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Occupational Therapy Treatment for Patients with Multiple Sclerosis

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Learning Outcomes

After this course, participants will be able to:

- Participants will be able to identify the pathophysiology, signs, symptoms, and type of Multiple Sclerosis.
- Participants will be able to recognize occupational therapy's role in treating occupational performance deficits for patients who have Multiple Sclerosis.
- Participants will be able to identify motor learning and metacognitive strategies that can be used to guide occupational therapy treatment for patients with Multiple Sclerosis.

Multiple Sclerosis Pathophysiology

- Inflammatory disorder of the central nervous system and optic nerves (Preissner, Arbesman, & Lieberman, 2016).
- Associated with damage to myelin sheaths and the axons of nerve cells
- Myelin is a protein and lipid based insulating sheath that covers nerve fibers
  - Myelin increases the speed of action potentials as they travel through and across neurons.

Multiple Sclerosis Insidense

(Yu & Mathiowez, 2014a) (Multiple Sclerosis International Federation, 2020)

- 135 in 10,000 U.S. residents have MS
- 200 diagnosed per week
- Effects approximately 2.8 million world wide
- More common in countries further from the equator
- Most are diagnosed between 20 and 40 years old

Multiple Sclerosis Causes

(Multiple Sclerosis International Federation, 2020)

- Auto-immune disorder in which the immune system attacks myelin sheaths
- Genetic Factors
  - 2% chance of a child developing MS when a parent has MS
  - 20-30% chance of developing MS if an identical twin has the disease
  - Linked to specific genes that influence components of the immune system.
- Environmental Factors
  - Smoking
  - Epstein Barr Virus

