Prognosis**:
  - Positive: age, good family support, motivated
  - Negative: sex, chronicity of condition/diagnosis
- **Plan of Care:**
  - 2x per week for 12 weeks → also seeing OT

Where would you want to start when thinking about interventions? Any specific impairment would you want to start with?

Interventions - Patient Education

- Education regarding the disease process and outcomes for therapy, helping the patient create realistic goals, exercise recommendations
- Energy conservation strategies
  - Fatigue journal/prioritizing the more important activities first
  - Breaking down activities
  - Use of an assistive device/AFO for mobility
  - Allowing others to assist is okay
- Cooling strategies:
  - Buying a cooling vest on Amazon → was able to be outside for an hour working on car before feeling symptoms getting worse

Interventions - Resistance & Gait Training

Resistance Training

- Strengthening the R knee extensors for knee control in midstance during gait and static standing
- Completed closed chained exercises in therapy with patient completing open chain exercises at home
- Circuit style training → intensity and endurance

Gait Training/Balance training:

- Multidirectional walking with/without cognitive tasks, VOR x 1, balance system rehabilitation/habituation, walking with assistive device or GRAFO

Interventions - Vision

- CN III intact suggests the pupil is still able to constrict; therefore, able to adapt to light
- Sunglasses:
  - Reduce the tint
  - Reduce the amount of coverage provided
  - Increase the time without wearing sunglasses inside and then outside
  - Consider alternative (hat)

Physical Therapy Goals

Short Term Goals (6 weeks)

- Pt will be independent with home exercise program. **(PROGRESSING)**
- Pt will be able to demonstrate improved management in heat sensitivity symptom by reporting consistent use of cooling strategies OR less severe symptoms with increased body temperature/high environmental temperatures. **(MET)**
- Pt will be able to tolerate at least 4 hours/day of a lighter tint or less coverage sunglasses while indoors. **(PROGRESSING)**

Long Term Goals (12 weeks)

- Pt will improve RLE knee extensor strength to a 4/5 or greater MMT to decrease knee buckling during gait. **(PROGRESSING)**
- Pt will improve gait speed to > 1.2 m/s on 10MWT to demonstrate decreased risk of falls (cut off: < 1.0 m/s) and be a safe community ambulator. **(PROGRESSING)**
- Pt will be able to walk 500m (MCID: 164m) on 6MWT with LRAD to demonstrate improved functional endurance. **(PROGRESSING)**
- Pt will be able to tolerate at least 2 hours/day without the use of sunglasses


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Questions?

References

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UNC NEURO STEP UP

The Angela and Marty Rosenberg Step Up Endowment for MS and Neurodegenerative Diseases

Upcoming Events

April 16th
12:15pm
Bondurant 2076

- ★ **Interest Meeting**! Learn more about Neuro STEP-UP by chatting with Jessica, Audrey, and current scholars
- ★ Applications due in May! (DPT Lounge → 6.3 Financial Aid)

April 28th
12:15pm
Bondurant 2076

- ★ **Journal Club** hosted by Claire Gentile
- ★ Article will be sent prior to meeting