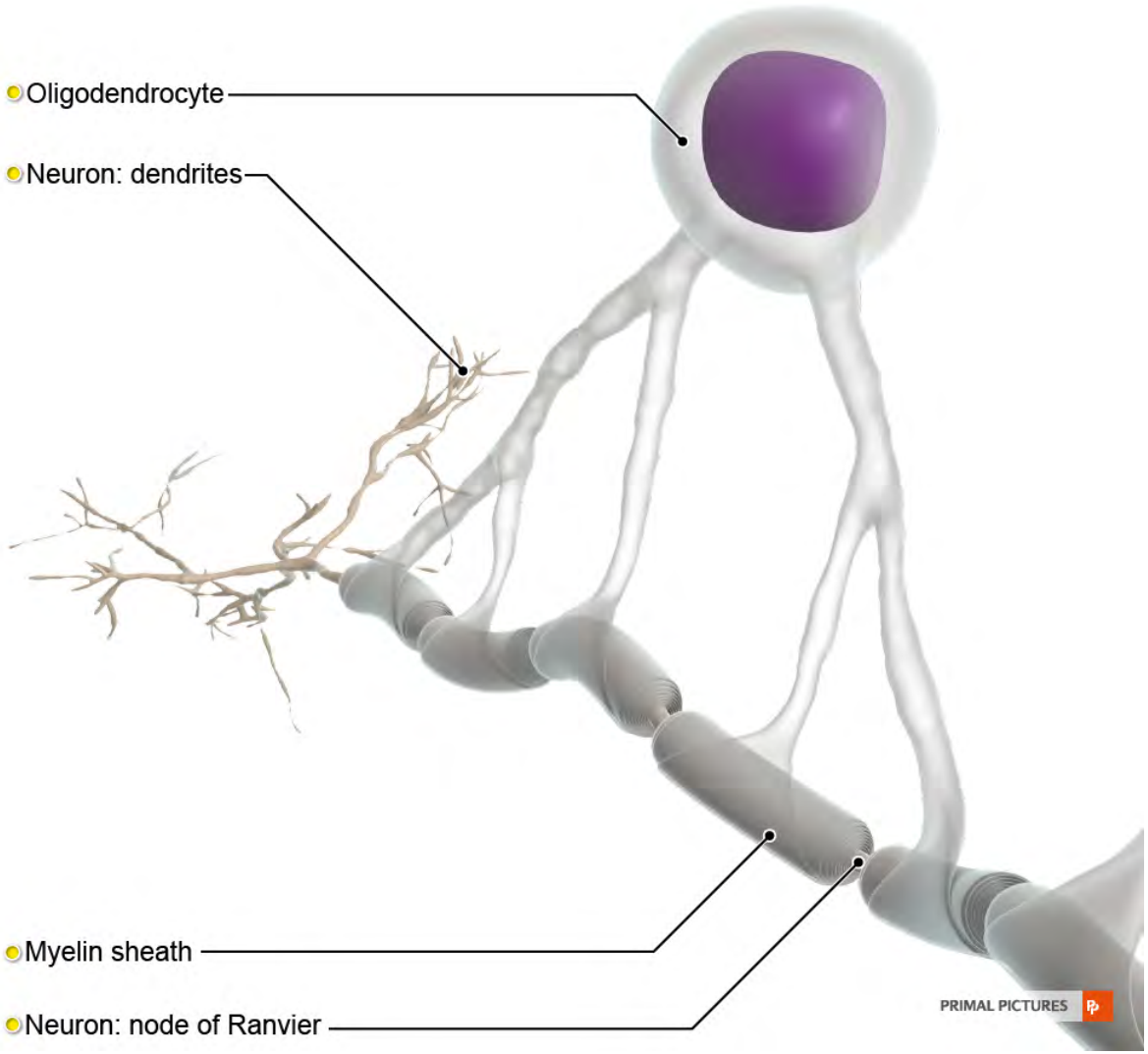
Symptoms

- Extreme Fatigue
- Weakness
- Paresthesia
- Spasticity
- Bowel and Bladder Changes
- Visual Disturbances

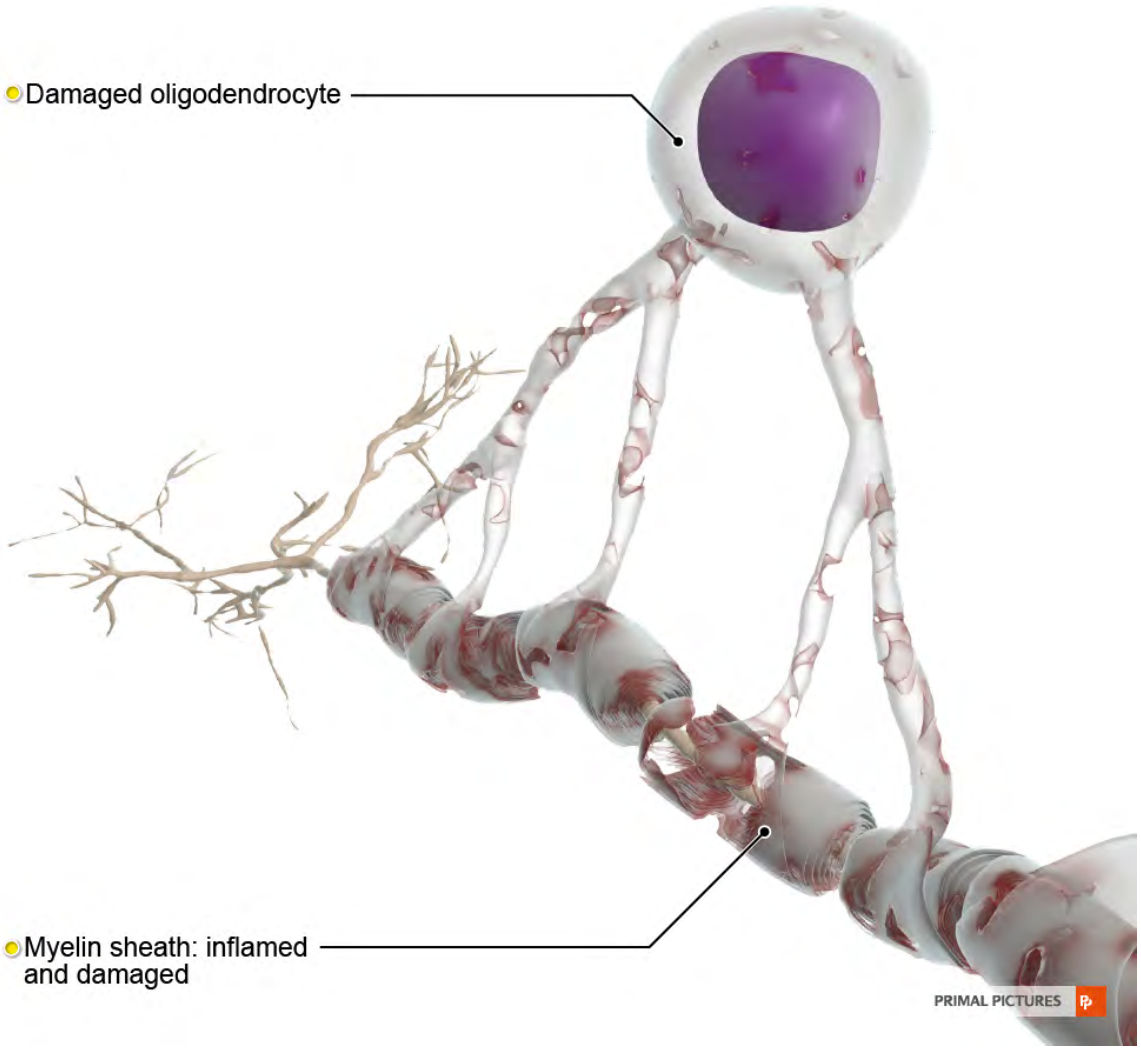
***Significant Impact on participation and performance in meaningful activities (Preissner, Arbesman, Lieberman, 2016)

Central Nervous System

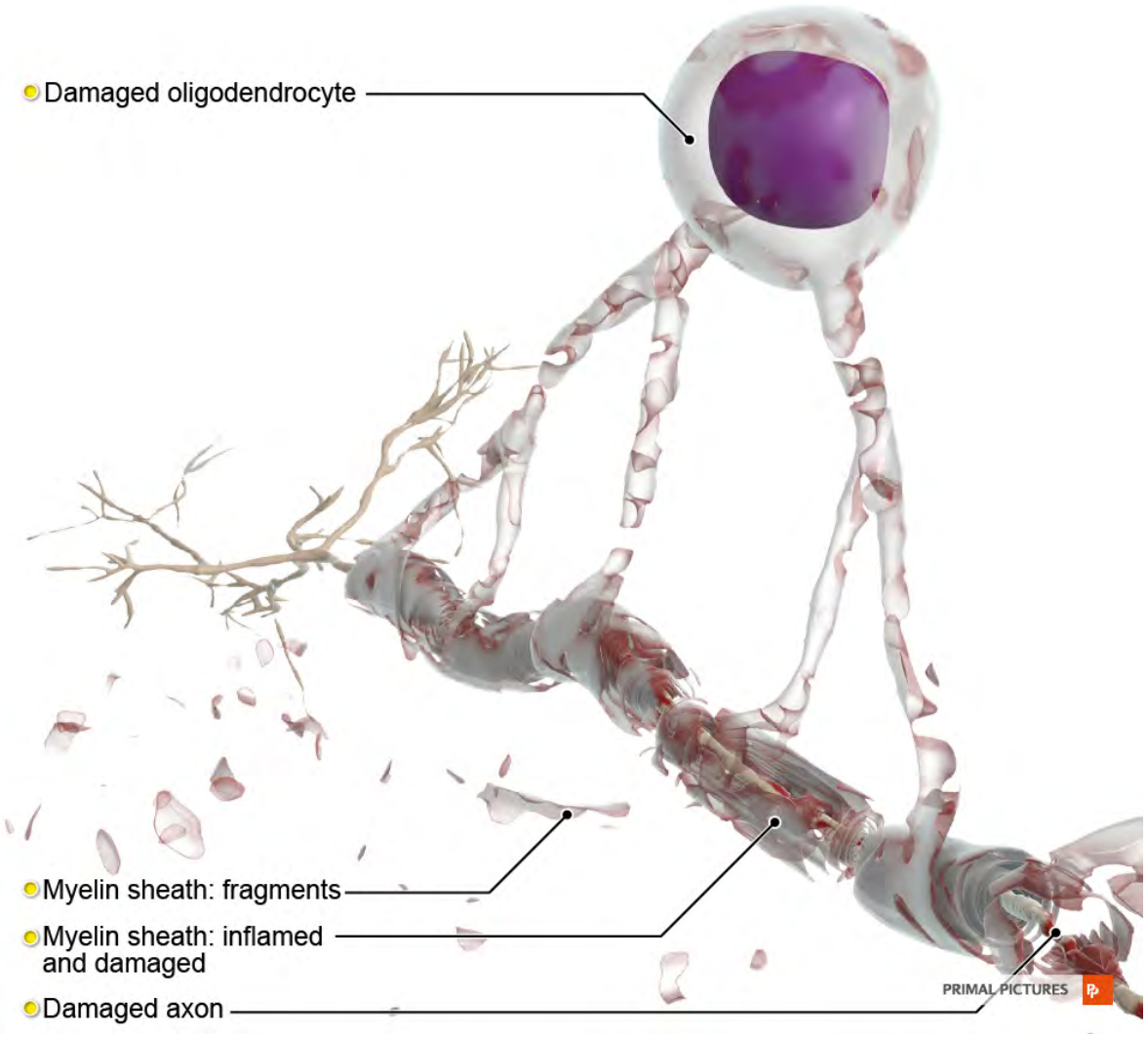
Myelin


Oligodendrocyte
Neuron: dendrites
Myelin sheath
Neuron: node of Ranvier
PRIMAL PICTURES

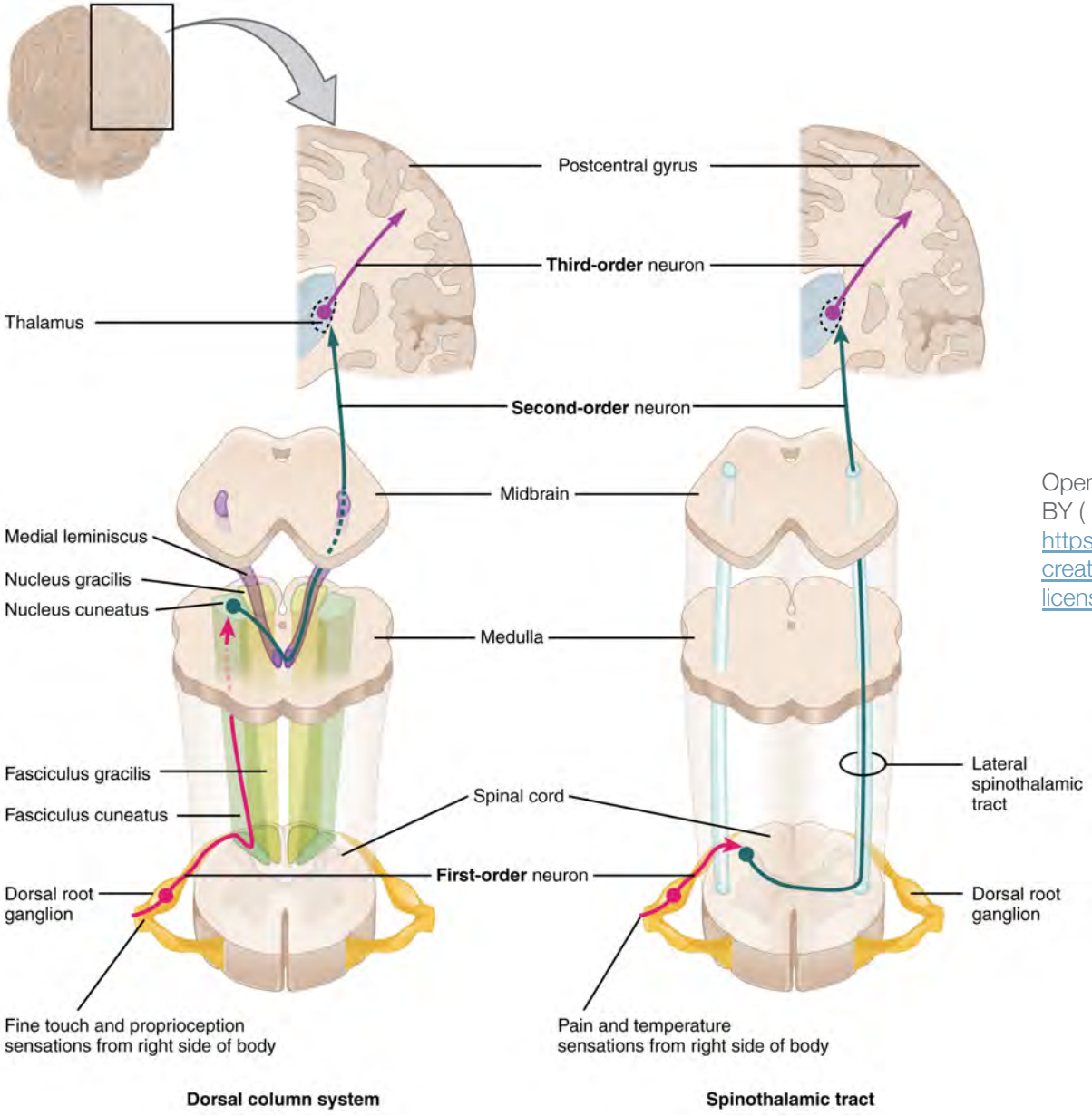
Myelin


Damaged oligodendrocyte
Myelin sheath: inflamed and damaged
PRIMAL PICTURES

Myelin


Damaged oligodendrocyte
Myelin sheath: fragments
Myelin sheath: inflamed and damaged
Damaged axon
PRIMAL PICTURES

Central Nervous System



Signs of MS - UMN

- Spasticity
  - Occurs due to lesions in the UMN of the primary motor cortex (PMC)
  - PMC is responsible for voluntary and purposeful excitation and inhibition of LMN –resulting in coordinated muscled contractions and functional movement
  - Degeneration of neurons in the PMC causes loss of control of LMN
  - Causes difficulty with ambulation, ADL, and IADL (Ashworth, Satkunam, & Deforge, 2006).

Modified Ashworth Scale

- 0 – No Increase in muscle tone
- 1 – Slight increase in muscle tone, manifested by a catch or by minimal resistance at the end of the range of motion (ROM), when the affected part(s) is moved in flexion or extension.
- 1+ – Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of the ROM.
- 2 – More marked increase in muscle tone through most of the ROM, but affected part(s) are easily moved
- 3 – Considerable increase in muscle tone and passive movement is difficult
- 4 – Affected part(s) are rigid in flexion or extension
- 9 – Unable to test

Types of Multiple Sclerosis

(NationalMSSociety.org)

- Relapsing Remitting MS
  - Unpredictable
  - Attacks followed by periods of remission
- Primary Progressive MS
  - Steady and ongoing deterioration of function
- Secondary Progressive MS
  - Initial relapsing remitting followed by primary progressive.
- Progressive-Relapsing MS
  - Periods of acute attacks followed by steady decline in function

Diagnosis

- McDonald Criteria
  - Combination of Magnetic Resonance Imaging (MRI) scans in conjunction with clinical evaluation.
    - Evidence of damage to the CNS and optic nerves
      - Damage occurs at different times
      - Damage on two or more parts of the CNS and or optic nerves

Efficacy of Activity and Participation Based Interventions (Yu & Mathiowetz, 2014a)

- Systematic Review
- Activity and participation based interventions not specific to the discipline of occupational therapy
- Many articles focused on multi-disciplinary care in various rehab settings

Efficacy of Activity and Participation Based Interventions (Yu & Mathiowetz, 2014a)

- Moderate to strong evidence for rehabilitation programs improving:
  - Motor function
  - Self perceived quality of life
  - MS related disability
  - Mobility
  - Transfers
  - Arm and hand dexterity
  - Balance
  - Walking speed
  - Fatigue management

Efficacy of Activity and Participation Based Interventions (Yu & Mathiowetz, 2014a)

- More research is needed to determine the dose age, intensity, and length of benefit of the various interventions
- The studies were inconclusive of the contribution of OT services on the outcomes.
  - Most studies were multi-disciplinary
  - However, the researchers found strong evidence for fatigue management courses as an intervention, which is well within the OT scope of practice.

Efficacy of OT Interventions Focused on Client Factors (Yu & Mathiowetz, 2014b)

- Systematic Review
- Interventions aimed at the impairment level (i.e., client factors and performance skills)
- Interventions were broken down into studies focused on:
  - Mental Functions (including cognition)
  - Emotional Regulation
  - Motor and Praxis Skills (including exercise)
  - Motor Training

Efficacy of OT Interventions Focused on Client Factors (Yu & Mathiowetz, 2014b)

- Moderate evidence from high quality studies supports the effectiveness of computerized cognitive training programs
- Moderate evidence from medium quality studies supports the effectiveness of memory training
  - Self generated recall strategies
- Strong evidence from high quality studies for interventions targeting emotional regulation
  - Cognitive Behavioral Therapy

Efficacy of OT Interventions Focused on Client Factors (Yu & Mathiowetz, 2014b)

- Strong Evidence from high quality studies supports physical activity and yoga
  - High intensity training three times a week was recommended
- Aerobic exercise can include leg cycling, treadmill walking, and aquatic exercise
- Yoga was found to be beneficial for improving balance and selective attention ability

Efficacy of OT Interventions Focused on Client Factors (Yu & Mathiowetz, 2014b)

- Conclusions
  - Few studies had OTs as part of the research team
  - OTs should make use of metacognitive strategies to improve performance.
  - Tele-medicine programs should be used as an extension of cognitive training
  - Group CBT based interventions can improve depression and self-efficacy
  - Exercise interventions can improve endurance

Efficacy of Exercise

(Bjarnadottir, Konradsdottir, Reynisdottir, & Olafsson, 2007)

- Randomized Control Study
- Effect of aerobic and strength exercise on physical fitness and quality of life in patients with mild MS (EDSS<4; ability to walk 500 m without an aide)
- Expanded Disability Status Scale (0 no impairment 10 is death due to MS)
- Exercise Group:
  - 60 minutes of exercise, three times a week, for 5 weeks, totaling 15 hours.
  - Monark Cycle Ergometer – 3 minutes at 33% peak oxygen uptake (VO2peak)
  - 15-20 minutes at 55% of VO2 peak)
  - Resistance exercise involving major muscle groups

Efficacy of Exercise

(Bjarnadottir, Konradsdottir, Reynisdottir, & Olafsson, 2007)

- Control Group: No exercise
- Results:
  - Exercise group:
    - 14.7% increase in VO2 peak
    - 18.2% increase peak work load
    - 27.3% increase in anaerobic threshold
    - Decrease in BORG rating for exercise from 17.2 to 17.0
    - Tendency towards improved quality of life (not significant), on the SF-36
  - Control Group:
    - No significant change

Efficacy of Exercise

(Bjarnadottir, Konradsdottir, Reynisdottir, & Olafsson, 2007)

- The study showed no negative effects of exercise in the participants, although, there is concern that intensive exercise in patients with more severe MS (>6 on the EDSS).
- What if exercise was replaced with strategies to improve participation and performance with meaningful activities, including socialization and community based activities?
  - Increased aerobic capacity?
  - Increased quality of life?

Cognitive Impairments in Patients with MS

- Patients with MS require significantly more time to learn tasks through verbal instructions (DeLuca, Barbieri-Berger, & Johnson,1994)
- Patients living with MS have difficulty with decision making in situations that involve risk and ambiguous information, demonstrating risk aversive behavior and longer deliberation times (Neuhaus, Calabrese, & Annoni, 2018).
- Learning and incorporating new and novel tasks into a daily routine can be difficult for patients with MS

Cognitive Impairments in Patients with MS

- Goal discrepancy and loss of function can lead to negative thoughts and depressive rumination (Watkins & Noelen-Hoeksema, 2014).
- Emotional state can alter decision making and ability to process information and learn from it
  - Anxiety
  - Sadness or Anger
  - Pessimism

Cognitive Orientation to Daily Occupational Performance

(CO-OP) (McEwen, Mandich, & Palatajko, 2018)

- Cognitive Strategies focused on performance
  - Does not focus on addressing specific cognitive impairment
- Client centered
- Performance Based
- Strategies are developed by the patient
- OTs role is that of a coach
  - Non-prescriptive with assigning strategies
  - Guide the patient as they discover solutions to solve performance deficits

Cognitive Orientation to Daily Occupational Performance (CO-OP)

- Goal-Plan-Do-Check is used to optimize self-identified strategies
- Assessments used in CO-OP
  - Activity Card Sort
  - Canadian Occupational Performance Measure (COPM) (Dedding, Cardol, Eyssen, Isaline C.J.M., & Beelen, 2004)
  - Performance Quality Rating Scale

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- 49 y/o female
- Diagnosed with MS 9 years ago
- Inpatient rehab stay after 3 days of acute care due to an MS exacerbation
- Clinical Information from chart review
  - Increased difficulty flexing hip and dorsi-flexion
  - Significant difficulty walking that worsened over 3 days
  - Increasing fatigue

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- OT Assessment
  - Informal Interview
  - Canadian Occupational Performance Measure
  - Lives in a single story home with 19 y/o daughter and husband
  - Alone for most of the day
  - Unemployed and on disability
  - Previously worked as a paralegal
  - Prior to MS exacerbation, patient was independent with self care and shared household management activities with husband and daughter.
  - Increasing fatigue, limiting ADL/IADL performance

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- COPM Results
  - Most important activities (in order)

Activity	Performance	Satisfaction
Toilet Transfers	2	1
Dressing	3	2
Meal Preparation	4	3
Bathing	5	3
Returning to Yoga Class	1	2

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

Activity	FIM Score
Eating	4
Grooming	4
Bathing	3
UB Dressing	4
LB Dressing	2
Toileting	3
Toilet Transfers	2
Tub Transfers	2

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- Assessment of Motor and Process Skills (AMPS)
  - Two Activities Chosen
    - Making a grilled cheese sandwich
    - Washing Dishes
  - Findings
    - Safety
    - Physical Assistance
    - Difficulty stabilizing her body
    - Difficulty reaching, grasping, and lifting tools and supplies
    - Difficulty transporting task objects
    - Decreased Endurance

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- Occupational Therapy Interventions
  - Basic ADL (toilet transfer, dressing, bathing)
    - OPTIMIZE POSITIONING OF THE BODY: sit versus stand
    - SIMPLIFY ACTIITIES: Choosing clothing the night before, having tools and supplies organized, use of a bedside commode or urinal to save energy
    - USE OF APPROPRIATE ASSISTIVE DEVICES: sock aides, reacher, tub seats, commode.
    - REST BEFORE BECOMING FATIGUED
      - Bank energy – build in rest breaks prior to participation
      - MS patients have difficulty recovering from over-fatigue

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- Occupational Therapy Interventions
  - Yoga Class
    - Patient described various yoga poses to the therapist
    - Analyze and modify poses, given the patient's current level of function.
    - Practice of modified poses
    - Development of a home program of progressive modified poses
    - Use of fatigue management strategies
    - Progress back to attending yoga class

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

- Occupational Therapy Interventions
  - Emotional Regulation
    - Positive imagery
    - Meditation
    - Positive Self Talk
    - Plan and prioritize activities
    - Utilize social support

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

Occupational Therapy Outcomes

Activity	FIM Score EVAL	Discharge
Eating	4	7
Grooming	4	7
Bathing	3	4
UB Dressing	4	5
LB Dressing	2	5
Toileting	3	6
Toilet Transfers	2	6
Tub Transfers	2	4

CASE STUDY (Preissner, Arbesman, Lieberman, 2016)

Occupational Therapy Outcomes

Activity	Performance Eval	Satisfaction Eval	Performance D/C	Satisfaction D/C
Toilet Transfers	2	1	8	8
Dressing	3	2	7	8
Meal Preparation	4	3	6	7
Bathing	5	3	6	6
Returning to Yoga Class	1	2	4	4

References

Ashworth, N. L., Satkunam, L. E., & Deforge, D. (2006). *Treatment for spasticity in amyotrophic lateral sclerosis/motor neuron disease*. Oxford, U.K.] ;: Wiley. doi: 10.1002/14651858.CD004156.pub3

Bjarnadottir, O. H., Konradsdottir, A. D., Reynisdottir, K., & Olafsson, E. (2007). *Multiple sclerosis and brief moderate exercise. A randomized study*. Houndmills, Basingstoke, Hampshire, UK] : Stockton Press. doi:10.1177/1352458506073780

Dedding, C., Cardol, M., Eyssen, Isaline C. J. M., & Beelen, A. (2004). *Validity of the canadian occupational performance measure: A client-centered outcome measurement*. London] : Edward Arnold Pub. doi:10.1191/0269215504cr746oa

DeLuca, J., Barbieri-Berger, S., & Johnson, S. K. (1994). The nature of memory impairments in multiple sclerosis: Acquisition versus retrieval. *Journal of Clinical and Experimental Neuropsychology, 16*(2), 183-189. doi:10.1080/01688639408402629

Multiple Sclerosis International Federation. (2020). Retrieved from http://www.msif.org

National Multiple Sclerosis Society. (2020). Retrieved from http://www.nationalmssociety.org

References

McEwen, S., Mandich, A & Palatajko, H (2018) Chapter 19.CO-OP Approach: A cognitive -based intervention for children and adults. In N. Katz & Toglia, J. (Ed.), *Cognition, occupation, and participation across the lifespan: Neuroscience, neurorehabilitation and models of intervention in occupational therapy (4rd ed.).* 315-351. Bethesda, MD: AOTA Press

Neuhaus, M., Calabrese, P., & Annoni, J. (2018). Decision-making in multiple sclerosis patients: A systematic review. *Multiple Sclerosis International, 2018*, 7835952-9. doi:10.1155/2018/7835952

Preissner, K., Arbesman, M., & Lieberman, D. (2016). *Occupational therapy interventions for adults with multiple sclerosis*. Boston : Published for the American Occupational Therapy Association by the AJOT Pub Co. doi:10.5014/ajot.2016.703001

Watkins, E. R., & Nolen-Hoeksema, S. (2014). *A habit-goal framework of depressive rumination*. Washington, D.C. : American Psychological Association. doi:10.1037/a0035540

Yu, C., & Mathiowetz, V. (2014a). *Systematic review of occupational therapy-related interventions for people with multiple sclerosis: Part 1. activity and participation*. Boston : Published for the American Occupational Therapy Association by the AJOT Pub Co. doi:10.5014/ajot.2014.008672

Yu, C., & Mathiowetz, V. (2014b). *Systematic review of occupational therapy-related interventions for people with multiple sclerosis: Part 2. impairment*. Boston : Published for the American Occupational Therapy Association by the AJOT Pub Co. doi:10.5014/ajot.2014.008680

Questions?

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